Validity and Usefulness of Enlistment Intention Information

Bruce R. Orvis, Martin T. Gahart, Alvin K. Ludwig

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Bruce R. Orvis, Martin T. Gahart, Alvin K. Ludwig
with Karl F. Schutz

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PREFACE

This document synthesizes the results of several years' analysis and reports on the validity and usefulness of enlistment intention information for nonprior-service youth. It draws on five previous studies:

- Bruce R. Orvis, *Forecasting Enlistment Actions from Intention Information: Validity and Improvement*, RAND, N-1954-MRAL, December 1982.
- Bruce R. Orvis, *Analysis of Youth Cohort Enlistment Intention Data: Progress Report*, RAND, N-2076-MIL, April 1984.
- Bruce R. Orvis and Martin T. Gahart, *Relationship of Enlistment Intention and Market Survey Information to Enlistment in Active Duty Military Service*, RAND, N-2292-MIL, June 1985.
- Bruce R. Orvis, *Relationship of Enlistment Intentions to Enlistment in Active Duty Services*, RAND, N-2411-FMP, September 1986.
- Bruce R. Orvis and Martin T. Gahart, with Karl F. Schutz, *Enlistment Among Applicants for Military Service: Determinants and Incentives*, RAND, R-3359-FMP, January 1990.

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SUMMARY

In synthesizing the results of several years' analysis, this document reports on the validity and application of enlistment intention information for nonprior-service youth (i.e., individuals who have not previously served in the military).

A number of surveys of young people ask respondents to rate their intention to enlist in the military. The resulting information has been used for three major purposes. First, to support recruit marketing analyses, intention information has been used as a means of distinguishing individuals who are more likely to enlist from those less likely to do so. Second, intention information has been used at the aggregate level as a barometer of enlistment rates. Third, to provide policy guidance, intention information has been used to predict changes in military enlistment and reenlistment behavior in response to alternative prospective options.

The results discussed in this synthesis document provide strong support for using enlistment intention information in recruiting research. These results demonstrate both the relationship between stated intention and actual enlistment behavior and the potential usefulness of intention data in making enlistment predictions for a variety of purposes. In addition, we found that several factors affect the relationship between intention and enlistment and that the negative intention group is an important source of enlistees.

DATABASES AND MEASURES

The primary survey database for our analyses contains results from the Youth Attitude Tracking Study (YATS). It includes 11 YATS waves administered between spring 1976 and fall 1981. Information from the YATS was combined with information on whether the respondents eventually enlisted or took the written test (Armed Services Vocational Aptitude Battery, or ASVAB) to qualify for military service. Additional databases used in our analyses of intention responses include the 1983 Survey of Military Applicants (a survey of male production ASVAB examinees), the 1981 Survey of Military Applicants, and the 1981 Grey Advertising National Survey (a survey of a representative sample of males aged 16–20).

In most of our analyses we use a composite intention measure with three categories to assess the strength of respondents' enlistment

intentions. The composite measure is constructed from a general enlistment intention question ("How likely is it that you will be serving in the military in the next few years?") combined with an "unaided mention" question that asks what respondents plan to do in the next few years. We place "definitely will serve" and "probably will serve" responses to the general intention question into a single positive category, but we discriminate between those with and without an "unaided mention" of plans for active military service; we place "definitely will not serve," "probably will not serve," and "don't know" responses into a single negative intention category. The three categories are

- Positive intention and unaided mention.
- Positive intention, no unaided mention.
- Negative intention.

Following are our main findings on the usefulness of intention information and their implications.

THE INTENTION-ENLISTMENT RELATIONSHIP

Enlistment Intention Results Predict Enlistment Actions

The findings directly validate the use of intention data in recruiting and advertising research to distinguish groups with different probabilities of joining the military. They also indicate that respondents can discriminate among the individual services in stating their intention and, thus, that service-specific intention measures can be applied in predicting written testing and enlistment actions for the individual services.

Intention Data Reveal More Than Demographics Alone

Our regression analyses suggest that intentions give information about a person's likelihood of enlisting beyond what we learn from his demographic or background characteristics. Intention measures thus appear to capture an underlying attitudinal or taste-for-service dimension not captured by the demographic characteristics. Because they indicate that intentions convey *additional* information about an individual's likelihood of enlisting, these findings provide further support for the use of intention data in recruiting research.

Aggregated Intention Information Predicts Regional Enlistment Rates

Analyses of the relationship between aggregated regional intention information and enlistments provide evidence that aggregate intention levels are significantly related to concurrent high-quality enlistment rates. There is also some evidence of lagged (later) effects. The results support the use of aggregated intention information to help anticipate the ease or difficulty of meeting recruiting goals and to help evaluate the effects of campaigns to change attitudes toward the military as a means of increasing enlistments.

Intentions to Enlist Under Hypothetical Options Provide a Useful Addition to Field Test Results

Our analysis of responses to survey questions about the likelihood of enlisting under specific hypothetical options suggests that survey data can predict the effects of certain options relative to others and, moreover, can be used to explore how these effects vary among subpopulations of special interest. This finding implies that survey analyses could be useful in helping us select among alternative options to get the best results for the funds available. The findings also suggest that the survey method can produce reasonable approximations of field test results. Such information, were it available in the development phase, might save a considerable amount of time and money in test design and execution. Furthermore, survey results could be used as a supplemental data source to approximate the effects of a broader spectrum of potential options than can feasibly be field tested directly.

FACTORS AFFECTING THE INTENTION-ENLISTMENT RELATIONSHIP

Several aspects of our analysis suggest that intentions do not capture fully the influence of external events on the true probability of enlisting. For example, the relationship between stated intention and actual enlistment is affected by the frequency of enlistment in the population of interest, by the period between intention assessment and expected enlistment, and by demand constraints. The correspondence between intention data and actual enlistment behavior will be greatest to the extent that the enlistment rate is high, the decision is near term, and demand constraints are low for the population of interest. The true parameters on these dimensions

should be identified when intention data are applied in a particular analysis.

A related implication is that when one applies the intention-enlistment relationship for one population to another population's intention data to predict enlistments for the latter, one should account for potential differences in the frequency, immediacy, and demand for enlistment. When these factors remain relatively constant for the group of interest and the purpose of the analysis is to examine trends in enlistment or to distinguish individuals who are more likely to enlist from those less likely to do so, these implications are not crucial. However, they are quite important when the purpose is to estimate actual enlistment rates, as, for example, when we seek to approximate the results of field tests of potential enlistment options. Enlistment *rate* predictions are most accurate when founded on known baseline enlistment rates for the population of interest and when the influence of background factors on intention and the translation of intention into actual enlistment—including eligibility—are accounted for. This allows the user to adjust stated intention for the influence of background characteristics and demand-side factors that are known to affect the true enlistment rate. As noted, our evidence suggests that intentions do not fully incorporate such factors.

THE NEGATIVE INTENTION GROUP IS AN IMPORTANT SOURCE OF ENLISTEES

About half of all enlistees come from the negative intention group. More generally, the contributions of the different intention groups to total enlistments correspond to the sizes of the groups, not to the pattern of enlistment rates associated with these intention levels. In other words, the size differences of the intention groups are even larger than their substantial differences in enlistment rates. The very large size of the negative intention group makes it, therefore, an important source of enlistees. In particular, the great concentration of women in the negative intention group results in the majority of female enlistees being drawn from that group.

These results have important implications and indicate that focusing exclusively on women and men with positive intentions—e.g., positive intention with or without unaided mention—is misguided. Even a small upward shift in the enlistment rate among people with negative intentions could represent an important source of additional recruits. Marketing research should identify factors that promote enlistment among persons at all intention levels, not simply factors that distin-

guish persons with different enlistment intentions or that motivate persons with positive intentions to enlist. This should be straightforward with the examination of intention changes in response to hypothetical enlistment options or the examination of factors related to enlistment. Such analyses could be performed within groups or across them, independent of the intention dimension.

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1. INTRODUCTION

This document synthesizes the results of several years' analysis and reports on the validity and application of enlistment intention information for nonprior-service youth (i.e., individuals who have not yet served in the military).[1] One can conceptualize an intention as a behavioral forecast—that is, an individual's prediction of his own behavior at some point in the future (e.g., Fishbein and Ajzen, 1975). This view assumes that an intention represents an individual's attempt to summarize the influences of a number of factors that may affect his behavior. These factors include the available alternatives, his own preferences, his abilities, the obstacles that must be overcome in order to perform the behavior, the opinions of other people important to him, and any other factors upon which his behavior is contingent.

Obviously, these factors are often not predictable with certainty, and the relationship between intentions and behavior is not a perfect one. Nonetheless, it has been documented that intentions do predict behaviors as diverse as purchasing toothpaste, donating blood, engaging in family planning, and reenlisting in the armed forces (Jaccard and Davidson, 1975; Ajzen and Fishbein, 1980; Sheppard, Hartwick, and Warshaw, 1988; Pomazal and Jaccard, 1976; Hom and Hulin, 1981; Chow and Polich, 1980). Moreover, there is evidence that individuals can estimate the effects on their behavior of changing conditions. For instance, Juster (1964) asked consumers to predict their future buying behavior under the assumption that their income would rise by 10 percent in the next year. These intentions, based on a hypothetical situation, were significantly related to the actual purchases of consumers who did have such an increase in income.

Uses of data on stated intention to enlist in the military have followed three major themes. All are discussed in this report. First, intention information has been used as a means of distinguishing individuals who are more likely to enlist from those who are less likely to do so. The recruiting community has used this information to examine issues such as advertisement recall and the appeal of various job characteristics and enlistment incentives, which in turn gives guidance to advertising and recruiting efforts. (See, for example, Research Triangle Institute, 1984.) Such analyses often focus on ways to increase enlistments among persons indicating a positive propensity toward

[1] Orvis (1982, 1984, 1986), Orvis and Gahart (1985, 1990).

enlisting or to change the minds of those who say they are unlikely to do so.

Second, intention information has been used at the aggregate level—e.g., by geographical area or at the national level—to provide a barometer of enlistment rates. By comparing national intention levels with those in the recent past, the recruiting community has attempted to anticipate changes in the ease or difficulty of meeting current accession goals; regional analyses have used the relative intention levels of different geographic areas to help allocate recruiting resources. In addition, it has been presumed that there is a lagged effect of intention on enlistment, that is, that aggregate information on intention level gives the recruiting community an early warning of things to come and, similarly, that changes in intention levels can be used to evaluate the effectiveness of advertising campaigns that seek to change attitudes toward the military as a means of increasing subsequent enlistments.

Third, intention information has been used to predict changes in military enlistment and reenlistment behavior in response to alternative prospective options. For example, Chow and Polich (1980) measured the reenlistment intention of enlisted personnel in response to alternative options, and Hiller (1982) estimated that a 10 percent reenlistment bonus would increase the mean reenlistment intention level of Army personnel by 13 percent. Typically, such analyses compare the relative desirability of the alternatives; they do not translate the changes in intention into changes in enlistment/reenlistment rates.

