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Attrition from Military and Civilian Jobs: Insights from the National Longitudinal Surveys

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1979. It concludes that attrition rates in the military can be reduced by increasing military wages, particularly in the lower rungs of the pay ladder, matching job requirements with education levels and increasing job satisfaction in the Military Occupational Specialties of the sepearates. *key words*

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Technical Report 638

Attrition from Military and Civilian Jobs: Insights from the National Longitudinal Surveys

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FOREWORD

The Management and Personnel Policy Research Group of the Army Research Institute (ARI) conducts research in the economic aspects of manpower, personnel, and training issues of particular significance to the U.S. Army. Retaining the desired quality and quantity of enlisted personnel is an issue of continuing concern to the Army. The unscheduled, permanent separation of enlisted personnel prior to completion of their first term of service is of particular concern. Specifically, the Army must understand more precisely the effects of certain factors such as civilian earnings, military pay, education, race, AFQT score, and other socio economic variables on attrition. This report was prepared as part of ARI's continuing support for the Office of the Deputy Chief of Staff for Personnel.

The research presented in this report identifies and quantifies several of the factors thought to affect attrition and contributes to the ongoing theoretical and empirical discussion of military manpower modeling.



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ATTRITION FROM MILITARY AND CIVILIAN JOBS: INSIGHTS FROM THE NATIONAL
LONGITUDINAL SURVEYS

EXECUTIVE SUMMARY

Requirement:

The US Army Research Institute conducts research on manpower, personnel, and training issues of particular significance and interest to the U.S. Army. The economic costs of attrition can be substantial as they represent a loss of human capital. In addition, it makes the recruiting effort all the more difficult as the Army faces increased competition from the private sector for a declining pool of trained manpower. The author has examined civilian and military pay as well as behavioral variables that can affect first-term attrition and, in turn, impact on the long-term readiness of an experienced Army.

Procedure:

The authors develop an interdisciplinary model of attrition in which separation from the military is explained in terms of servicemen's education, educational backgrounds of their parents, job satisfaction, type of military occupational speciality prior to separation, and other factors such as pay, benefits, desire to continue education, obtaining a better civilian job, and servicemen's locus of self control. Multiple regression equations are used to estimate attrition as a function of the aforementioned predictor variables.

Findings:

The results reveal that the probability of quitting increases with a decrease in wages, with a decrease in job satisfaction, and with an increase in perceived locus of control.

Utilization of Findings:

The research shows that attrition rates can be reduced primarily by increasing military pay and job satisfaction. The locus of control that a serviceman perceives is also quite significant.

ATTRITION FROM MILITARY AND CIVILIAN JOBS: INSIGHTS FROM THE NATIONAL
LONGITUDINAL SURVEYS

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Since the advent of the AVF (All Volunteer Force), the U.S. military services have newly encountered a phenomenon long and widely experienced by civilian employers, namely the voluntary job separation by an employee. This is not to ignore the behaviors of desertion or being AWOL with which the services have considerable historical experience. Rather it is to highlight and focus upon the problem of attrition--i.e., the unscheduled permanent separation of (substantial numbers of) enlisted personnel prior to completion of the contractual obligation of their first term of service. Although the magnitude of attrition has varied over the past decade and among the several branches of military service, it continues to be sufficiently extensive (i.e., in the neighborhood of 30-40%) to warrant the ongoing research programs in several locations. (See, for example, Blandin and Morris 1981, Buddin 1981, GAO 1979, Warner 1981.)

This report is an initial effort at drawing together analyses of job quitting behavior by young men in the civilian and military sectors as a basis for policy guidance to personnel managers in the military services. It is important for these managers to understand the causes of attrition if they are to formulate and implement policies to minimize its occurrence and impact. Clearly, from the vantage point of those charged with the responsibility of managing the human resources of the military services, attrition is a problem.¹ It is a problem because it represents increased costs (of training and recruiting) without commensurate increases in defense preparedness, efficiency of the armed forces, size of armed forces or other "benefits" against which costs must be balanced. The severity of the problem has been intensified by the demographic facts facing these managers, namely a diminished potential pool of young men and women from whom to draw enlistees

which will continue into the 1990s due to the decline in the national birth rate in the 1960s and 1970s.

While there are doubtless many similarities between military employment in the regime of an AVF and civilian employment, it is also important to be mindful of the differences. Assuming that he is eligible, a young man might opt to "work" for the Army, Navy, Air Force, Marines or a particular civilian employer because of the wages, nonwage fringe benefits, employment security, training options and/or job satisfaction that he expects to derive from doing so. Rarely, however, is patriotism a motive underlying the choice of a civilian job.² It is likewise rare for a specific time period of employment to be stipulated in a written contract when a youth enters a civilian job, in contrast to enlisting in one of the armed forces. While temporary jobs may have well-specified termination dates, this is seldom either a matter of written contract or for durations as long as four years. Finally, it is hardly typical of civilian employment that one lives 24 hours per day, 7 days per week with one's co-workers and supervisors as is characteristic of the first term of service in a branch of the military. Thus, while policy makers should be attentive to research based on behavior of youth in civilian labor markets and analogies therefrom to the military context, the singularities of the latter should not be overlooked. To that end, the continuing research program within the several armed services should be encouraged. (See Allen and Bell 1980, Blandin and Morris 1981, Buddin 1981, Haber 1975, Luckman and Warner 1977, and Warner 1981.)

With the foregoing in mind, this report utilizes data drawn from two surveys of nationally representative samples of young men that are part of the

National Longitudinal Surveys.³ The first data set began to be collected in 1966 and was based on a sample of 5,225 young men selected to be representative of the approximately 16 million males in the U.S. civilian noninstitutionalized population who in 1966 were between the ages of 14 and 24. Most of the panel was surveyed periodically for 15 years.⁴ The second set of data is derived from annual interviews begun in 1979 with a panel of 12,700 youth selected to be representative of the more than 35 million males and females in the U.S. noninstitutionalized population who in 1979 were between the ages of 14 and 21. Unlike the earlier NLS data, the second set permits examination of the behavior and attitude of young persons in the military sector of the society, but currently contains a much briefer span of longitudinal information.⁵

I. Theoretical Frameworks and Issues

There are several respectable theoretical traditions in economics which may be drawn upon to serve as a foundation for an empirical investigation of job mobility by young men. (For reviews see Lippman and McCall 1976, Parnes 1970 and Parsons 1977.) First of all, there is the well-established model of neoclassical, competitive microeconomics in which workers are motivated to move (between employers, occupations or geographic locations) exclusively (or at least primarily) by the existence of wage differentials. Thus, voluntary job changes serve as an equilibrating mechanism which reallocates labor resources in the society in the direction of greater economic efficiency. Modern versions of this theoretical paradigm also incorporate nonwage, pecuniary forms of compensation as motivators of job movement. (See Ehrenberg and Smith 1982.)

Closely allied to this neoclassical microeconomic approach is the human capital theory framework in which the mobility decisions and behavior of workers are conceptualized as the actions of investors. That is, the decision to change jobs (employers) is viewed as an action involving current costs (in the opportunity cost sense of foregoing something) and future benefits. Thus, voluntarily quitting a job would be analyzed as deciding that the present discounted value of the benefits accompanying a new job outweighs the cost of giving up the current job.

Amplifying the preceding are the insights derived from the still-young economic theories of search behavior as applied to labor markets. (See Barron and McCafferty 1977, Black 1980, Burdett 1978, Lippman and McCall 1976, and Parsons 1977.) While emanating from theoretical efforts to explain the macroeconomic relationships between the rate of inflation and the aggregate unemployment rate, the approach focuses on the probabilistic (stochastic) character of individual job-related choices in the context of an explicitly uncertain world. It thereby makes possible the interpretation of behavior in terms of perceptions of reality and the acknowledgement of the likelihood of "erroneous" decisions even in a world of presumed rationality.

Complementing (and challenging) the foregoing conceptualizations is the group of "institutionalist" schools of labor market analysis that explicitly recognize the role of nonpecuniary factors in stimulating and facilitating job movement by workers. Indeed, worker mobility is a central issue in the ongoing development of the segmented-labor-market analyses, whether derived from a socio-psychological (Mobley et al. 1979) or a radical (Edwards et al. 1975) perspective. (See also Cain 1976.)

In view of its recency as a phenomenon, it is not surprising that voluntary departure from a military job prior to completing the initial enlistment obligation has not been the subject of comprehensive, rigorous theorizing. The vast majority of the research and writing on the topic has been very pragmatic and has been based on reasoning by analogy from the conceptual models built to explain behavior in civilian employment situations. Because of the training, expertise and orientation of most professionals who have focused on the military attrition issue, there has been a decided emphasis on psycho-sociological explanations of attrition rather than economic ones.

As I have claimed before (Kohen 1977), my preferred conceptual framework is an eclectic one, acknowledging that each of those theoretical paradigms can contribute to an understanding of the voluntary job mobility of young men. While the exclusive focus on voluntary job separations would seem to be natural and in order, it is not without complications. Starting with departures from civilian jobs, a widely cited economist has pointed to the importance of distinguishing " . . . between the role of events outside the control of the individual and the role of his response to his economic environment" (Hall 1972, p. 709). At the same time, another labor market economist cites "End of temporary job" as an example of an involuntary separation and "Quit because of health or disability" as a voluntary separation (Gilroy 1973). If a job is known to an applicant to be inherently temporary and is accepted with that knowledge, leaving that job at its completion cannot unambiguously be classified as involuntary. Likewise, the onset of a health impairment which occasions a worker quitting his job is

hardly a manifestation of the same degree of volition as, say, quitting a job because of a "personality clash" with one's supervisor or because of finding a job paying higher wages.

Altering the focus to separations from military enlistment introduces additional complications in the voluntary/involuntary distinction. First, the Interservice Separation Codes do not lend themselves to unambiguous categorization into the dichotomy. Second, there is considerable, albeit anecdotal, evidence that numerous enlistees learn rather quickly that the most expeditious method of gaining (voluntary) separation from military service may be to behave (perform) in a manner that will "earn" a (involuntary) discharge. Apparently it is recognition of these problems that has led virtually all researchers of the military attrition phenomenon to disregard entirely the matter of voluntariness.

II. An Eclectic Conceptual Model

In general terms the model to be used in this study presumes that the likelihood of a young man voluntarily separating from his employer is the result of an interplay between his propensity to leave and his opportunities for doing so. Both the propensity and the set of opportunities are, in turn, dependent upon characteristics of the individual worker, characteristics of the job that he holds, and characteristics of the labor market(s) in which he supplies his services.

One personal characteristic widely hypothesized to influence a young man's propensity to move is the length of time he has served with his current employer--i.e., his job tenure (Blau and Kahn 1981, Kohan 1977, Kohan and Andriani 1973). A first reason that tenure and the propensity to quit should

be expected to be inversely related is that longer service provides protection against involuntary termination (layoff) and frequently indicates a buildup of rights to certain nonwage forms of compensation (e.g., vacation time or paid sick leave). Second, it seems intuitively reasonable that the passage of time serves to strengthen the psychological and social bonds to a particular work place. From the standpoint of the relationship between job tenure and opportunities, it can be argued that increasing length of service with an employer is immobilizing because it represents a growth of job-specific skills which, by definition, are not transferable to other firms.

Other personal characteristics that are expected to affect the propensity to quit and the opportunity to do so successfully are various measures of the human capital (skills) embodied in a worker. Thus, on the one hand, it may be argued that chronological age could inhibit a young man's propensity to quit by reducing the length of time over which the payoff to the job switch will be received. On the other hand, it seems reasonable to expect that typical employer preferences along with prevailing child labor laws would make quitting less risky when a youth is in his twenties than when he is a teenager. Nonetheless, aversion to risk is itself probably directly related to age.

Another personal characteristic usually thought to represent skill level is the amount of formal schooling completed, but it too has an ambiguous theoretical impact on the likelihood of a voluntary job separation. Although more education enhances a young man's attractiveness to other employers, it also may represent greater skill in having selected his current job and greater costs of job search in the form of foregone earnings. Alternatively,

the relationship between educational attainment may be nonmonotonic, as suggested by some proponents of segmented labor market theory, and voluntary quits should be expected to be more prevalent among both the very well educated and the very poorly educated.

Emanating from the socio-psychological approaches to employee turnover (e.g., Mobley et al. 1979) is the set of affective personal characteristics (i.e., attitudes) often hypothesized to be proxies for what is called above the propensity to quit. Probably the most often cited is some indicator of global job satisfaction usually measured by the worker's self-reported position on an ordinal scale. The supposition, of course, is that level of satisfaction and propensity to quit are inversely related and that, therefore, the former is also inversely related to actual quit behavior. Another psychological attribute which might be expected to influence quit behavior is a young man's perceived locus of control. All other things equal, a youth who is strongly inner directed (i.e., feels that he is in control of his own destiny) would be expected to have a higher propensity to leave an employer in pursuit of self improvement.

Finally, a young man's race and socio-economic status may affect both his propensity and opportunity to separate from an employer voluntarily. Despite the proliferation of laws and judicial decisions along with some changes in societal mores, hiring preferences of employers doubtless still favor whites and those from middle (or higher) socio-economic families. Second, the perception of labor market discrimination according to race and/or social class (irrespective of the accuracy of the perception) may serve to reduce the proclivity of young blacks and other economically disadvantaged youth to quit their jobs, other things being the same.

All in all, there is no reason to suppose that the hypothesized personal determinants of the probability of a young man quitting his job would operate differently in the case of military enlistees than in the case of civilian employees. Indeed, the conceptual model would seem capable of application to the behavior of re-enlistment after completing a term of service as well as to the behavior of completing the initial enlistment term. It is important to note, however, that the policy implications for military personnel managers of the various personal attribute effects are not uniform. Those which are demographic and/or not subject to alteration while in military service still have policy relevance insofar as they can serve as screening variables in the recruitment of enlistees. By contrast, those which are alterable (e.g., attitudes) while the young man is enlisted may carry policy implications for the organization and structure of the contemporary military life style, to the extent that there is documentary evidence of how those attitudes get formed and/or modified.

In addition to the personal traits of a young man, the context in which he is located should be expected to influence the likelihood of his voluntarily leaving the job. First, there are characteristics of the specific job such as (1) whether the wages and working conditions are determined by a collectively bargained agreement, (2) the specific occupation, especially insofar as the occupational assignment is congruent with the worker's education, training and interests, and (3) the wage rate.

The logic of lowered quit rates in unionized settings is simply that the propensity to quit is reduced where workers have a direct means to voice their discontent to management and to have disputes adjudicated in a democratic fashion, ceteris paribus. The hypothesized effect on the propensity to quit of incongruence between the occupational assignment and aptitudes or interest of a young man should be self-evident--i.e., incongruence raises the propensity. Finally, wages should be expected, all other things being equal, to be inversely related to the probability of quitting because the wage represents the cost of job search and/or the reservation wage.