Such applications of enlistment intention data presume a direct relationship between the strength of a person's stated intention to serve and his actual likelihood of enlisting. Yet, at the initiation of our work, there had been little systematic research to evaluate the validity of this assumption—particularly for first-term enlistment among nonprior-service youth, the primary recruiting issue—and concern remained about the validity and usefulness of self-reported enlistment intentions. In addition, other fundamental questions concerning the application of intention information remained unanswered. For example, even if intentions do predict enlistments, do they tell us more than we would learn from examining an individual's background characteristics? Under what conditions do they serve as useful indicators of subsequent behavior, and under what conditions are they less useful? How can intention levels be translated into enlistment rates? And, in what ways can they be used to help anticipate the results of potential policy changes?

APPROACH

After discussing the databases, we begin in Sec. 2 by defining the intention measures used. We then look at the basic question of the relationship between respondents' stated enlistment intentions and their actual enlistment actions. Within this broad area, several specific issues are examined: We will review the differences in enlistment rates and production Armed Services Vocational Aptitude Battery (ASVAB) testing rates by intention level.[2] We will then examine whether intentions tell us something about a person's probability of enlisting that we would not know from his background characteristics. In addition, we will consider the contributions of different intention groups to total enlistments. Although looking at the enlistment rates associated with different intention levels is essential in considering potential uses of intention information, we also need to examine the way the population is distributed among different intention groups to understand the implications of intentions for recruiting or advertising efforts.

Next, we take the intention analysis a step further, to see whether there is a relationship between aggregated intention information and regional enlistment rates. Here, we are not asking whether an *individual* who tells us he is likely to enlist really is more likely to do so than an individual who says he is not going to enlist; rather, we are asking whether differences in the *average* intention levels of different geographic areas correspond to differences in the enlistment rates of those areas.

The bulk of our research concerns active-duty enlistments among nonprior-service men, who account for the vast majority of accessions. In Sec. 3, we examine the use of intention information for predicting enlistment behavior in other populations or in specific services in which the frequency or immediacy of enlistment differs. We begin by comparing women's enlistment intention results with those of men. Then we examine the use of enlistment intention measures to predict specific service enlistments and the type of intention questions that are best suited for this kind of information. Finally, we discuss the predictability of military applicants' enlistments—i.e., enlistments among persons who have taken the production ASVAB to qualify for military service—by intention level. The enlistment rate among women and in the specific services is considerably lower than the total

[2]Production ASVABs are those taken at Military Entrance Processing Stations or mobile examination sites. They do not include student administrations (e.g., high schools), since student tests are routinely administered in many instances and thus may not reflect interest in joining the military.

active-duty enlistment rate among men; in all three cases, enlistment typically occurs long after the survey point when intention is measured. In contrast, the enlistment rate among applicants is considerably higher and the action is much more immediate.

In Sec. 4 we evaluate how useful enlistment intention responses to hypothetical enlistment options might be as an adjunct to field tests. We are especially interested in whether the survey approach can provide consistent estimates of the effects of certain kinds of options relative to others (e.g., enlistment bonuses versus educational benefits) and whether it can provide reasonable approximations of the results of actual field tests of such options. If so, intention information could help in choosing among the options available for testing (by identifying which options might provide the best results for available funds), in designing the field tests, and in supplementing the information they provide. Importantly, the results are based on extensive research concerning the prediction of actual enlistment rates from intention information. This research fills a significant void in earlier studies and applications: it provides a metric that allows users to translate intention information to the outcome of interest, i.e., enlistments. The method is discussed in detail in Orvis and Gahart (1990).

2. DEFINITION AND VALIDATION OF MEASURES

DATABASES

Our primary survey database for these analyses has been the Youth Attitude Tracking Study (YATS), a national survey of military-eligible nonprior-service youth. The YATS was initiated in fall 1975 on a semiannual basis. In 1981 it became an annual survey. Market Facts, Inc. carried out the survey through the fall 1982 wave, after which the Research Triangle Institute took over administration and reporting. To be eligible for the YATS, youths must be 16–21 years of age, have completed not more than two years of college, have never served in the military, and meet certain other criteria, such as residing in the continental United States.[1] Women were not included in the YATS until the fall 1980 survey wave; as a consequence, most of the research undertaken to determine the relationship between intentions and enlistment has been performed for male respondents.

The results presented in this report are drawn principally from a matched database that combines information for individual respondents to the YATS with information on whether the respondents enlisted or took the written test (the ASVAB) to qualify for military service. The military records were provided by Defense Manpower Data Center (DMDC) extracts of information from the Military Entrance Processing Station Reporting System (MEPSRS).

The final matched database compiled during the research period combines survey and enlistment/testing records for 37,047 male YATS respondents, surveyed in any of the 11 YATS waves administered between spring 1976 and fall 1981, and 6226 female respondents, surveyed in fall 1980 or fall 1981.[2] The enlistment/testing information in the military database covers the period from October 1975 through March 1985. Analyses conducted during earlier years of the research period used subsets of this database.

The analysis of the relationship between intentions and enlistments at the aggregate level takes advantage of a database developed at RAND by Robert Cotterman. The database groups the 50 states into 16 geographical regions and provides regional information on high-

[1]A detailed discussion of the YATS study design is provided in Appendix D of Research Triangle Institute (1984).

[2]As noted earlier, women were included in the YATS beginning with the fall 1980 wave.

quality enlistments, economic conditions, recruiter levels, and other factors. The information drawn from that database for the aggregate analysis covers October 1976 through March 1983.

Various other databases are used in Sec. 4 for the analysis of intention responses to questions concerning hypothetical enlistment options. Although the databases will be discussed more fully in Sec. 4, we describe them briefly here. We use results from the 1983 Survey of Military Applicants, the 1981 Survey of Military Applicants, and the 1981 Grey Advertising National Survey. These surveys were designed to supplement the results of the Enlistment Bonus Test and Educational Assistance Test Program experiments—which tested and compared the effects of different incentive programs in balanced geographical areas across the United States—by collecting additional information that could not be obtained through existing data sources. The military applicant surveys were administered to persons who took the ASVAB during the test period for the corresponding field study, and the Grey survey was administered to a national youth sample during the Educational Assistance Test Program. The experiments and their results are discussed in detail in Polich, Dertouzos, and Press (1986) and Fernandez (1982).

ENLISTMENT INTENTION MEASURES

The military applicant and YATS surveys have a general intention question that asks about the strength of the respondent's intention to serve in the military. The YATS surveys also have several service-specific intention questions concerning the strength of the respondent's intention to serve in the Army, Navy, Air Force, and Marine Corps. Finally, the YATS surveys contain an "unaided mention question"—a question that asks the respondent what he plans to do in the next few years. If he indicates that he plans to join the active-duty military, he is considered to have an unaided mention of plans for active military service.

Below we discuss the general intention measure and define a composite measure that combines responses to the general intention and unaided mention questions. We consider intentions to enlist in specific services later, in Sec. 3.

General Enlistment Intention Measure

We begin the intention analysis with the general enlistment intention question because it is present in both the applicant and YATS surveys

and because it provides the most general approach to military enlistment intentions. The general enlistment question is

> How likely is it that you will be serving in the military in the next few years?[3]

In response to this question, individuals are asked to choose among four alternatives: that they

- Definitely will serve.
- Probably will serve.
- Probably will not serve.
- Definitely will not serve.

Individuals unable to choose among the four alternatives are allowed to say that they do not know the strength of their intention. In fact, a very small percentage of the YATS sample—about 3 percent—is coded as "don't know." In most of these analyses, as we explain more fully below, the "definitely" and "probably" categories have been combined and referred to as the positive intention group, and the remaining categories have been combined and referred to as the negative intention group. However, we first show results separately for the "definitely" and "probably" groups; the results for the three negative propensity groups will be combined into a single category from the outset because of the similarity of enlistment rates for these groups (which, in our research, typically range from 5 to 10 percent).

We now look at the results of the general intention measure for a national youth sample, such as YATS, where the enlistment decision

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[3]The wording of the general enlistment intention question is different from a Fishbein-Ajzen intention question. They probably would ask the respondent to rate the likelihood that "I intend to enlist in the military in the next few years." Their type of wording focuses on a *behavior,* not an *outcome.* They argue that behavioral intentions predict behaviors better than outcomes (Ajzen and Fishbein, 1980, p. 29).

Actually, the YATS wording comes closer to what Sheppard, Hartwick, and Warshaw (1988) call a behavioral *estimation,* rather than a behavioral *intention.* In their meta-analysis, they found that such self-estimations are significantly better predictors of behavior than are behavioral intentions. They argue that estimations do better because respondents take into account facilitating and inhibiting conditions that might affect their ability to carry out their intentions.

The net effect may be some gain in predictive power due to soliciting an estimation rather than an intention, but some loss in predictive power due to focusing on an outcome, rather than a behavior. If so, a better item for predicting enlistment might be "How likely is it that you will [an estimate] enlist in the military [a behavior] in the next few years?"

may be several years down the road. The results shown in Table 1 combine the data from the first five waves of our YATS database, covering spring 1976 through spring 1978. In this early analysis, conducted in 1982, we concentrated on the first half of the YATS data to provide a reasonably long follow-up period. This was based on our finding, discussed shortly, that there is a continual increase in cumulative enlistments over a several-year period among the YATS respondents, i.e., 16–21 year old nonprior-service male youth, and on the fact that the available enlistment results supplied the enlistment rate through December 1981. In the table, the numbers above the parentheses indicate the enlistment rate for each intention level. The numbers in parentheses represent the portion of the sample classified at each intention level. For example, we find that 3 percent of the sample say that they definitely will serve. Among these individuals, 33 percent did enlist by the end of 1981. In comparison, among the 73 percent who indicated they were unlikely to enlist, only 5 percent did so.[4]

Table 1

Youth Population Enlistment Rates by Intention (combined YATS surveys, spring 1976–spring 1978)

	Percent Enlisting by December 1981
Enlistment Intention in Survey[a]	General Measure
Definitely will serve	33
	(.03)
Probably will serve	17
	(.24)
Negative propensity	5
	(.73)

[a]The proportion of the sample classified at each intention level is shown in parentheses.

[4]The results are limited to persons who provided Social Security numbers (SSNs)—about two-thirds of the sample—because it is not possible to follow up on the others. Although they cannot resolve the issue with certainty, the available data suggest that the results should be representative of the entire sample. YATS respondents without SSNs differ in predictable ways from those with SSNs; for example, they are younger and are less likely to have been employed. As shown later in Table 3, there is a significant relationship between intention and enlistment even when differences among respondents on such factors are accounted for.