A second set of contextual features of relevance to a young man voluntarily separating from a civilian job would refer to the labor market(s) in which he supplies labor. Thus, the "tightness" of the general labor market should affect both a worker's propensity to quit by influencing his estimate of the availability of alternative jobs and by influencing his "true" opportunities to move. Thus, all things the same, higher quit rates should have characterized the middle 1970s rather than the early 1980s. The hypothetical effect of a local area unemployment rate is somewhat more ambiguous. On the one hand, young men in localities with high unemployment rates surely face fewer opportunities to change jobs and, therefore, may be more reticent to consider quitting. On the other hand, young men in these contexts may have relatively greater incentives than those in tight local labor markets to leave the area which almost inevitably implies a change of employers.

Application of these environmental variables to a model of military attrition is somewhat more problematic than was the case for the personal

attributes. The collective bargaining measure is obviously irrelevant, though the openness of the system to grievance resolution would be pertinent (if measurable). Occupational congruence would appear to have similar relevance to a military setting as to a civilian one. Even though the hourly wage has declined significantly as a proportion of total compensation in civilian jobs in the last few decades (Ehrenberg and Smith 1982), it is still a larger fraction than in military jobs. Thus, it is a less accurate reflection of a young enlisted man's reservation wage. Similar caveats ought to be borne in mind with respect to the impact of wider context variables.

III. Existing Empirical Research

A. Civilian Jobs

When one turns to a consideration of published empirical research on quit behavior of young men in civilian settings, one finds only fragments of information, and even these are often only tangentially related to the central issue of why young men quit their first jobs.^{6,7} While chroniclers of labor mobility cite the higher rates of interfirm movement among young men (Gallaway 1969 and Parnes 1970), there are but few indepth studies that carefully test the hypotheses described above with multivariate statistical methods.⁸

Although it is a well known "fact" that very few young men remain with their first post-school employer throughout their work lives, relatively little is known with confidence about when the separation occurs or what the likelihood of its being voluntary is. Based on a group of studies with varying degrees of relevance to the central issue, a consensus seems to emerge that at least three-fifths and perhaps as many as four-fifths of the

departures by young men from their first jobs, during the initial several years, are voluntary (Freedman 1969, Grasso 1977, Kohen and Andrisani 1973, Ornstein 1971, Parnes et al. 1969, Rosenfield et al. 1975).

Concrete evidence on the determinants of first job quitting is also fragmentary. One consistent finding in accord with the hypothesis offered above is that the probability of quitting is significantly reduced as a young man accrues longer tenure with his (first) employer (Blau and Kahn 1981, Grasso 1977, Kohen and Andrisani 1973). The findings with respect to the impact of formal education are more mixed. Based on data for young who left their first jobs in the early 1960s, one study documents a greater likelihood of quitting among the better educated, controlling for race and broad occupational group (Parnes et al. 1969, pp. 108-109). By contrast, examinations of separations by young men from first and other jobs during the late 1960s and early 1970s show generally negative but nonmonotonic relationships between the probability of quitting and education (Grasso 1977, Kohen and Andrisani 1973, Kohen 1977) or no statistically significant relationship between them (Blau and Kahn 1981).

The only other hypothesized personal determinant of a young man voluntarily leaving his (first) employer that is included in several of the studies is race. The consensus of the findings appears consistent with the hypothesis that, all other things constant, young black men are less likely to quit their jobs than are young white men. The sole contextual variable to be tested empirically in more than one or two studies has its presumed effect confirmed, i.e., all studies including a measure of the wage rate find it to be inversely related to the likelihood of a youth quitting his job.

The other theorized determinants of voluntary separation have been examined empirically in only one or two studies. Support for the hypothesized effects has been found in the cases of degree of job satisfaction (Kohen and Andrisani 1973) and collective bargaining coverage (Blau and Kahn 1981). However, the only tests of the impact of local labor market tightness on young men's quitting discovered no statistically significant relationship (Blau and Kahn 1981) and a significant relationship only among white men (Grasso 1977).

B. Military Job

It is not possible here to survey and review all of the studies that have been conducted germane to the first-term military attrition matter. The selected ones referred to appear to be representative of the work completed and in process. Most of the research may be characterized as focusing on a small number of the factors hypothesized above to influence voluntary job separations by young men and adding a few variates of particular relevance to attrition from one or another branch of military service. Many of those additional variates can be categorized as affective personal characteristics whose expected effect would seem to be on the propensity to quit. In numerous studies the effort seems to have been directed at statistically generating profiles of "high and low risk" young men so as to identify the potential quitters as soon after induction as possible, if not prior to enlistment. Presumably, the ultimate objective is to intervene and lower the risk of quitting or to minimize the cost of the quit by precipitating an even earlier separation.

Among the factors hypothesized to affect attrition that has been generally studied because it is a recruitment screening measure is education. There is a general consensus that better educated enlistees (i.e., high

school graduates) are less likely to attrite (Blandin and Morris 1981, Buddin 1981, Haber 1975, Luckman and Warner 1977, Matthews 1977, Warner 1981). By contrast, there is no consensus about the impact of age on the likelihood of attrition. Indeed, two separate studies focusing on the Marine Corps found diametrically opposite results (Haber 1975 and Matthews 1977). Even so, these same two studies both provided support for the hypothesis that attrition would be lower among young black men, whereas two investigations based on data from the Army and the Air Force do not confirm the hypothesis (Blandin and Morris 1981 and Buddin 1981).

Another variable common to the studies of first-term attrition is some variant of mental ability--usually measured in terms of AFQT category.⁹ While it has been widely tested, there is not universal agreement about its impact. Some have found that attrition is lower among those with higher AFQT scores (Blandin and Morris 1981, Luckman and Warner 1977). Others, using more elaborate models, have concluded that holding other things constant statistically eliminates the superficial relationship between AFQT and attrition likelihood or that the relationship only persists within some military occupational specialties (Buddin 1981, Haber 1975, Warner 1981).¹⁰

Finally, there have been a host of other variables utilized in the many empirical investigations to represent both personal and contextual factors influencing the likelihood of attrition. The wide variety of specific measures, theoretical constructs they were designed to represent, and mixed statistical conclusions argue against cataloguing them here. The strong influence of socio-psychological schools of thought on the extant research is very evident in numerous variables that have been examined including various

measures of job satisfaction; role expectations; congruence between individual and organizational goals, values and expectations; and perceived locus of control. In general, the passage of time reveals growing sophistication in the conceptual schema and statistical models employed in the research, although the approaches of researchers in the several branches of military service are still far from uniform.

IV. New Empirical Evidence

In an attempt to fill some, but by no means all, of the gaps in knowledge and confidence alluded to above, this study employs unique data sets with an empirical model focused explicitly on the analogy between quitting a first civilian job and attriting during the first term of a military enlistment. A study begun five years ago (Kohen 1977) is a direct precursor of this one, but the scope here is considerably broader and the data employed here are different and more current.

An initial examination of cross-tabular data related to quitting and attriting behavior by young men in the late 1970s is illustrated in Table 1. Here it is possible to compare the way which some personal (demographic, cognitive and attitudinal) variables relate to the likelihood that a young civilian man will quit his first post-school job and the likelihood that a young enlisted man will separate from military service prior to completing the initial term of service. No inferences can or should be drawn concerning the absolute magnitudes of the quit and attrition rates, since the time frames for the behavior differ as do the bases upon which the percentages are calculated.¹¹

What is most apparent from the data in the table is that some personal characteristics of a young man relate to the likelihood of his "quitting"

Table 1

Probability of Quitting First Civilian Job and Probability
of Attriting From Military Service Prior to Completing
First Term, 1979-80, by Selected Characteristics

Selected Characteristic	Civilian ^a		Military ^b	
	Total Number (000's)	Percent Voluntarily Quitting	Total Number (000's)	Percent Attriting
Race				
White	3,471	26.9	84	30.5
Black	402	22.5	24	39.0
Education^c				
Less than 9	291	40.6	1	*
9-11	986	23.2	37	37.4
12	2,206	28.8	67	28.2
More than 12	345	10.4	5	*
Labor Market Knowledge^d				
High	1,440	29.6	46	25.4
Medium	1,362	25.0	42	35.0
Low	1,020	24.2	20	43.4
Socioeconomic Level^e				
High	1,724	23.3	54	25.9
Medium	1,867	29.9	52	37.9
Low	268	22.7	2	*
Locus of Control^f				
Internal	894	31.5	35	42.9
Ambiguous	2,252	24.3	54	29.7
External	702	27.4	19	21.0

Source: National Longitudinal Surveys of Youth 1979-80

Notes:

* Percent not shown where category is represented by fewer than 25 sample cases.

a. The universe for the civilian sample is males 16-21 years of age in 1979 who were not enrolled in school and had held a job lasting at least 2 months since leaving school. Varying rates of missing information mean that the total universe may not be identical for each characteristic. Voluntary quitters are identified by reference to standard BLS definitions.

b. The universe for the military sample is males 16-21 years of age in 1979 who were in the military and not enrolled in school and who were out of the military 12 months after the 1979 interview. Attriters are identified as those whose responses was "No" to the question posed in 1980 "Did you complete the term of service?"

c. The variable treats holders of GED graduation certificates as nongraduates, unless they claim to have finished the twelfth grade. For those in the military the variable is measured at time of entrance to military service. For civilians, it is measured as of 1979.

d. The variable is based on the number of correct responses to nine occupational identification questions posed in 1979. The categories of High, Medium and Low correspond to scores of 8-9, 6-7, 1-5. For more detail on this measure and its history see Borus et al. 1980, and Parnes and Kohen, 1975. The structure and categories are unique to this study and have not been subjected to validity checks.

e. Socioeconomic level is based on one feature of a youth's home when he/she was 14, namely how many of the following items were regularly available: newspapers, magazines, a library card. Those in the High group had all items; those in the Medium group were missing one or two items and those in the Low group were missing all three. The face validity of this measure may be found in prior research on the NLS. (See Kohen 1977 or Parnes and Kohen 1975.)

f. Locus of control is a measure of the degree to which a youth perceives success as being contingent upon personal initiative. At one extreme are the Internals who perceive effort to be highly efficacious in attaining success, while at the other are Externals who attribute most, if not all, success to luck, the external environment. Here it is measured on a scale ranging from 16 to 4, based on responses to four questions, each containing two parts. The score ranges corresponding to Internal, Ambiguous and External are 4-6, 7-10, and 11-16, respectively. The structure and scaling of this variable are unique to this study and were designed without reference to validity checks since it is conceived of here exclusively as an ordinal index. The structure is patterned after more conventional measures of the same affective attribute. (See Andrisani et al. 1977.)

either a civilian or military job, but that the relationship is not necessarily the same. While we observe a moderately higher quit rate among young whites than among blacks, the difference is in the opposite direction for attrition rates. This may be related to the observation that while enlisted blacks in the AVF come from higher socio-economic backgrounds than nonserving young blacks, enlisted white men represent somewhat lower socio-economic backgrounds than their civilian counterparts (Fredland & Little 1982).

For civilian and military quit rates there appears to be a generally inverse association with the amount of formal schooling completed. At least in the civilian labor market, the relationship is not completely regular. This latter feature is in accord with recent military research on attrition among youth who are not high school graduates (Blandin and Morris 1981). Interestingly and perplexingly, a measure of the extent of (civilian) labor market knowledge a young man has is seen to be mildly directly related to his quitting his first civilian job but strongly inversely related to the probability of attriting during a first term military enlistment. Without further statistical analysis it is not possible to be confident of the meaning of these associations, especially since the measure of knowledge is itself a result of many antecedent factors such as mental ability, quantity of schooling, family background, and work experience (Borus et al. 1980 and Parnes and Kohen 1975). One possible interpretation is that better informed young men are more liable to quit civilian jobs, and that better informed enlisted youth were cognizant of the deterioration of the civilian labor market that was occurring in 1979-80.¹²

Finally, there is evidence of a positive association between a young man perceiving that he controls his own fate (rather than being controlled by luck or the environment) and the likelihood that he will quit a military or civilian job. This is certainly consistent with the notion that a young man who believes in a payoff to effort and initiative will be more likely than one who does not to leave a job in order to improve his well-being (Andrisani et al. 1977). Why the relationship should appear so much stronger among enlisted men than among civilians is not readily apparent.

In order to investigate these and other determinants of the decision to quit or attrite in greater detail, it is necessary to subject the data to multivariate analysis. Therefore, multiple regression analyses of linear probability functions have been conducted and their results are displayed below.¹³

To analyze the likelihood of attriting from a first-term enlistment in the military, the same data set is employed as was used in computing the figures shown in Table 1. Although this allows for investigation of the behavior of a sample representing more than 100,000 young men who separated from one or another branch of the military in the 1979-80 period, it must be noted that the sample contains only 148 observations. This poses some serious degrees-of-freedom constraints within which the analysis must be confined. One such is that it is not possible to estimate the parameters of the likelihood function separately for young black men. While some tentative insights may be drawn from comparing the estimates for whites with those for the entire group, extreme caution must be exercised. Another constraint is that some theoretically plausible interactions among determinants of attrition (e.g., ability and MOS as suggested by Warner 1981) cannot be investigated with any degree of confidence.

The multivariate equation whose parameters are estimated has its basis in the conceptual model outlined earlier and in the extant research literature on attrition that is referred to at several junctures above. The equation contains measures of personal cognitive characteristics of the young man, namely years of formal schooling completed at the time of entrance to military service and the score on the test of labor market knowledge used as a proxy for general mental ability.¹⁴ To test for possible nonlinearities, the equation is estimated with both continuous and binary-variable measures of schooling. Generally inverse relationships between these cognitive traits and the probability of attrition are anticipated.

The model also contains variables representing demographic characteristics of the enlistee, namely race and three measures of the socioeconomic level of his family of orientation--the reading material exposure variable depicted above, father's education and mother's education.¹⁵ In addition, the equation includes affective characteristics of the enlistee; namely a measure of his perceived locus of control, an ordinal measure of his expressed satisfaction with the military experience, and a series of binary variables identifying the specific reasons he offered for not staying in military service longer than he did.¹⁶

Finally, the equation contains several binary variables representing the environment in which the decision to attrite is made. From the existing research literature it is clear that the extent or magnitude of the attrition phenomenon varies among the several branches of the armed forces. Hence, variables designating whether a young man separated from the Army, Navy or Marines are included in the equation. (The omitted group who separated from the Air Force is subsumed as the reference group in the equation's constant

term). For similar reasons, several binary variables are constructed to represent the primary military occupational specialty held by the youth prior to separation.¹⁷ A list of variables appears in Table 2.

The statistical results of estimation three alternate versions of the probability of attrition equation are displayed in Table 3. All in all, the model is reasonably successful (by conventional standards of analyzing microdata) in explaining the probability of attrition--i.e., over 40% of the variance is accounted for by the included variables.

In contrast to the majority of in-house research, these results indicate that there is a net effect of race in the form of black young men being more likely than their white counterparts to separate before completing a first term of enlistment. Yet, it should be noted that what is measured in this study is the conditional probability of attrition in a particular year, given that separation has occurred, whereas the focus in most previous studies has been on the probability of attrition, given the initial enlistment. Thus, the findings with respect to race may not be as disparate as they appear, especially since the NLS-based results are contrary to the racial discrimination avoidance hypothesis. Nonetheless, it is noteworthy that the significant racial difference persists even after controls have been added for other measures which would distinguish white from black enlistees, such as education, family background, branch of service and pay level.