Composite Intention Measure

As Table 1 shows, the simple, general intention measure does discriminate among individuals with different actual enlistment rates. We can, however, better discriminate enlistment behavior among different intention groups by taking advantage of some of the other intention measures in the YATS surveys and, in particular, by combining the results of the unaided mention question with those of the general intention measure. We combine the responses to both questions to form a new intention variable—a *composite intention measure* with three groups:

- Positive intention and unaided mention.
- Positive intention, no unaided mention.
- Negative intention.

The intention levels defined by the measure are based on the work we carried out during 1984–1985. Interestingly, that work indicated that the "definitely will serve" category may be sensitive to economic conditions. During the mid-to-late 1970s, economic conditions were unfavorable for the employment of the YATS respondents, but by the end of that period and the early 1980s, employment prospects had improved considerably. Reflecting this change, recruiting was extremely difficult during the latter period. The change in economic opportunities appears to have affected the relationship between YATS responses and enlistment behavior. Results from the first five survey waves (Table 1) showed a much greater rate of enlistment among the "definite" intention group as compared to the "probable" intention group. As enlistment results for the next several waves were made available, it became clear that this difference had diminished considerably. Exploratory analyses conducted to investigate the change indicated that the effect was concentrated among persons no longer in high school. For such individuals, the enlistment rate for respondents surveyed between fall 1978 and spring 1980 fell markedly among those expressing definite intentions but rose several percentage points among those expressing probable intentions. The results also indicated that during the same period, the percentage of "definite" respondents with full-time jobs rose considerably, the perceived difficulty of finding employment fell, and the enlistment aptitude (Armed Forces Qualification Test or AFQT) scores of "definite" examinees fell. These changes did not occur for the "probable" respondents or for those with unaided mentions. Overall, then, the results suggest that the civilian labor market provided stronger competition for the

"definite" group during the latter period, causing some of them to shift to the probable group and leaving as examinees individuals who were less qualified to enlist. The analyses also indicated that the instability in the relationship between intentions and enlistments was greatly reduced by combining the definite and probable intention categories into a single "positive" category and by using the unaided mention measure to distinguish stronger positive intentions from weaker ones. We therefore recommend using the three-group composite measure, and will do so in this document.[5]

Persons in the first or most positive category express both positive intentions and unaided mentions. These persons say they will be joining the active-duty military when asked about their plans for the next few years, and they say they definitely or probably will serve when asked specifically about the strength of their intention to join. Persons in the second category express positive intentions toward serving in the military—that is, they say they definitely or probably will serve—but do not have unaided mentions of plans to join the military. Finally, individuals in the third category express negative enlistment intentions. These individuals indicate they probably will not or definitely will not serve in the military. (The category also includes the small "don't know" group.)[6]

COMPARING INTENTIONS AND ACTUAL BEHAVIORS

Using the three-group composite measure, Table 2 shows the relationship between strength of enlistment intention and actual enlistment and production ASVAB testing rates. The actual behavior of the respondents shows a very strong and statistically significant relationship to strength of enlistment intention.[7] As seen in the "percentage enlisting" column, 37 percent of those with the most positive intention level—positive intention and unaided mention—actually enlisted within the follow-up period. This falls systematically to an enlistment rate of only 6 percent among those with negative intentions.

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[5]The development of the composite intention measure is discussed in Orvis and Gahart (1985).

[6]The inclusion of the "don't know" group in the negative intention category is customary in YATS research; it is based on the small size of the group (about 3 percent of the respondents) and the similarity of the enlistment rate for the group to that of other persons stating negative intentions.

[7]Unless otherwise noted, the term "statistically significant" in this report is reserved for effects with probabilities of occurrence of less than 5 percent by chance.

Table 2

Enlistment and Written Testing Rates by Intention Level (combined YATS surveys, spring 1976–fall 1980)

Enlistment Intention Level	Percentage Enlisting by March 1984	Percentage Testing by March 1984
Positive intention and unaided mention	37 (.05)	55 (.05)
Positive intention, no unaided mention	15 (.23)	28 (.23)
Negative intention	6 (.72)	12 (.72)

NOTE: Results are weighted to ensure representativeness (N = 33,809). The proportion of the sample classified at each level is shown in parentheses.

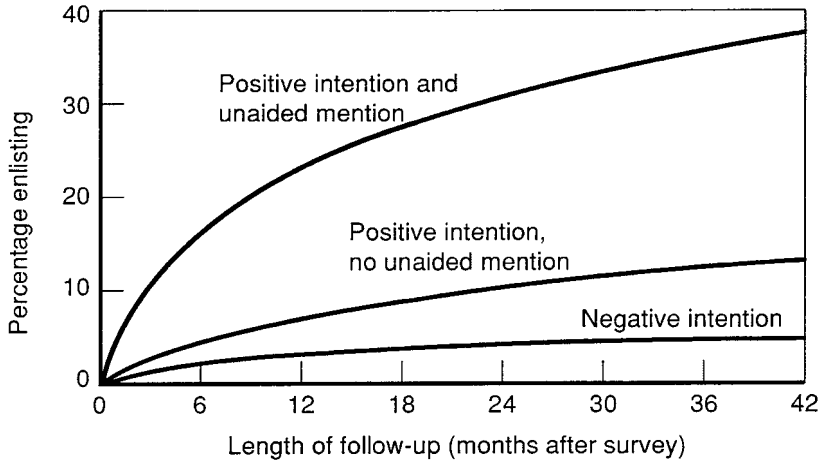
The production ASVAB testing rates also show a strong relationship to intention level. We find that 55 percent of those with the most positive intention level took the production ASVAB by the end of the follow-up period. In comparison, only 28 percent of those in the middle group and only 12 percent of those with negative intentions did so.

Once individuals initiate the formal testing process, a significant loss of potential enlistees occurs between the written and physical examinations, which require separate visits to testing sites. In this context, a less obvious result also should be noted: the conversion rate—the percentage of written examinees that enlists—varies systematically in the expected direction with strength of enlistment intention. For the most positive intention level, people with positive intentions and unaided mentions, two-thirds of those testing also enlisted. The conversion rate falls to 6 of 12, or 50 percent, for persons with negative intentions.

ENLISTMENT RATES OVER TIME

The analysis summarized in Table 2 is based on a March 1984 follow-up of respondents to the spring 1976–fall 1980 YATS waves. This provides a minimum follow-up period of 3.5 years. A long follow-up period is required to observe the full relationship between intentions and enlistments, because many of the enlistment actions are not undertaken until long after the intention question is asked, as illustrated in Fig. 1.[8]

[8]This is especially true for younger high school students, who do not tend to enlist until their senior year or the year thereafter.



NOTE: Results are weighted to ensure representativeness (N = 33,809).

Fig. 1—Cumulative Enlistment Rates for Intention Levels over Time (combined YATS surveys, spring 1976–fall 1980)

Figure 1 shows the total or cumulative enlistment rates at six-month intervals following the survey, from six months afterward to 3.5 years later. The rates are shown separately for the three intention groups introduced in Table 2. Note that enlistments continue throughout this entire period; the lines keep moving upward. This trend illustrates the need for a long follow-up to observe the full relationship between intentions and enlistments. The figure also shows that it is reasonable to use the intention measure over this long term. The discriminating power of the measure is best within the first year or so following the survey; it is in this initial period that the slopes of the three lines are most distinct. However, the slopes remain significantly different even three years after the survey. In other words, the composite intention measure continues to discriminate differences in enlistment rates by intention level even long after the survey.

INTENTIONS VERSUS BACKGROUND CHARACTERISTICS

The results in Table 2 and Fig. 1 demonstrate a strong relationship between intentions and enlisting or testing. However, people with different intentions also differ in background characteristics. Thus, differences in enlistment and testing rates could be due simply to the different background characteristics of members of different intention groups. On the other hand, intentions may tell us more about a per-

son's likelihood of enlisting than his background characteristics alone, and may contain an underlying attitudinal or taste-for-service component. This issue is important in considering whether to collect intention information and, if so, how to use it.

Variables Used in Regressions

To investigate whether intention conveys more information than background characteristics alone, intention-level information was entered into ordinary least squares (OLS) regression models of enlistment or of taking the production ASVAB, together with a variety of background information on the individual available from the YATS; the full information included the following:

- Enlistment intention level (dummy variable for each positive intention group).
- Age (ln age).
- Geographic region (dummy variables for East, North Central, and West).
- Race (dummy variable for Black and for other than white non-Hispanic).
- Education status (dummy variables for in high school, high school graduate not in school, and in college or vocational school).
- Academic courses and GPA (dummy variables for algebra, geometry, intermediate algebra, and trigonometry courses passed, and 4-point scale for GPA).
- Father's education (4-point scale).
- Employment history (dummy variables for employed full time and for looking for work, and 5-point scale for perceived difficulty of finding a full-time job).
- Recruiter contacts (dummy variables for any recruiter contact and a contact within the last six months).
- Discussions about enlisting (dummy variables for discussions with parents, friends, teachers, and girlfriend).
- YATS survey wave (dummy variable for each wave).

The background information is known from previous research to be related to the likelihood of enlisting. The question here is whether the intention information is still a significant factor in predicting enlistment or testing when the other factors are controlled, i.e., when

the differences in background characteristics of members of different intention groups are accounted for.

The argument that intentions assess an underlying attitudinal or taste-for-service component not captured by the background factors can be taken a step further. If there is evidence that intention information is significant in predicting enlistment after controlling background factors—that it perhaps signals a taste for military service—then the effects of intentions may carry past the accession point for YATS respondents who enlist. We therefore looked for differences in first-term performance—in terms of promotion or attrition—according to the strength of initial enlistment intention. These analyses used many of the factors in the enlistment and testing analyses. However, in the case of enlistees we were able to use accession records to update information on *age, geographic region,* and *educational status;* those records also provided information not available from the YATS on *AFQT,*[9] *Delayed Entry Program (DEP) history, service entered,* and *time in service.* The background factors were entered into regression models, together with intention information, to see whether intentions were significant in explaining first-term performance.

Enlistment Behavior by Intention After Demographic Adjustments

Table 3 shows the relationship between intention level and enlistment decision, after controlling for the effects of the background factors just mentioned. The regression analysis allows us to compare the enlistment and testing rates found for the positive intention groups with those found for the negative intention group, controlling statistically for differences in the background characteristics of persons with positive and negative intentions. We noted that people in different intention groups differ in background characteristics and that these differences are associated with differences in enlistment and testing rates. The regression analysis, in essence, examines whether the enlistment and testing rates for persons with positive and negative intentions are still different after we remove the effects of background characteristics on the probability of enlisting or taking the written examination.

The results, as shown in Table 3, suggest very strongly that this is the case. The regression coefficients indicate that even if we removed

[9]Verbal and math subtests from the ASVAB are combined to form the AFQT composite. The AFQT is used to determine enlistment eligibility and to report recruit quality to Congress.