The other ascriptive or demographic variables also yield rather mixed results in the sense that it is unclear whether an enlistee from a more advantaged family background will be less likely to attrite than one from a disadvantaged home. While the coefficients on SELMEDIA and SELMAEDU signal an affirmative response, the consistently positive coefficient

TABLE 2
LIST OF VARIABLES

Variable Name	Description
EDPREMIL	Education prior to joining military, in years
HSDOFREMIL	High School Diploma prior to joining military
COLLPREMIL	Some College education (did not graduate) prior to joining military
ABILITY	Scale of score on labor market test, 0-9
CONTROL	Ordinal index of perceived locus of self control 4-16
SELMEDIA	Selected index of Reading Material Experience of Attritee, 0-4
SELFAEDU	Selected level of father's education, in years
SELMAEDU	Selected level of mother's education, in years
BLACK	Binary; 1=black, 0=otherwise
JOBSATHIL	Index of Military Job Satisfaction, 1-4
ARMY	Binary; 1=Army, 0=otherwise
NAVY	Binary; 1=Navy, 0=otherwise
MARINES	Binary; 1=Marines, 0=otherwise
MOSCRAFT	Binary; 1=MOS 700 through MOS 899, 0=otherwise
MOSTECH	Binary; 1=in technical Military Occupational Speciality (MOS), 100 through 499 before attriting from the military, 0=otherwise
MOSSUPRT	Binary; 1= in support MOS 500 through MOS 599 before attriting, 0=otherwise
RESNJOB	Binary; 1=Gave job based reason for not staying in military, 0=otherwise

TABLE 2 (Continued)

LIST OF VARIABLES

Variable Name	Description
RESND&TR	Binary; 1=Gave continuing education or training reason for not staying in military, 0=otherwise
RESNPAY	Binary; 1=Gave low pay, low benefits, or better civilian job as reason for not staying in military, 0=otherwise
RESNDISC	Binary; 1=Gave sex, race, or rank discrimination as reason for not staying in military, 0=otherwise
RESNGEOG	Binary; 1=Gave disliking geographic location, too frequent moving, or separation from family as reason for not staying in military, 0=otherwise
OUTEARLY	Binary; 1=attrited from military service during 1979-80, 0=otherwise
PAYCAT	Ordinal index of military wage category, 1-9

Table 3

Multiple Regression Results--Determinants of the Probability
of a Male Attriting from Military Service 1979-80
(coefficients shown in percentage points)

Independent Variable ^a	Model 1		Model 2		Model 3	
	Coefficient	t	Coefficient	t	Coefficient	t
EDPREMIL	5.5***	(3.67)	b		b	
HSDOPREMIL	b		- 0.7	(0.25)	3.0	(1.04)
COLLPREMIL	b		23.8***	(2.83)	20.9***	(2.57)
ARMY	-20.7***	(4.93)	-17.1***	(4.17)	-13.2***	(3.29)
NAVY	-10.0**	(2.18)	-10.5***	(2.56)	- 8.3**	(2.08)
MARINES	-19.2***	(3.56)	- 5.4	(0.98)	- 0.1	(0.02)
ABILITY	- 2.1**	(2.23)	- 1.3*	(1.63)	- 0.5	(0.64)
CONTROL	b		- 3.7***	(6.17)	- 4.6***	(8.38)
SELMEDIA	- 2.8**	(2.15)	- 1.9*	(1.66)	- 0.8	(0.63)
SELFAEDU	1.1***	(3.67)	1.4***	(4.67)	1.5***	(5.69)
SELMAEDU	c		- 1.2**	(2.20)	- 1.3***	(3.89)
BLACK	11.6***	(3.41)	14.4***	(4.50)	20.3***	(6.49)
JOBSATMIL	- 3.8***	(2.71)	- 5.4***	(3.60)	- 5.9***	(4.03)
MOSCRAFT	b		b		-34.3***	(9.00)
MOSTECH	b		b		9.3**	(2.26)
RESNJOB	21.2***	(7.31)	25.5***	(9.11)	25.1***	(9.58)
RESNED&TR	-31.4***	(10.46)	-31.3***	(10.79)	-34.8***	(12.68)
RESNPAY	-19.3***	(6.89)	-20.3***	(7.25)	-15.0***	(5.67)
RESNDISC	19.0***	(5.76)	13.9***	(5.89)	c	
RESNGEOG	8.0***	(2.58)	5.3*	(1.71)	c	
CONSTANT	16.7	(0.95)	98.2	(10.67)	98.6	(11.11)
R ² (adj.)	.257		.286		.316	
S.E.E.	40.4		39.6		38.7	

Source: National Longitudinal Surveys of Youth

Universe: Males 16-21 years of age in 1979 who were enlisted in a branch of the military service in 1979 and who were civilians in 1980.

- a. For details on variables, see text, Endnotes and Appendix Table 1.
- b. Variable not included in this model.
- c. Variable excluded from model by failure to pass test of statistical tolerance for stepwise entrance.

- * Significant at the .10 level
- ** Significant at the .05 level
- *** Significant at the .01 level

on SELFAEDU indicates the opposite. If the impact of each of the separate variables is evaluated at the mean of the variable and results are summed, the outcome is that family background has a negligible net effect on the probability of a young man attriting from his initial military enlistment.

When pre-enlistment education is measured in continuous form (Model 1), it appears to be strongly positively related to the likelihood of attrition--precisely the opposite of most military research on this topic. When education is categorized by schooling level, however, it becomes apparent that the only statistically significant difference is between high school graduates and young men who attended, but did not graduate from, college prior to enlisting. This is consistent with the conclusion that there is no payoff to training (formal or OJT) during the period of obligated service (Fredland and Little 1982, pp. 149-150). The better educated youth would discover the lack of payoff and be prone to separate early. In any event, the graduate-dropout distinction found in much prior research on attrition is not evident for all youth but does show up in analysis restricted to whites (Appendix Table 2).

Until occupational skill categories are introduced, the measure of mental ability retains the significant inverse association with attrition first noted in Table 1.¹⁸ Whether the occupational category measures are merely statistical moderators or real differentiators among enlistees cannot be determined conclusively from these data, but the findings are not inconsistent with the kinds of interactions between ability and MOS found by others (Haber 1975 and Warner 1981). Additionally, the persistence of significant differences in attrition probabilities among MOS categories in the face of controlling for pay level is supportive of the "reality of the differences. The substantial negative coefficient

on the measure of pay level, other thing held constant, certainly also suggests that attrition could be reduced by alteration of some features of the job, e.g., wages and occupational assignment.

The most consistently significant variables in the empirical model are those representing affective traits of the young enlisted men.¹⁹ The strong association between the likelihood of attriting and a perceived internal locus of control persists from the simple tabular result (Table 1) through multiple levels of control for other personal characteristics. It is clear that the young man who believes success to be mainly a product of his own action is more likely to take it upon himself to separate from the armed forces (even early), whereas the youth whose view is that the external environment largely determines his attainments will be less likely to attrite.

Unsurprisingly, the more expressed dissatisfaction a young enlistee had the more likely he was to have separated without completing his initial enlistment. In addition, attrition was relatively more probable among those whose reason for not continuing was job related, while those who cited education, training or pay as reasons were more likely to have waited out their term of service and simply not re-enlisted. In general, these findings appear to buttress only part of the conclusion by Fredland and Little (1982, p. 234) that

"When viewed from a policy perspective, it is improvements in these areas, rather than attempts to recruit a different kind of serviceman or change some other aspects of the job itself, that offer the prospect of improving... retention, ... assuming that improved job satisfaction bears favorably on these [retention] factors."

Indeed, it would appear that some gains in retention might be achieved from higher pay and/or different occupational assignments, although this study is mute on the impacts of such actions on other policy goals (e.g., cost containment and minimum preparedness levels).

To complement the multivariate analysis of attrition from a military job and explore some other potential determinants of young man's mobility, an analogous statistical investigation was conducted of civilian job quits. In order to take advantage of research begun earlier (Kohen, 1977) and a richer data set, it was necessary to sacrifice some currency in the information and focus on quits from first jobs during the late 1960's and early 1970's.²⁰ Once again, the empirical model whose parameters are estimated derives both from the conceptual model outlined above and the fragments of prior pertinent research. The variables in the regression model represent both the personal contextual characteristics hypothesized to influence the likelihood of quitting the first civilian job.

The personal cognitive traits include a measure of formal schooling completed at the time of beginning the first job and a measure of general

mental ability in the form of the score on a more elaborate test of labor market information. (See Parnes and Kohen 1975.) Also included are two personal, ascriptive characteristics, namely the age at which the youth accepted his first post-school civilian job and an ordinal index of the socioeconomic level of his parental family.²¹ A third ascriptive trait, race, is used to stratify the data into two separate statistical analyses. The preponderance of studies of young men's civilian labor market experiences makes it clear that the causal structure differs according to race and that correct specification requires separate equations (Andrisani et al. 1977, Blau and Kahn 1981, Kohen et al. 1977, Parnes and Kohen 1975).

The other four variables in the empirical model may be viewed as contextual factors. First is a measure of the pecuniary opportunity cost of quitting to search for a new job, the hourly rate of pay on the first job.²² Second, the occupational prestige (status) on the first post-school job may reflect the longer-run opportunity cost of quitting. It may also reflect the reduced likelihood of gaining from a job shift the closer one begins to the top of the occupational hierarchy. The third contextual feature represents a measure of the "fit" between the job and the individual and is operationalized in two separate binary variables. The first identifies those young men who held initial jobs for which they were "over-educated," and the second identifies those who were "under-educated" for their first jobs.²³ The underlying hypothesis is that incongruity between the job requirements and the skills of a youth will generate a heightened propensity to quit.²⁴

Finally, the equation contains binary variables representing the length of time over which the quit was "allowed" to occur. The maximum value permitted was four years to accord with the longest voluntary enlistment

span.²⁵ The model is estimated on a sample representing about 2.8 million young men.

All in all, the empirical model's power to explain civilian quit behavior is noticeably less than the counterpart model to explain attrition from military service--perhaps because direct measures of some of the potent individual attitudinal characteristics were unavailable for inclusion in the civilian model. Indeed, less than 10% of the overall variance in quit probability is explained for either race group (Table 4). However, the different patterns of statistical significance and magnitudes of the coefficients lend strong support to the a priori decision to estimate separate equations for blacks and whites.

The results of the regression analyses provide support for some, but not all, of the hypotheses proposed in the conceptual framework laid out above. There is strong evidence that the probability of quitting is inversely related to the principal short-run monetary cost--i.e., the wage--even controlling for numerous other factors. For example, a 25% increase in hourly pay would have reduced the likelihood of a quit by a young black man by 2 1/2 percentage points and that of his white counterpart by 1 1/2 percentage points, ceteris paribus. Likewise, there is confirmation that the higher the long-run opportunity costs (or the lower the potential gains) as measured in first job status, the lower is the probability of a quit, irrespective of race. For neither racial group is there confirmation of the hypothesized inhibiting effects of age or social class background on the likelihood of quitting the first job within four years.

The remainder of the results vary rather considerably according to race. Young white men with greater mental ability are more likely to leave their first job voluntarily, but the coefficient is not statistically

Table 4

Multiple Regression Results--Determinants of the Probability
of a Young Male Quitting the First Post-School Job Within
Four Years in the Late 1960s and Early 1970s, by Race
(coefficients shown in percentage points)

Independent Variable ^a	Blacks		Whites	
	Coefficient	t	Coefficient	t
EDELEM	4.3	0.34	1.1	0.13
EDHSDO	13.7**	2.05	4.0	0.75
EDSOMCOL	- 5.2	0.44	5.6	0.98
ABILITY	0.4	0.81	0.6**	2.16
SELNDX	0.2	0.23	0.4	0.57
AGEFRST	3.3	1.93	0.1	0.16
OVERED	14.9*	1.50	- 4.8	0.64
UNDERED	7.8	0.49	11.5*	1.37
STATUSFRST	- 0.4**	1.67	- 0.2**	1.85
WAGEFRST	- 6.8**	1.90	- 3.1**	1.79
4YRSPAN	29.2***	3.32	24.4***	4.35
3YRSPAN	31.3***	2.82	12.7**	1.88
2YRSPAN	- 2.1	0.17	- 1.1	0.21
CONSTANT	-44.5	1.06	6.0	0.24
R ² (adj.)	.082		.066	
S.E.E.	47.8		47.5	

Source: National Longitudinal Surveys of Young Men

Universe: Males 23-31 years of age in 1973 who began and ended an initial post-school civilian job during a period of up to four years during the span 1966-1973. None of these men were college graduates and all were employed in 1973.

a. For details on variables, see text, Endnotes and Appendix Table 3.

* Significant at the .10 level

** Significant at the .05 level

*** Significant at the .01 level

significant among blacks even though it is of nearly the same magnitude. By contrast, the net impact of formal schooling is (partly) significant among black youth but not among white youth. The effect is not monotonic—i.e., high school dropouts are significantly more likely than graduates to quit, but neither those with only elementary schooling nor those who completed some college quit at a significantly different rate than diploma holders.²⁶

Finally, the regression results for each racial group provide some support for the general conception that a mismatch between job requirements and a young man's (educational) qualifications raises the likelihood of a voluntary separation. Inexplicably, it is the "over-educated" young black men and "under-educated" young white men who manifested significantly greater quit rates than others within their respective racial groups.²⁷

V. Conclusions

Although the state of our knowledge about job quitting (civilian and military) has progressed considerably in the past five to seven years, it is still some distance from enabling the proffer of incontestable advice to policy makers concerning the phenomenon of attrition from the armed forces. Nevertheless, some implications of the study conducted here may be used as guidelines.

Based on the analysis of military quits, it would appear that recruitment of enlistees from among the ranks of young men who attended, but did not graduate from, college is not well advised. Although such young men probably enter with greater skills, they may well be "over-educated" for the tasks they are expected to perform (at least in the beginning) which serves as a stimulus to attrition. They certainly seem to attrite at higher rates, other things being the same. Some support for this may also be found in the measures of educational incongruence in the model of civilian quit behavior.

The preceding may also be interpreted as consistent with the unsurprising finding that a global measure of job satisfaction in military service is strongly inversely related to the likelihood of an enlistee separating prior to completing his first term of service. Combined with the statistical results for measures of perceived locus of control and avowed reasons for noncontinuation, it is clear that policy to attenuate attrition must be attentive to affective as well as cognitive dimensions of an enlistee's experience.

That objective, contextual features of the military experience influence the decision to leave prior to completing an initial enlistment term is also apparent in the findings. Both the nature of primary military occupational specialty and the level of pay are seen to be significant determinants of the decision to attrite. Attrition was found to be more likely among enlistees in technical and support MOS's and among those lower on the pay ladder, other things held constant.