Table 3

Effect of Intentions on Enlistment After Demographic Adjustments (combined YATS surveys, spring 1976–fall 1980)

Enlistment Intention Level	Percentage Point Increase in Enlistment Rate[a]	Percentage Point Increase in Testing Rate[a]
Positive intention and unaided mention	24	30
Positive intention, no unaided mention	5	9

[a]Increase compared to negative intention level after controlling for demographic factors (N = 33,809).

the effects of the background factors on enlistment, persons with positive intentions and unaided mentions could still be expected to have a significantly higher enlistment rate than persons with negative intentions (by about 24 percentage points). In other words, if the enlistment rate among persons with negative intentions is 6 percent, we could expect persons with the same background characteristics who express positive intentions and unaided mentions to enlist at a rate of about 30 percent. Similarly, the analysis suggests that persons with positive intentions but no unaided mentions also would enlist at a significantly higher rate than those with negative intentions—by five percentage points—even if they had the same background characteristics.[10]

[10]The percentage of variance accounted for by the regression equation (r^2) is increased significantly by the inclusion of dummy variables for the two positive intention levels, from .056 to .083. Since the main issue is whether these intention variables are significant, it was deemed acceptable to use an OLS model, which produces the same significance levels as logistic regression (see Haggstrom, 1982). However, we also did a logistic regression analysis of enlistment behavior. It provides very similar estimates of the intention level effects, specifically, 24 and 6 (versus 24 and 5) percentage points, when computed at the average values of the demographic factors.

It is possible, of course, that the enlistment differences between intention groups could be due, at least in part, to differences in unmeasured demographic factors. However, the inclusion of a large number of important factors in the current analysis and the significance of the post-accession results reported in Table 4 make it unlikely that unmeasured demographic factors account for the significance of the effects reported here. It should be recognized nonetheless that a positive correlation between the intention dummy variables and unmeasured demographic factors—captured in the error term of the regression equation—would lead to overstatement of the true coefficients of the dummy variables. A two-equation approach is required to deal with this possibility. We discuss and apply that approach in Sec. 4. That section deals with the use of intention information to predict changes in the enlistment *rate* in response to potential options. Here, we are not interested in using the equation to predict the enlistment rate, but rather in whether significant differences in enlistment among the

A parallel analysis was performed for production ASVAB rates. As seen in the right column of Table 3, this analysis produced results very similar to those found for enlistment. Again, even after we removed the effects of background characteristics on the testing rate, respondents expressing positive intentions and unaided mentions and those expressing positive intentions without unaided mentions both were significantly more likely to test than persons in the negative intention group. Thus, the evidence suggests quite strongly that intentions provide important information about a person's likelihood of enlisting not available from background factors alone.

Effect of Intentions on Post-Accession Behavior

The evidence that intentions significantly affect enlistments even when background factors are accounted for suggests that intentions may indicate taste for military service. Thus, we next asked whether, among YATS respondents who enlisted, there might be differences in first-term performance according to the strength of initial enlistment intentions. We did not find an effect of enlistment intention level on promotion rate.[11] Consistent with known promotion patterns, our analysis indicated that the dominant factor in first-term promotions was time in service; other factors were far less important in comparison. However, we did find that the attrition rate among enlistees from the most positive intention group was significantly lower than the attrition rate among enlistees from the negative intention group. As seen in Table 4, enlistees with positive intentions and unaided mentions had an attrition rate six percentage points lower than enlistees who initially expressed negative intentions. This difference is not only significant, it is a relatively large one when we bear in mind that the average attrition rate in this analysis is 22 to 23 percent.[12] (Perhaps equally interesting from a recruiting stand-

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members of different intention groups remain after accounting for differences in their demographic characteristics. The magnitude of the effects—particularly for the most positive group—strongly suggests that this is the case. Thus, we defer discussion of the two-equation model.

[11]Promotions were assessed by analyses of both the highest pay grade attained and the percentage of enlistees achieving grade E4 or higher.

[12]The analysis applies to attrition within the first three years of service. In order to increase sample size and include recent enlistees, the analysis includes some persons who enlisted less than three years before the follow-up point. The intention effect was replicated in a parallel analysis that included only those persons enlisting three or more years before the follow-up, indicating that the attrition finding cannot be attributed to the inclusion of recent enlistees in the analysis.

Table 4

Effect of Intentions on Attrition After Demographic Adjustments (YATS enlistees, spring 1976–fall 1980 surveys)

Enlistment Intention Level	Decrease in Attrition Percentage[a]
Positive intention and unaided mention	6
Positive intention, no unaided mention	1

[a]Decrease compared to negative intention level after controlling for demographic factors (N = 3259).

point is that there is virtually no difference in attrition between enlistees from the two largest groups, those with positive intentions but no unaided mentions and those with negative intentions, who together account for about 80 percent of the enlistees. The analysis thus suggests, at least from the standpoint of limiting first-term attrition, that people with negative intentions may be as attractive for recruiting purposes as those with positive intentions but no unaided mentions.)

IMPORTANCE OF THE NEGATIVE INTENTION GROUP

As has been shown, there is considerable evidence of a strong relationship between intention level and actual enlistment or written examination rate. However, we must also consider the division of the population into different intention groups to get a sense of how each group contributes to the total enlistment picture. In the first column of Table 5, the sample is divided into the three intention groups. Note

Table 5

Sample Distribution and Sources of Enlistees by Intention Level (combined YATS surveys, spring 1976–fall 1980)

Enlistment Intention Level	Percentage of Sample	Percentage of Enlistees
Positive intention and unaided mention	5	18
Positive intention, no unaided mention	23	36
Negative intention	72	46

NOTE: Results are weighted to ensure representativeness (N = 33,809; N = 3259 enlistees).

that more than two-thirds of the sample express negative intentions; this group is the largest by far. The second group, those with positive intentions but no unaided mentions, contains the vast majority of the remaining individuals. This particular division of the population has important implications, as can be seen in Table 5's right column, which shows enlistees' intention group of origin. Note that nearly half the enlistees came from the negative intention group, that is, from people who indicated initially that they were not likely to serve. Note also that about two-thirds of the remaining enlistees came from the middle group, those with positive intentions but no unaided mentions.

The results, then, show an interesting pattern. The contributions of the different intention groups to total enlistments correspond to the sizes of the groups, not to their pattern of enlistment rates. This occurs because the differences in the sizes of the intention groups are even larger than the substantial differences in enlistment rates among groups. Putting this finding together with the very low enlistment rate observed among persons in the negative intention group, we note that even a small increase in that group's enlistment rate could represent an important source of additional recruits. Moreover, this finding also implies that enlistment analyses should not focus simply on differences between persons with positive and negative enlistment intentions, but should attempt to identify enlistment motivators for the persons in each group.

AGGREGATED INTENTION INFORMATION

We next review evidence concerning the relationship between aggregated intention information and aggregate enlistment rates. Here, we are not asking whether an *individual* who says he is likely to enlist is more likely to do so than one saying he is unlikely to enlist; rather, we are asking whether *geographical areas* with higher average intention levels also have higher enlistment rates. Specifically, we are interested in evidence about two types of aggregate relationships. The first concerns the effect of intention levels on enlistments during the same time period, i.e., concurrent intention effects. The second concerns lagged effects of intention levels on aggregate enlistments, i.e., the relationship between past intention levels and current enlistment rates (or between current intention levels and future enlistments). Evidence of lagged effects is particularly important in justifying the use of intention measures as barometers of upcoming enlistment rates and as outcome measures to help evaluate the effects of policy options that attempt to alter attitudes toward military service

in order to increase enlistments. The analysis finds evidence of both concurrent and lagged intention effects.

Factors in Regressions

The aggregate analysis examines a time series of cross sections. It aggregates YATS intention information for "high-quality" respondents—i.e., high school graduates who score in AFQT categories I–IIIA—to derive intention levels for 16 geographical regions, and it computes monthly regional intention levels from the semiannual (or annual) YATS results by using moving averages.[13] These intention results—represented as proportions of the regional high-quality youth population—are combined with monthly information on high-quality enlistments—the population proportion enlisting times 1000, corrected for autocorrelation—and other factors, using a database developed by Robert Cotterman. The factors in Cotterman's database can be separated into two groups: (1) those that should be related to enlistment rates but be relatively independent of intention levels and (2) those that should be related to both enlistment rates and intention levels. The first group contains factors that are conceptually independent of intention levels, such as

- Recruiter levels.
- Recruiting quotas (Army).
- Calendar month (representing seasonal effects on signing contracts, but not necessarily on more stable enlistment intentions).
- GI Bill transition months (each of two months immediately preceding and two months immediately following the transition from the GI Bill to the less generous Veterans' Educational Assistance Program (VEAP), when a temporary increase followed by a temporary decrease in enlistment might be expected).
- Service policy changes.

In the second group are factors that presumably would be related to intentions, such as

- Position in business cycle (strength of the economy).
- Ratio of military to civilian pay.

[13]See Orvis and Gahart (1985) for a discussion of the identification of high-quality respondents.

- Geographic regions (since we know there are stable regional differences in intention levels).
- Availability of the GI Bill or the Army's education supplement (Ultra VEAP kicker), which provides $12,000 in educational benefits (representing longer-term policy options).[14]

The OLS regression analyses described below included variables for regional intention level. In addition, to help identify the relationship between aggregate intention levels and enlistment rates, the analyses controlled (included variables for) the factors conceptualized as being independent of intentions (first group above). Because the purpose of the analyses was to assess the significance of the relationship, if any, between aggregate intention levels and enlistment levels—which underlies their use as barometers or trend indicators—rather than the significance of intentions in improving aggregate models, the analyses did not include the factors presumably reflected in intention levels (second group).[15]

Intention Levels and Concurrent Enlistment Rates

Table 6 presents evidence concerning the concurrent effects of intentions on enlistments. A parallel analysis was conducted for each of the four services to look at the relationship between regional intention levels and high-quality enlistment rates, controlling for the factors discussed above. As indicated in the first row, there is evidence of a significant relationship between intention levels and concurrent high-quality enlistments in all four analyses. Moreover, it does not matter whether positive intentions are defined using the general intention measure (as in the current case) or the unaided mention measure in the YATS; in each case, the results are significant for all four services.

[14]Today, education supplements to the Montgomery GI Bill are known as the Army College Fund. When this research was done, supplements were called Ultra Veterans' Educational Assistance Program kickers.

[15]Because the factors conceptually related to intentions were excluded from the analyses, the results reflect only the relationship between intentions and enlistments, not whether the inclusion of intention information improves aggregate enlistment models. The usefulness of intention information in aggregate models undoubtedly depends on the nature and quality of the factors in the model, including the intention variables. In the present case, the results provide little evidence that Cotterman's full model is improved by the inclusion of intention information. See Cotterman (1986) for a description of the full model.

Table 6

Relation of Aggregated YATS Intention Information to Concurrent High-Quality Enlistment Rate (monthly high-quality enlistments, 1976–1983)

Intention Level	Regression Coefficient for Proportion of Region with Positive Propensity in Model of (1000 Times) Proportion of Population Enlisting, by Service			
	Army	Navy	Air Force	Marine Corps
Positive intention	.06**	.13**	.10**	.04**
Positive intention and unaided mention	.28**	.45**	.20*	.11*
Positive intention, no unaided mention	.01	.05	.08**	.02

*Statistically significant at $p < .10$.