In addition to there being relatively little evidence to support wholesale modification of the recruiting target population according to schooling, the results of this research do not offer a basis for focusing recruiting efforts on any particular age or socioeconomic group. The statistical results with respect to race are sufficiently complex and yet incomplete that they are inadequate as the foundation for policy prescription. Indeed, a message of the less-than-wholly-consistent findings in the civilian and military models may be that the current thrust of military research is precisely on target--i.e., that there may be less comparability than would at first blush appear between attriting and quitting a civilian job.

Nonetheless, efforts with more carefully specified models and based on more extensive mining of existing data on civilian quits ought not to be totally abandoned. As more years of data from the NLS Youth panel become

available, exactly matching cohorts who enter and leave civilian and military jobs will be constructable and between which behavioral differences can be charted. Likewise, the secular changes in civilian and military job participation by young women remain a severely understudied dimension of the quit/attrition issue to which research should be addressed.

END NOTES

¹Whether or not the attrition phenomenon represents an uncompensated cost from the broader vantage point of the entire society is open to debate. That it renders more expensive the accomplishment of our national defense goals is unquestionable. However, it may be argued that it is indicative of an increased awareness, maturity and world of work "savvy" among youth which can only be acquired through the job hopping and experimentation that have heretofore only typified the civilian sector. It might thus be contended that the attrition represents an improvement in the society's allocation of human resources because it is a manifestation of the operation of free, competitive markets. It should be clear that these issues are not resolvable at a purely theoretical level and that even addressing them in more detail falls outside the scope of this report. Nonetheless, it does seem to be in order to remind the reader of their existence.

²It would be inappropriate to say "never" in place of "rarely" because of public employment opportunities whose incumbents may be partly impelled by a motive to perform national service--e.g., the Public Health Service medical personnel.

³These surveys were designed by the Ohio State University Center for Human Resource Research under contract to the Employment and Training Administration of the U.S. Department of Labor. The sample design, field work and initial stages of data processing were the responsibility of the U.S. Bureau of the Census in the case of the NLS which began in 1966 and were performed by the National Opinion Research Center in the case of the NLS which began in 1979. For a complete description of the surveys, see Center for Human Resource Research, 1982. In both survey designs, young black men were deliberately oversampled so as to provide statistically reliable estimates and this also applied to Hispanics and economically disadvantaged whites in the case of the later panel.

⁴The panel members were interviewed in person annually from 1966 through 1971, biennially by phone through 1975, in person in 1976, biennially through 1980, and in person in 1981. Only the data through 1978 were available for use in this report. Despite the high rates of geographic mobility that characterize men at this life-cycle stage, the attrition from the panel has been remarkably small--e.g., more than 75% were re-interviewed five years after the initial survey.

⁵At the time of performing the statistical analysis, only data from the 1979 and 1980 surveys were available.

⁶Regarding the paucity of evidence, an investigator of Navy manpower policy recently remarked that "Much less research has been done on the reasons why people leave" than on policy to reduce attrition (Warner 1981, p. 13).

⁷The focus on the first civilian job derives from the recognition that even in an era of an AVF, military enlistment often represents the youth's first post-school regular job.

⁸For example, Ornstein (1971) analyzed the duration of a young man's first job rather than the determinants of the probability of his leaving it voluntarily. Although Kohen and Andrisani (1973) focused on interfirm shifts according to voluntariness, their analysis was not restricted to moves from first jobs and it was based on rather crude statistical tools. While Grasso (1977) carefully attended to the volition occasioning the job separation, the unit of observation was not an individual youth but the job, some of the statistical tools were not very sophisticated, and the focus was not on first jobs. Blau and Kahn (1981) conducted an extremely methodologically sophisticated analysis, not restricted to first job separations, which nevertheless omitted some of the potential determinants described above.

⁹The variables usually employed distinguish enlistees according to performance on the Armed Forces Qualifications Test, where membership in Category I signifies scoring at or above the 93rd percentile, Category II signifies scoring in the range including the 65th through 92nd percentiles and Category III represents scores in the inclusive range 31-64. In some analyses, Category I-I is subdivided into A B groups at the midpoint of the range. Persons scoring below the 31st percentile are further divided into Category IV, comprising the range 11-30, and Category V containing those whose performance was in the bottom 10 percentiles.

¹⁰There appear to be some potentially serious multicollinearity problems in assessing the statistical significance of the AFQT variable(s) which have not been addressed by researchers and which argue for caution in accepting any of the findings thus far presented.

¹¹The comparability implied is not strict because the quits are not confined to having occurred during a specific time period (other than since taking the first job), whereas the attrition occurred during the 12 months between the 1979 and 1980 interviews. The data do not permit the direct comparison--attrition during 1979 versus quitting during 1979--because the 1980 survey did not ascertain the reason for a youth having left his/her 1979 civilian employer. For further detail, see notes a and b, Table 1.

¹²It should also be borne in mind that both the labor market information and locus of control measures are taken chronologically after many of the civilian quits occurred, which raises serious questions about the direction of causality. Indeed, it is probably true that experimentation in the labor market (job hopping) is a significant source of knowledge for many youth.

¹³In instances where the dependent variable in the empirical model is dichotomous, it is often argued that either LOGIT or PROBIT analysis is superior to OLS regression because of problems of heteroscedasticity and predicted values outside the range of 0 to 1 (Blau and Kahn 1981). These statistical problems are much less serious when the mean of the dependent variable is in the range 0.30-0.70. Since all of the quit and attrition rates under study here fall in that range, the necessity to perform LOGIT or PROBIT is less apparent. Also, the available computing facilities have been unable to operationalize a software package adapted to performing LOGIT or PROBIT

incorporating the differential sampling weights used in the NLS. Finally, as is not unusual in research on dichotomous dependent variables, the qualitative findings of at least one study that employed both statistical techniques were not substantively different and the OLS figures are more easily interpreted (Blandin and Morris 1981).

¹⁴While the NLS of Youth did collect information from schools on the scores of respondents on numerous intelligence, aptitude and achievement tests, amalgamating those into a useful single measure is a Herculean undertaking which has not been done for public users of the data tapes. Resources permitting, the analyses here should be repeated using a more elaborate and accurate measure of mental ability.

¹⁵To preserve data cases, the regression technique employed imputed the mean value to the parental education variables if there was no legal value coded in the data file. Rather than arbitrarily selecting one of the indicators of parental family socioeconomic status, it was decided to permit the regression to select whichever ones were important using conventional stepwise criteria.

¹⁶The measure of locus of control is a continuous variable ranging in value from 4 to 16, with lower values connoting a greater sense of personal control (i.e., internality) and higher values connoting a greater sense of fate or environmental control (i.e., externality). While the raw data identify 18 specific reasons for not remaining in the military and a respondent can have chosen any number of them, they have been condensed for use here. The three responses concerning use of job skills, boredom with the job or dislike of the job are grouped and coded 1 in the variable RESMJOB. The two responses of continuing education and unhappiness with training are grouped and coded 1 in RESNED&TR. The three responses of low pay, a better civilian job and low benefits are grouped and coded 1 in RESNPAY. The three responses of discrimination according to race, sex and rank are grouped together and coded 1 in RESNDISC. The three responses concerning disliking the location, too frequent moving, and separation from family are grouped and coded 1 in RESNGEOG. The remaining four answers are grouped with the catchall category "other" and serve as the reference group.

¹⁷The grouping of MOS's was performed on very pragmatic grounds--i.e., after inspecting a univariate distribution of all separates across the full spectrum of three-digit categories. The groupings were as follows: MOS1 identifies those in infantry, gun crews and seamanship specialties (codes 1-99); MOSTECH identifies electronic equipment repairmen and technical specialists (codes 100-499); MOS3 identifies functional support and administrative personnel (codes 500-599); MOS4 identifies electrical and mechanical equipment repairmen (codes 600-699); MOSCRAFT identifies craftsmen, service workers and supply handlers (codes 700-999); MOS6 identifies persons in the various nonoccupational categories (codes 900-999). Since they never entered the statistical equation, no data are shown in Appendix Table 1 for MOS1, MOS3, MOS4 or MOS6. Respectively, their mean values for the weighted sample are .14, .10, .20, .08.

¹⁸ While Model 3 differs from Model 2 by the addition of occupational skill categories and a measure of pay level, the ability variable loses its significance prior to the inclusion of the latter. Further, the lack of significance of the ability measure does not appear to be due to multicollinearity as the coefficient declines in size by more than 40 percent.

¹⁹ The dominance of the attitudinal factors among young white enlisted men is even more evident. See Appendix Table 2.

²⁰ Several features of the NLS Youth data set detract from its usefulness in this phase of the analysis. Because of the structure of the follow-up questionnaire (in 1980), it is not possible to distinguish voluntary from involuntary departures from the 1979 job. Therefore, a strictly comparable analysis to the attrition equation is ruled out. Also, many of the variables whose timing measurement is important to inferring causality are not available at a time prior to or coincident with the acquisition of first jobs by young men in this panel. Finally, through some unfortunate interviewing errors, the occupation of nearly three in ten young men in their first job is unavailable.

²¹ The index was constructed by normalizing, weighting and summing variables measuring father's occupational status, father's education, mother's education, access to reading material in the home, and education of the youth's oldest older sibling.

²² Because the data have been pooled over a seven year time span during which the general price level increased by about 40%, all wage levels have been deflated to constant 1966 dollars.

²³ Being "over" or "under" educated is operationally defined here in terms of the difference between the GED rating of the three-digit occupation and the years of schooling completed by the youth. If the GED rating is more than 0.5 years below the actual education, the youth is classified as overeducated (i.e., coded 1 on OVERED). If the GED rating is more than 0.5 years above, he is coded 1 on UNDERED.

²⁴ To some extent the variables may be proxies for a measure of job satisfaction which is not available in the data.

²⁵ The variables do not conform exactly to the date at which the first job was taken because there were three four-year periods (1966-70, 1967-71, 1969-73), two three-year periods (1968-71 and 1970-73) along with the two-year period (1971-73) and the one-year period (1972-73).

²⁶ Experimentation with alternate coding schemes for formal schooling had no substantive impact on the outcome for either racial group.

²⁷ Once again, alternative coding did not alter the qualitative results. Also, see note²⁴.

Appendix Table 1

Means and Standard Deviations of Variables in
Models to Explain Attrition

Variable Name	Unit of Measurement	Mean		S.D.	
		Total	Whites	Total	Whites
EDPREMIL	Years	11.4	11.3	1.0	1.0
HSOPREMIL	Binary (1=Less than 12 years of school)	.35	.39	.48	.49
COLLPREMIL	Binary (1=13-15 years of school)	.03	.02	.16	.15
ABILITY	Score on labor market test, 0-9	6.9	7.1	1.7	1.6
CONTROL	Ordinal index, 4-16 (Low=Internal)	7.9	7.7	2.5	2.5
SELMEDIA	Index of reading material, 0-4	3.2	3.3	1.0	1.0
SELFAEDU	Years	10.4	10.8	5.0	4.6
SELMAEDU	Years	11.2	11.5	3.8	3.4
BLACK	Binary (1=Black)	.22	--	.42	--
JOBSATMIL	Index of Military Job Satisfaction, 1-4	2.3	2.3	0.9	0.9
ARMY	Binary (1=Army)	.44	.40	.50	.49
NAVY	Binary (1=Navy)	.31	.36	.46	.48
MARINES	Binary (1=Marines)	.11	.10	.32	.30
MOSCRAFT	Binary (1=MOS 700 through MOS 899)	.12	.14	.32	.34
MOSTECH	Binary (1=MOS 100 through MOS 499)	.11	.10	.31	.31
MOSSUPRT	Binary (1=MOS 500 through MOS 599)	.20	.22	.40	.41
RESNJOB	Binary (1=Gave job based reason not staying in military)	.40	.44	.49	.50
RESNED&TR	Binary (1=Gave education or training reason)	.39	.38	.49	.49
RESNPAY	Binary (1=Gave pay or benefits reason)	.62	.66	.49	.47
RESNDISC	Binary (1=Gave sex, race or rank discrimination reason)	.27	.31	.44	.46
RESNGEOG	Binary (1=Gave geographic location reason)	.36	.43	.48	.50
OUTEARLY	Binary (1=Attrited from military service 1979-80)	.324	.305	.468	.461
PAYCAT	Ordinal index of Military wage Category (E,O,W) 1-9.	3.2	3.3	1.3	1.4
Sample Size	Persons	148	114	--	--
Population	Estimated thousands of persons	108.2	83.9	--	--

Source: National Longitudinal Surveys of Youth

Appendix Table 2

Multiple Regression Results--Determinants of the Probability
of a White Male Attriting from Military Service 1979-80
(coefficients shown in percentage points)

Independent Variable ^a	Model 3	
	Coefficient	t
HSDOPREMIL	-7.5**	2.24
COLLPREMIL	0.2	0.02
ARMY	2.6	0.62
NAVY	-0.1	0.02
MARINES	-1.9	0.33
ABILITY	-2.1	0.22
CONTROL	-4.9***	8.47
SELMEDIA	2.1	1.49
SELFAEDU	1.4***	4.32
SELMAEDU	-0.6	1.30
MOSCRAFT	-21.4***	4.77
MOSTECH	3.8*	1.69
MOSINF	-10.0**	2.28
JOBSATMIL	-1.9*	1.27
RESNJOB	23.1***	8.44
RESNED&TR	-26.6***	9.03
RESNPAY	-18.0***	6.32
PAYCAT	-11.9***	11.74
CONSTANT	113.8	13.68
R ² (adj.)	.390	
S.E.E.	36.0	

Source: National Longitudinal Surveys of Youth

a. See note a, Table 1.

Appendix Table 3

Means and Standard Deviations of Variables in
Models to Explain Civilian Quits

Variable Name	Unit of Measurement	Mean		S. D.	
		Blacks	Whites	Blacks	Whites
EDELEM	Binary (1=Less than 9 years of school)	.17	.09	.37	.28
EDHSDO	Binary (1=9-11 years of school)	.28	.23	.45	.42
EDSOMCOL	Binary (1=13-15 years of school)	.08	.19	.27	.39
ABILITY	Score on labor market test, 0-56	27.5	34.4	7.6	7.2
SELNDX	Index of social class of parental family, 0-16.0	7.4	9.7	3.0	2.8
AGEFRST	Years	18.6	19.1	1.8	2.1
STATUSFRST	Duncan's index of occupational status	16.0	24.6	12.0	18.3
WAGEFRST	Dollars (1966 dollars)	1.51	1.81	.85	1.21
OVERED	Binary (1=over-educated)	.77	.77	.42	.42
UNDERED	Binary (1=under-educated)	.17	.16	.38	.37
4YRSPAN	Binary (1=left job before end of 4th year)	.63	.61	.48	.49
3YRSPAN	Binary (1=left job before end of 3rd year)	.12	.10	.32	.31
2YRSPAN	Binary (1=left job before end of 2nd year)	.09	.13	.29	.33
QUIT	Binary (1=Quit first job)	.54	.41	.50	.49
Sample size	Persons	289	657	-	-
Population	Estimated thousands of persons	413.1	2,446.0	-	-

Source: National Longitudinal Surveys of Young Men

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