**Statistically significant at $p < .05$.

As noted, the coefficients indicate the predicted effect of the proportion of high-quality youth with positive intentions on (1000 times) the high-quality enlistment rate (proportion of population). Given these rates (see Appendix A of Cotterman, 1986), the magnitude of the coefficients suggests a 3 to 5 percent increase in enlistments if the proportion of high-quality youth with positive intentions for a given service were to double, i.e., increase by about 10 percentage points.[16]

We next asked whether it is the overall positive intention level that matters or whether it is the level of very strong positive intentions that affects enlistments. To examine this issue, positive intentions, as shown in the first row of Table 6, were broken into the two levels discussed earlier: (1) positive intention and unaided mention and (2) positive intention but no unaided mention. The proportions for the two levels were computed for each region, and the aggregate data were reanalyzed using these new intention measures. As seen in the two lower rows of Table 6, the results suggest that it is primarily the level of very strong positive intentions that affects high-quality enlistments. The positive intention and unaided mention level is a significant explanatory variable, or marginally significant, in all four analyses. On the other hand, the result for the positive intention

[16]The true magnitude of intention effects may be larger than indicated, because of limitations in the available intention data. These include semiannual (after 1980, annual) rather than monthly assessments, relatively small sample sizes for some of the regions, and imperfect identification of high-quality respondents.

level without unaided mention is significant in only one of the four analyses.

Lagged Intention Effects on Aggregate Enlistments

The next question concerns evidence of lagged effects of intention levels on enlistments; that is, is there some carry-over effect of past intention levels on current enlistment rates? To examine this question, we conducted an analysis parallel to that conducted for concurrent intentions; in this case, however, we entered the intention level estimated to be present in a region 12 months prior to the point at which enlistments were measured (e.g., intention level in April 1977 and enlistments in April 1978). We used the unaided mention (and positive intention) level as the intention measure, for the reasons noted in the preceding subsection. As seen in the first row of Table 7, the lagged intention level was significantly related to the high-quality enlistment rate in each of the four analyses.

Although these results provide evidence of a lagged intention effect on enlistments, it could be argued that they really reflect the same results seen in Table 6. The basis of this argument is that the factors captured by the aggregated intention variable may not change all that much from one year to the next in the regions evaluated. For example, stable regional differences in enlistment behavior should remain relatively constant, and other factors, such as economic conditions, may not vary much over a period of 12 months. To test this possibility we must redo the analyses, entering into the regressions not only the lagged intention level but the concurrent intention level as well. We can then determine whether there is a carry-over effect of intentions from 12 months prior to the enlistment period, controlling for concurrent intention level.

The lower two rows of Table 7 show the results of this reevaluation. Note that concurrent intention level is significant in all four analyses. However, there is considerable evidence of an additional lagged intention effect on enlistments. The lagged intention level is significant or marginally significant in three of the four analyses, even after controlling for concurrent intentions. The results thus support the use of aggregate intention measures as barometers of future enlistment rates or as outcome measures to help evaluate policy options that attempt to increase enlistments by altering attitudes toward military service.

Table 7

Lagged Effect of Aggregate Intention Level on High-Quality Enlistments (monthly high-quality enlistments, 1976–1983)

Intention Level	Regression Coefficient for Proportion of Region with Positive Propensity in Model of (1000 Times) Proportion of Population Enlisting, by Service			
	Army	Navy	Air Force	Marine Corps
Lagged unaided mention	.20**	.17**	.30**	.17**
Concurrent unaided mention	.34**	.95**	.36**	.42**
Lagged unaided mention, controlling concurrent unaided mention	.14*	.01	.23**	.09**

NOTE: Twelve-month lag.

*Statistically significant at $p < .10$.

**Statistically significant at $p < .05$.

3. USEFULNESS OF INTENTION INFORMATION FOR OTHER POPULATIONS AND ENLISTMENT IN SPECIFIC SERVICES

In the preceding section, we saw that enlistment intention information is strongly predictive of actual active-duty enlistment behavior among young nonprior-service men. We now examine this relationship for other populations and specific services. We begin with women, whose active-duty enlistment rate is much lower than that of their male counterparts. In such instances, we are interested in two questions: (1) whether the lower enlistment rate is reflected in stated intentions and (2) whether it affects the relationship between stated intentions and actual enlistments. We then examine intentions to enlist in specific services, which individually have lower enlistment rates than the active-duty services as a whole. Thus, we are interested in the same issues concerning the intention-enlistment relationship as for women. In addition, we are interested in whether intention questions specifically concerning enlistment in the individual services are better predictors of those enlistments than the composite intention measure examined thus far. Finally, we conclude the section by examining the intention-enlistment relationship among military applicants. Such persons are more likely to enlist than the YATS respondents. They are also much closer to their decision point than the other youths we examine and thus should be able to predict their behavior more accurately.

ENLISTMENT INTENTIONS AMONG WOMEN

Thus far we have examined results for men only. What about women? Table 8 shows the enlistment intention distribution for female YATS respondents. As noted earlier, a long follow-up period is needed to observe the full relationship between intentions and enlistments. Thus, the analysis is based on an enlistment record check in spring 1985 of actions by respondents to the fall 1980—when women were first included—and fall 1981 survey waves; this provides a follow-up of at least 3.5 years. For comparison purposes, we show intention results for men for the same time frame.

As Table 8 shows, nearly nine out of ten women expressed negative enlistment intentions, compared to about seven out of ten men. Moreover, only about 1 percent expressed positive enlistment inten-

Table 8

Comparing Women's and Men's Enlistment Intentions (combined YATS surveys for fall 1980–fall 1981)

Enlistment Intention Level	Percentage of Women	Percentage of Men
Positive intention and unaided mention	1	6
Positive intention, no unaided mention	12	26
Negative intention	87	68

NOTE: Results are weighted to ensure representativeness (N = 6226 for women and 6457 for men).

tions and unaided mentions. This compares to 6 percent among men. Thus, the women's intention distribution is substantially less positive than the men's. This would be expected, based on their lower enlistment rate. We now turn to the next question: whether women's lower enlistment rate is accounted for by the shift in intentions or whether the relationship between intentions and enlistment also differs for the two sexes.

Comparing Women's Actions with Their Intentions

We have seen that women are less likely than men to indicate that they plan to join the military. How do their actions compare with their intentions? Table 9 shows active-duty enlistment and written examination (i.e., production ASVAB) rates by intention level for women and men. There is a significant relationship between intentions and actions for both sexes. However, the enlistment and testing rates are not as high for women as for men with the same stated intention. For example, although the enlistment and written examination rates are significantly different for women expressing positive intentions without unaided mentions and those expressing negative intentions, the rates for the positive group are relatively low. Only one of nine such women took the written test, and only one of twenty-five enlisted. Enlistment and written examination rates for men expressing positive intentions without unaided mentions were considerably higher. About one of every four tested, and one of every eight enlisted.

The percentages of persons taking the written test at a given intention level tend to be more similar for the two sexes—for example, in terms of their ratio—than the corresponding enlistment rates.

Table 9

Relationship of Intention to Enlistment and Written Testing Rates Among Women and Men (combined YATS surveys for fall 1980–fall 1981)

Enlistment Intention Level	Percentage Enlisting by March 1985	Percentage Testing by March 1985
Women		
Positive intention and unaided mention	18	40
Positive intention, no unaided mention	4	11
Negative intention	1	4
Men		
Positive intention and unaided mention	31	49
Positive intention, no unaided mention	12	26
Negative intention	6	13

NOTE: Results are weighted to ensure representativeness (N = 6226 for women and 6457 for men).

This is because the proportion of examinees that enlists, i.e., the conversion rate, is smaller for women at every intention level. Moreover, the discrepancy in the ratio of female to male testing or enlistment percentages increases as the intention level becomes less positive.

There are several possible explanations for these results. First, it is possible that people simply do not fully adjust their behavioral intentions in accordance with the full set of contingencies that affect the true probability of a behavior. This may be especially true for long-term forecasts, and the error may increase as the frequency of the behavior decreases. Both of these conditions apply to the YATS intention analysis, and the latter point may help explain the difference in the results for women and men. Relatedly, it is also possible that women require a stronger commitment to enter military service than men because there are more pressures in society for them not to do so, i.e., such behavior is more atypical for women. This explanation is consistent with the lower enlistment rates found among women and with the fact that the disparity between sexes increases as strength of enlistment intention decreases or when we look at enlistments as compared to testing rates. Finally, another explanation consistent with the pattern of results is that demand constraints on total enlistments, types of jobs, and written/physical eligibility may operate to restrict enlistments among women more so than among their male

counterparts. As a consequence, enlistment constraints could weaken the relationship between intentions and enlistments for women, as compared to men.

Intention-Enlistment Relationship Among Women After Demographic Adjustments

Table 10 shows the relationship between intention level and enlistment decision for women and men after we control for the effects of the background factors listed in Sec. 2 (for the comparable analysis made for the full male sample). The OLS regression analysis enables us to compare the enlistment and testing rates for the positive intention groups with the rates for the negative intention group, after statistically removing differences attributable to the background characteristics of persons with different intentions.

In the discussion of Table 9, it was noted that the more restrictive eligibility standards for women might help explain the weaker relationship between their stated intentions and their actual enlistment actions, as compared to men. The results in Table 10 appear to support this notion. After the effects of background characteristics are controlled, the influence of positive intentions on the testing rate is reasonably similar for the two sexes. Moreover, although the relationship of intentions to enlistment still is stronger for men, the adjusted results for the two sexes are considerably closer than the

Table 10

Enlistment and Written Testing Rates by Intention After Controlling for Background Factors (combined YATS surveys for fall 1980–fall 1981)

Enlistment Intention Level	Increase in Enlistment Percentage[a]	Increase in Testing Percentage[a]
Women		
Positive intention and unaided mention	13	26
Positive intention, no unaided mention	0	4
Men		
Positive intention and unaided mention	19	22
Positive intention, no unaided mention	4	7

[a]Increase compared to negative intention level after controlling for demographic factors (N = 6226 for women and 6457 for men).

unadjusted enlistment rates in Table 9. Since the background characteristics being controlled are related to enlistment eligibility, differences in service admission policies for the two sexes appear to help explain differences in the relationship between their stated intentions and enlistment rates.

Overall, the results in Table 10 suggest that women's and men's enlistment intentions convey information about their likelihoods of taking the written test or enlisting that would not be known from their background characteristics. Thus, as is true for men, women's intentions appear to capture an underlying attitudinal or taste-for-service component. (There is one exception to this pattern. We noted earlier that the enlistment rate was small for women with positive intentions but no unaided mentions. The results in Table 10—a zero percent increase in enlistment—suggest that women in this group are in fact no more likely to enlist than women with negative intentions, when we account for the differences in background characteristics between women in the two groups.)

Contribution of the Negative Intention Group to Enlistments Among Women

Table 11 shows the distribution of YATS enlistees across the three intention groups. We saw in Sec. 2 that nearly half the enlistees among

Table 11

Intention Distribution of Female and Male Enlistees (combined YATS surveys for fall 1980–fall 1981)

Enlistment Intention Level	Percentage of Sample	Percentage of Enlistees
Women		
Positive intention and unaided mention	1	14
Positive intention, no unaided mention	12	23
Negative intention	87	63
Men		
Positive intention and unaided mention	6	19
Positive intention, no unaided mention	26	35
Negative intention	68	46

NOTE: The results are weighted to ensure representativeness. For women, there are 6226 respondents and 114 enlistees; for men, the corresponding numbers are 6457 and 567.

male respondents to the spring 1976–fall 1980 YATS waves came from the negative intention group. The results for men in the fall 1980–fall 1981 waves in particular are similar. Among women in the fall 1980–fall 1981 waves, nearly two-thirds of the enlistees (63 percent) came from the negative intention group. This result is attributable to the very large size of the negative intention group, which contains almost 90 percent of the female respondents. Because the group is so large, it accounts for a majority of the female enlistees, despite the low enlistment rate observed among persons stating negative enlistment intentions. Since a larger proportion of female respondents is concentrated in this group than among males, the effect is more pronounced for women.

As was true for men, these results imply that in developing recruiting/advertising strategies it is important to understand why some women within the negative intention group enlist and others do not, rather than to simply identify factors that distinguish women with positive enlistment intentions from those with negative intentions. A further implication is that analyses that compare positive intention levels for the two sexes can overstate women's potential enlistment rate relative to that of men. As the YATS data indicate, this is because fewer women stating positive intentions actually enlist. Consequently, whereas the percentage of young men expressing positive intentions is generally two to three times the positive intention rate among young women, the male enlistment rate is more than five times the female enlistment rate.

PREDICTING ENLISTMENTS IN SPECIFIC SERVICES

Let us now examine nonprior-service male enlistments in the individual active-duty services. The general composite measure has succeeded well in tracking enlistments, so we might ask whether this measure also may be adequate for predicting enlistments in the specific services. Or it may be that we can improve prediction for the specific services by creating analogous composite measures that incorporate the intention measures specific to each service that are included in the YATS. We will compare the results for the two types of composite measures.

Table 12 shows the distribution of enlistment intentions on the two types of composites: the three-category general composite measure we have examined so far and the corresponding specific service composite measures that combine the unaided mention results with one's stated likelihood of serving specifically in the "Army," "Navy," "Air

Table 12

Distribution of Enlistment Intentions for General and Service-Specific Composite Measures (combined YATS surveys for spring 1976–fall 1980)

Enlistment Intention Level	Composite Intention Measure				
	General	Army	Navy	Air Force	Marine Corps
Positive intention and unaided mention	5	2	2	3	1
Positive intention, no unaided mention	23	13	15	16	11
Negative intention	72	85	83	81	88

NOTE: Results are weighted to ensure representativeness (N = 33,809).

Force," or "Marines," rather than in "the military." The service-specific intention questions are included in the YATS survey in the same section as the question concerning one's likelihood of serving in the military in general.

As we would expect, the distribution of intentions to enlist in the individual services is less positive than intention to serve in the military in general. This reflects the lower enlistment rates in the individual services. Thus, overall, it is consistent with the results seen for women. It is worth noting that although the positive intention levels are all lower than for the general composite measure, the adjustments are not completely in line with actual enlistment behavior. In reality, the Army has the highest enlistment rate and the Marine Corps the lowest, with the Air Force and Navy in between. As can be seen in Table 12, these rates are reflected only partially in the intention results. This pattern has implications for the results shown in the next section, and we will return to it at that time.

The Intention-Enlistment Relationship for Specific Services

Table 13 shows the enlistment and written testing rates for the individual services for the two types of composite measures. Enlistment results are shown in the upper panel and written testing rates in the lower panel. From left to right, the first set of columns shows the results for the general composite measure; the second set shows the analogous results for the service-specific composite measures.

The analyses reveal several important results. First, it is clear that both the general and service-specific composite measures are signifi-

Table 13

Relationship of Intention to Enlistment and Written Testing Rates for General and Service-Specific Composite Intention Measures (combined YATS surveys for spring 1976–fall 1980)

Action and Enlistment Intention Level	General Composite				Service-Specific Composite			
	Army	Navy	Air Force	Marine Corps	Army	Navy	Air Force	Marine Corps
Enlistment								
Positive intention and unaided mention	14	9	9	5	21	15	13	10
Positive intention, no unaided mention	6	4	3	2	7	5	4	3
Negative intention	2	2	2	1	3	2	2	1
Written test								
Positive intention and unaided mention	21	14	13	7	33	22	18	15
Positive intention, no unaided mention	12	7	6	3	14	9	7	5
Negative intention	5	3	3	1	6	3	3	2

NOTE: Results are weighted to ensure representativeness (N = 33,809).

cant discriminators of actual enlistment and testing behavior. It is equally clear that the service-specific measures are more accurate. This is true in every instance for the positive intention groups, for both the enlistment and written examination results. In each case, the enlistment and written testing rates for the positive intention groups are significantly higher for the specific measures than for the general measure. (The rates for the "positive intention, no unaided mention" groups are similar in absolute terms.) The results also show that the service-specific behavior rates are lower than the rates of enlistment or testing in general (as seen in Table 2). In other words, not only is the percentage of persons expressing positive enlistment intentions smaller for the individual services than for "the military" in general (as seen in Table 12), but the enlistment and testing rates among such persons are smaller as well. These results are thus analogous to those shown earlier for women.

Finally, note that the intention-behavior relationship appears strongest for the Army and weakest for the Air Force. Again, in part, this most likely reflects the fact that enlistment and written testing rates are higher for the Army—which has the largest recruiting mission—than for the other services. Thus, to the extent that intentions concerning enlistment actions over the long term are not error-free, the Army could be expected to show the highest behavior rates at each intention level and to get the greatest boost from cross-service movements. In addition, we noted earlier that demand constraints (i.e., service admission policies) may act to attenuate the intention-enlistment relationship among women. The same may be true for the service-specific measures and for the Air Force in particular. Individuals with strong preferences to enter a particular service may not meet its eligibility criteria. In terms of impact on the intention-enlistment relationship, the tough eligibility standards of the Air Force coupled with the preference for the Air Force reflected in intention measures could explain the weaker relationship for this service.

THE INTENTION-ENLISTMENT RELATIONSHIP AMONG MILITARY APPLICANTS

We have seen that stated enlistment intentions are a significant discriminator of actual enlistment and written testing behavior in the general youth population. We also have seen that the enlistment and testing rates for the positive intention groups decrease when the overall rate of the behavior across all individuals decreases. We suggested that failure to adjust stated intentions for the full array of contingencies that may affect subsequent behavior might account for

these results, and that this tendency may be especially pronounced for long-term forecasts and low-frequency behaviors. We also suggested that demand constraints may help explain the results.

We can use intention data provided by military applicants to examine these notions more closely. Military applicants are persons who have taken the written test to qualify for service in the armed forces. About half these applicants enlist (compared to about 10 percent of the YATS male national youth sample), and they do so in a short period following the written test (typically, within a few months). Thus, both the higher rate of the behavior and the shorter length of the intervening period should contribute to a stronger relationship between the applicants' stated intentions and their actual enlistment behavior. In addition, we can use MEPS Reporting System records to identify the (aptitude and physical) eligibility of the applicants, and thus directly examine the impact of demand constraints.

Table 14 shows results from the 1981 Survey of Military Applicants. The survey was administered to a stratified random sample of 3700 men who took a production ASVAB in April 1981. On average, respondents completed the survey six to seven weeks after testing. The follow-up check of enlistment records to determine the applicants' final enlistment status was made one year after the survey. Applicants who enlisted before the survey were excluded from this analysis.

Table 14

Applicants' Enlistment Rates by Intention (1981 Survey of Military Applicants)

Enlistment Intention in Survey	Percentage Enlisting Within One Year	
	High-Quality Applicants[a]	Lower-Quality Applicants
Full sample		
Definitely will serve	53	35
Probably will serve	27	17
Negative propensity	7	9
Qualified applicants		
Definitely will serve	52	52
Probably will serve	26	21
Negative propensity	7	11

[a]"High-quality" applicants are high school graduates who score in the upper half of the written test distribution (i.e., categories I–IIIA). All others are "lower-quality" applicants.

The upper portion of the table shows the one-year enlistment rate by intention level for high-quality and lower-quality applicants. (A "high-quality" applicant has a high school diploma and scores in the upper half of the written qualifying test national percentile distribution.) The unaided mention question was not included in the applicant survey; thus, the general intention question alone—i.e., likelihood of serving in the military—was used to assess intention.[1]

The pattern of enlistment rates by intention level seen in the upper portion of Table 14 is quite similar among high- and lower-quality applicants. In both cases, there is a strong relationship between stated intention and actual enlistment decision. However, there is a difference in the absolute level of enlistments between the two quality groups: the enlistment rates for the positive intention groups are lower for lower-quality applicants. Let us examine the extent to which the data reflect a demand constraint on lower-quality enlistments.

The lower portion of the table reports essentially the same analysis as above, with one important difference—we now concentrate only on "qualified" applicants. These are persons who passed the written test and, for those who went on to take the physical exam, those who passed that step in the enlistment process as well.[2] The data in the lower half of Table 14 show clearly that when we look at those individuals who are qualified to enlist, the results for high- and lower-quality applicants are very similar and, indeed, do not differ statistically.

For both groups, there is a strong relationship between intention and enlistment. Enlistment rates for the positive intention groups are higher among the qualified applicants than in the YATS national youth sample (see Sec. 2); about one-half of those with a definite intention enlist, compared to one-third of the analogous YATS respondents, and about one-fourth of those with a probable intention do so, compared to one-sixth of the analogous YATS group. (It should be noted that approximately one-third of the applicants enlisted prior to

[1]The influence of economic conditions on this measure—discussed in Sec. 2—should be much less pronounced among applicants than among the general population. This is because the choice to apply reflects a recent decision that accounts for current economic conditions and because the quality variable controls for possible differences in the composition of the intention groups that would affect eligibility.

[2]Many high-quality applicants with temporary or remedial physical examination failures eventually enlist. The exclusion of these individuals accounts for the slight decrease in enlistment rates for high-quality applicants in the definitely and probably groups shown in the lower half of Table 14.

the survey and thus could not be asked about their intention to enlist; presumably, the inclusion of such persons immediately after testing would further strengthen the relationship between intention and enlistment.) Overall, the results in Table 14 provide support for the effects of increased frequency and immediacy of behavior on improving the intention-behavior relationship. They also show clearly the importance of demand constraints; such constraints should be well understood when using the intention results from one group to predict the behavior of another (e.g., using applicants' intention-enlistment results to predict national youth population enlistments, or using men's intention-enlistment results to predict women's enlistments from their intentions).

4. EVALUATION OF ENLISTMENT INTENTION RESPONSES TO HYPOTHETICAL ENLISTMENT OPTIONS

Thus far we have seen that intention level is a significant discriminator of the likelihood of enlistment. An additional focus of our research was to develop better methods for interpreting responses to survey questions about the likelihood of enlisting under specific hypothetical options, and to evaluate the potential usefulness of such intention information as an adjunct to field tests.[1]

In particular, we were interested in whether the survey approach could provide meaningful results on the effects of certain kinds of options relative to others—for example, enlistment bonuses versus educational benefits, or larger-value options versus smaller ones. If so, such information could help us choose among the options available for testing and determine which options might provide the best results for the funds available.

Given the various factors that affect the translation of intentions into enlistment, we also were interested in developing better methods for predicting enlistment rates from survey enlistment intention responses and, then, in seeing how enlistment rate changes predicted by the survey approach for specific options would compare with the actual enlistment results obtained in field tests of those options. A considerable amount of time and money is spent in the design and execution of field tests to ensure that they will reveal the effects of particular options with a reasonable degree of statistical precision. If survey results can give an early indication of the approximate size of the options' effects, they could save time and money in designing the tests. Moreover, survey data could be used in conjunction with field results to evaluate the effects of a broader spectrum of potential options than could feasibly be tested directly.

DATABASES AND METHODS

Table 15 provides an overview of the databases used in our analyses of responses to hypothetical enlistment options. The databases in-

[1]This material is drawn heavily from Orvis and Gahart (1990). In particular, the reader is referred to Section IV and Appendix D of that report.

Table 15

Survey Databases Providing Information on Effects of Hypothetical Enlistment Options

Database, Sample, and Recruiting Environment
1983 Survey of Military Applicants Male production ASVAB examinees Enlistment Bonus Test in field
1981 Survey of Military Applicants Male production ASVAB examinees Educational Assistance Test Program in field
1981 Grey Advertising National Survey Representative sample of males, ages 16–20 years Educational Assistance Test Program in field

clude the 1983 Survey of Military Applicants, which provided information on male production ASVAB examinees who tested in April 1983. At that time, the Enlistment Bonus Test was in the field; it offered special bonus programs to high-quality Army enlistees. A second database containing similar questions was the 1981 Survey of Military Applicants. As in the 1983 survey, respondents were male production ASVAB examinees; in this instance, they tested in April 1981. In 1981, the Educational Assistance Test Program was in the field; it offered special educational benefits to high-quality enlistees in all services. We evaluated data from both applicant surveys to avoid relying on applicants who applied at a time when special, generous educational programs (or enlistment bonuses) were available. Under such conditions, individuals attracted into the applicant pool might be particularly interested in educational incentives (or bonuses). Finally, we also analyzed results from the 1981 Grey Advertising National Survey. This survey was conducted in conjunction with the 1981 applicant survey and contained many similar questions. The national survey, however, was administered to a representative sample of nonprior-service men, ages 16–20 years. Because the hypothetical options are directed toward attracting more young men into the applicant pool, i.e., expanding the market, the national survey is the most appropriate database for our analysis, and it is the primary database upon which we focus. Moreover, as a national survey, it avoids the possible self-selection problems in applicant surveys.

We developed a simple method and a multivariate method for interpreting answers to questions about the respondent's likelihood of en-

listing under various hypothetical options (see Orvis and Gahart, 1990). The methods are summarized in Table 16. The first or "simple" method treats all respondents in a given intention group equivalently. It has three basic steps. First, the actual enlistment rate under the current (or baseline) program must be determined for each intention group. Assuming two groups—i.e., those with positive (definitely or probably will enlist) or negative (definitely or probably will not enlist, or don't know if will enlist) intentions—results from a prior follow-up would be applied or a follow-up would be conducted to determine what proportions of persons expressing positive and negative intentions actually enlist.

The second step is to measure the distribution of enlistment intentions—i.e., the proportions of respondents reporting positive and negative intentions—under specific hypothetical options. In the third step, the enlistment rates for the positive and negative intention groups are applied to the enlistment intention distributions measured in the second step. By combining this information, it is possible to

Table 16

Summary of Methods Used to Estimate Effects of Hypothetical Enlistment Options

	Methods
I.	Simple method: treats all respondents in enlistment intention group equivalently
	Step 1. Determine enlistment rates for intention groups under the baseline program
	Step 2. Measure enlistment intention distribution under hypothetical option
	Step 3. Apply enlistment rates to intention distribution to estimate change in enlistments under hypothetical option
II.	Multivariate method: does not treat all respondents in enlistment intention group equivalently
	Step 1. Model relationship between stated enlistment intention level and background characteristics, to impute "true" intention level
	Step 2. Model enlistment probability based on imputed intention level and background characteristics
	Step 3. Estimate respondent's enlistment probability based on his stated intention level under hypothetical option and his background characteristics, using models in Steps 1 and 2.

estimate the enlistment rates under the hypothetical options and compare them with the current rate. This involves multiplying the proportion of persons expressing positive intentions by the proportion of such individuals who enlist and adding the result to the product of the proportion of individuals expressing negative intentions with the proportion of those individuals who enlist. The sum provides an estimate of the enlistment rate under the given option. By comparing such sums with the enlistment rate under the current or baseline condition, the effects of hypothetical options on enlistments can be estimated.

We devoted a considerable amount of work to developing a more complete method of evaluating responses to questions about enlisting under hypothetical options. The "multivariate" method differs fundamentally from the simple method in that it does not treat all respondents in a given intention group equivalently, that is, it does not assume that all persons with the same stated intention are equally likely to enlist. Instead, it assumes that the probability of enlistment is a function of true intention level and background characteristics, that observed intentions reflect true intentions plus error, and that true enlistment intentions are related to respondents' background characteristics. In other words, the multivariate method assumes that there is imprecision inherent in the relationship between stated intentions and enlistment, and that demographic and background factors can be used to adjust intention responses to provide more accurate estimates of the likelihood that particular individuals will enlist.

As seen in the lower portion of Table 16, the first two steps in applying the multivariate method are to model the relationships between stated intentions and background characteristics (to impute "true" intention level) and between enlistment, imputed intentions, and background. Using the models, in step three a respondent's stated intention (in response to a particular option) is adjusted for his background characteristics to provide a better estimate of his true enlistment intention. The enlistment probability for the respondent is then estimated, based on this adjusted intention level and his background characteristics, as specified in the enlistment model.

By computing the average predicted enlistment probability under the option across all respondents, and comparing it with the enlistment rate under the baseline (current) program, the effect of the hypothetical option on enlistments can be estimated. We have shown in Sec. 2 that enlistment intention conveys information about an individual's probability of enlisting in addition to that conveyed by his background

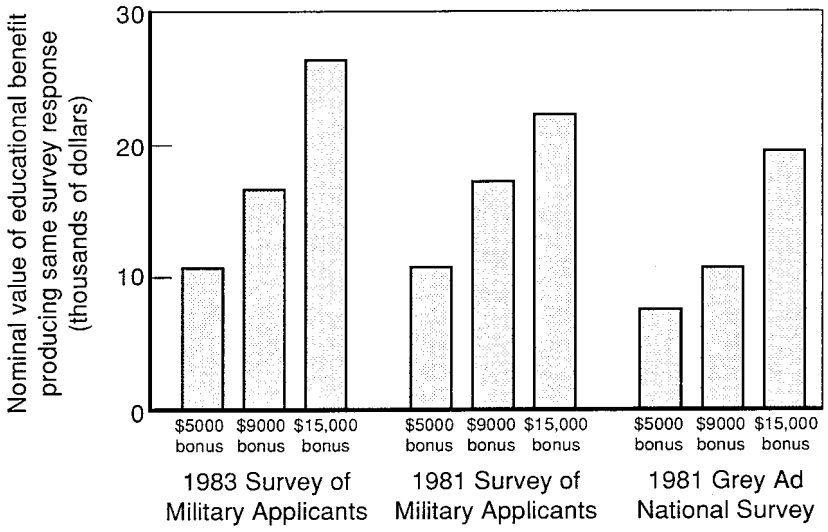
characteristics (see also Orvis and Gahart, 1985). As will be seen below, the converse is also true—that is, background characteristics are not fully incorporated into stated enlistment intentions, and they help to explain why some individuals with a given intention enlist while others do not. The multivariate method accounts for these relationships.

COMPARISONS BETWEEN TYPES OF OPTIONS

Consistency Across Databases

One application of intention information is to compare the effects of different types of options, such as large-value versus small-value options or educational benefits versus enlistment bonuses. The key questions for such comparisons are whether they produce reasonable results and whether the results are consistent across different survey samples. Figure 2 illustrates this type of comparison, using the simple method and applying it to each of the three survey databases.

In each survey, respondents were asked about their enlistment intentions in response to various nominal dollar values of cash enlistment



NOTE: Higher-quality respondents.

Fig. 2—Consistency of Responses to Option Types Across Databases

bonuses and postservice educational benefits. Based on these results, the figure shows the approximate nominal values (i.e., face values) of educational benefits that produced the same predicted enlistment rates as the three indicated values of cash enlistment bonuses. The applicant results are based on data from high-quality respondents. For comparability, the national results are based on data provided by persons who were identified as higher-quality respondents according to the procedure developed by Orvis and Gahart (1985). These persons are high school graduates or high school students who would be expected to score at or above the 50th percentile on the AFQT.

For each of the survey databases, the bars increase in height as we move to larger enlistment bonuses. This change indicates that larger educational benefits were required to produce the same predicted enlistment rate changes as larger bonuses, as should be expected. The surveys also produce roughly consistent results concerning the effects of benefits relative to bonuses. The data indicate that it took a greater *nominal* value in educational benefits to produce the same response as a given enlistment bonus.[2] Among applicants, the ratio was about \$1.50–\$2.00 to \$1.00. For example, in the 1983 applicant survey it took just over \$10,000 in nominal educational benefits to produce the same response as a \$5000 enlistment bonus, a ratio of about 2 to 1. Similarly, it took about \$27,000 in nominal educational benefits to produce the same response as a \$15,000 enlistment bonus, a ratio of approximately 1.8 to 1. The heights of the bars are similar for the 1981 applicant survey, indicating similar ratios.[3] The bars also are similar—with respect to larger nominal values of educational benefits being required to produce the same response as given values of enlistment bonuses—but somewhat shorter (about 1.2 to 1) for the Grey Advertising National Survey. This suggests that educational benefits do a little better in a national sample than in applicant samples. The result is reasonable, since we would expect many of the persons most seriously interested in attending college to be present in

[2]Because only some of these entitlements are actually used and because they are used after a period of several years, the expected value (and cost to the government) of educational benefits is well below their nominal value.

[3]Whereas the educational benefit values corresponding to the \$5000 and \$9000 bonuses are nearly the same in the 1981 and 1983 applicant surveys, the benefit value corresponding to the \$15,000 bonus (just under \$23,000) in the 1981 survey is somewhat lower than the \$27,000 value found in the 1983 applicant survey. This could reflect greater receptivity to large benefits (as compared to bonuses) in the 1981 survey among applicants less inclined to enlist (i.e., those inclined to enlist only under more generous options), greater receptivity to bonuses in the 1983 survey, or both. If so, this would be consistent with the notion that persons desirous of particular types of options are drawn into the applicant pool during periods when those options are offered.

a national sample but not in an applicant population. Among such persons, educational benefits as an enlistment incentive would hold greater appeal than they would among those less likely to continue their education. In total, the analysis produces reasonable results, and their general consistency concerning the relative appeal of benefits and bonuses supports the use of intention information in gauging the comparative effects of different types of potential enlistment options.

Effects of Respondent and Option Characteristics

The simple method assigns an equal enlistment probability to everyone in a given intention category, whereas the multivariate method uses background characteristics to help predict the likelihood of enlistment. Nonetheless, the simple and multivariate methods can produce similar results to the extent that the survey data can be partitioned meaningfully according to respondents' characteristics on important background variables. By (1) partitioning the sample on important background factors and (2) computing a separate baseline enlistment rate for each factor level-intention level combination, the enlistment estimates produced by the simple method are adjusted for the influence of the background factors. In the multivariate method, this is accomplished by the application of the intention and enlistment equations. Since it can take account of many dimensions, the multivariate method is the preferred approach. However, the simple method provides satisfactory results when the survey data can be partitioned on the dimensions of interest and when the effect of a hypothetical option on enlistments is relatively consistent across individuals within these dimensions.

Figure 3 illustrates this type of analysis; using responses to the 1981 Grey Advertising National Survey, it predicts the effects on enlistment of various dollar values of enlistment bonuses and educational benefits. The basic background characteristic distinction in Fig. 3 is whether the respondent was in high school at the survey point. Respondent quality is not distinguished. The lighter bars represent results based on the simple method; the darker bars are based on the multivariate method. The findings represented by the lighter and darker bars are roughly similar in each of the four graphs. This similarity reflects the comparability of results generated by the two approaches for the high school student and nonstudent groups. The bars are somewhat shorter for the multivariate method than for

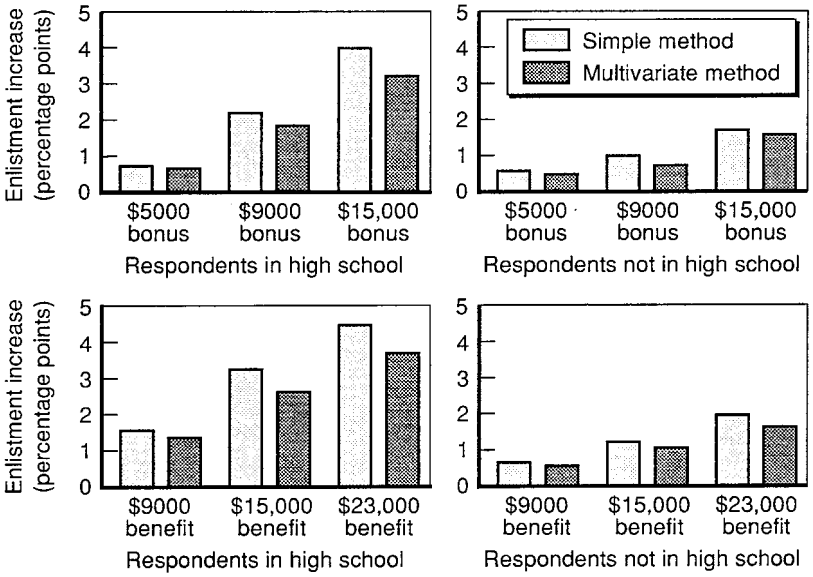


Fig. 3—Comparison of Results from Simple and Multivariate Prediction Methods for Basic Analyses

the simple one, however, particularly for the larger option values. This difference occurs because the multivariate method takes into account the background characteristics of the respondents. It suggests that individuals who express positive intentions only under more generous options are in actuality somewhat less likely to enlist under those options than are individuals who previously expressed positive intentions under less generous options. The simple method is not sensitive to the difference in background characteristics underlying this pattern.

The results in Fig. 3 suggest that an analysis evaluating the simultaneous effects of several dimensions might be informative. For example, the bars for respondents in high school are taller than the bars for respondents not in high school, suggesting that the enlistment incentives produce a greater response among high school students. Moreover, the discrepancy in the height of the bars between the high school students and nonstudents appears to increase as the nominal value of the incentive increases. Thus, for example, the bars for persons in high school and not in high school are more similar for a

$5000 bonus than for a $15,000 bonus; the bars for a $9000 benefit are more similar than for a $23,000 benefit.

To investigate the effects of option characteristics and show how they vary among different types of respondents, we conducted an analysis of variance (ANOVA) on the changes in enlistment rates predicted for the options by applying the multivariate method to the national survey results.[4] The predicted enlistment effects were evaluated according to whether respondents were still in high school. Also, respondents predicted to score at or above the 50th percentile on the AFQT were compared to lower-aptitude respondents. The analysis further distinguished the type of enlistment option, benefit versus bonus, and the nominal dollar value of the option. The analysis thus contained two between-subjects factors (school status and aptitude) and two within-subjects factors (option type and option value).

The analysis of variance suggests a number of important differences in the predicted enlistment rate according to respondent and option characteristics, as shown in Table 17. In total, the results are consistent with observed behavior in the recruiting market and, therefore, afford confidence in the validity of the enlistment intention approach. For example, predicted enlistment increases under the potential options were significantly greater among high school students than among those not in high school, as suggested in the discussion of Fig. 3. This difference would be expected, since most persons who eventually enlist do so during or shortly after high school. As one would also expect, larger options produced greater predicted enlistment increases than smaller options.

A number of statistically significant interaction effects were also indicated. For example, not only were high school students more responsive to the prospective options, but, as suggested above, the difference between the predicted enlistment rates for high school students and persons not in high school increased as the nominal value of the in-

[4]It is important to understand that the predicted effects of the options are determined primarily by the changes in enlistment intentions expressed by the respondents, rather than the enlistment and intention equations applied in the multivariate method. The dependent variable represents *changes* in the predicted enlistment rate. Thus, the ANOVA would show no effects whatsoever if enlistment intention responses did not change. Also, if intentions did change, but changed uniformly—for example, an equivalent proportion of persons expressing negative intentions changed to positive intentions (in response to an option) in the high school student and nonstudent groups—the predicted effect of the option appropriately would depend on the characteristics of the persons in each group changing intentions in response to the option and on the observed relationship between intentions, respondent background, and enlistment.

Table 17

Predicted Variations in Enlistment Rates by Respondent and Option Characteristics

Source of Variance	Degrees of Freedom	Mean Square	F-ratio	p-level[a]
Respondent aptitude	1	.0000	0.00	ns
Respondent school status	1	.1958	25.63	.001
Respondent aptitude × school status	1	.0008	0.10	ns
Error term	761	.0077		
Option type	1	.0136	8.71	.003
Option type × aptitude	1	.0047	3.01	.083
Option type × school status	1	.0078	5.01	.025
Option type × aptitude × school status	1	.0001	0.09	ns
Error term	761	.0016		
Option nominal dollar value	2	.1201	138.71	.001
Option value × aptitude	2	.0016	1.80	ns
Option value × school status	2	.0183	21.10	.001
Option value × aptitude × school status	2	.0004	0.48	ns
Error term	1522	.0009		
Option type × option value	2	.0007	1.32	ns
Option type × option value × aptitude	2	.0009	1.77	ns
Option type × option value × school status	2	.0002	0.47	ns
Option type × option value × aptitude × school status	2	.0009	1.75	ns
Error term	1522	.0005		

[a]The ANOVA uses classifying factors that are distinct from the variables in the multivariate method enlistment equations and, moreover, combines results for the high school student and nonstudent models. The p-levels in the ANOVA should nonetheless be interpreted with caution, since the results are based on predicted rather than actual enlistment effects (N = 765). ns = not significant.

centives increased. Interaction effects were also found concerning respondents' likelihood of enlisting under enlistment bonus options as compared to educational benefit options.[5] In comparison with the response to enlistment bonus options, response to educational benefits was more favorable for high school students than for persons not in high school, and marginally more favorable for high-aptitude youths than for low-aptitude youths. These results seem reasonable,

[5]The main effect found for option type (i.e., benefit versus bonus) is not readily interpreted, since the nominal dollar values of the enlistment bonus and educational benefit options were not equivalent.

since we would expect high school students and high-aptitude youths to be the individuals most interested in continuing their education.

APPROXIMATION OF FIELD TEST RESULTS

Thus far we have presented evidence suggesting that questions about the likelihood of enlisting under hypothetical options can produce reasonable and consistent results on the effects of certain kinds of options relative to others. This makes the survey approach potentially useful in choosing among alternative options, to get the best enlistment results for the funds available (e.g., specified values of educational benefits as compared with enlistment bonuses, alternative dollar values, special features such as student loan repayments, etc.). Another important issue is the comparability of the enlistment rate changes predicted for specific options from the survey approach with the changes observed in field tests of the same options. To make such comparisons, we must be able to predict the enlistment rate for the control cell of an experimental program and for at least one test cell.

Using data from the Grey Advertising National Survey, it was possible to predict and compare enlistment rates for the control and Ultra VEAP kicker cells of the Educational Assistance Test Program and for the control and $8000 cells of the Enlistment Bonus Test. To predict enlistment rates for the four cells, we used the multivariate estimation method, making certain restrictions as warranted by the features of the test programs. First, because the programs were open only to high-quality enlistees, the intention analysis was based on the responses provided by higher-quality respondents.[6] Second, because the programs evaluated were Army programs, the enlistment model used in the estimation predicted enlistment in the Army, rather than enlistment in the military in general. Finally, consistent with the results observed in the Educational Assistance Test Program and the Enlistment Bonus Test, we assumed that enlistment increases would occur only in eligible military occupational specialties (MOSs). Thus, we applied a factor in the analyses that took into account the proportion of training seats eligible for the test programs. These procedures are summarized in Table 18.

[6]As used here, "higher-quality" refers to respondents predicted to score at or above the 50th percentile on the AFQT who were high school graduates or high school students at the survey point.

Table 18

Survey Data Analysis Procedures Used to Approximate Field Test Results

Programs and Procedures
Cells Analyzed
Control and Ultra VEAP kicker cells of Educational Assistance Test Program
Control and $8000 cells of Enlistment Bonus Test
Procedures
Use "multivariate" estimation method
Analyze results for "higher-quality" respondents[a]
Use model of enlistment in Army
Limit enlistment increases to eligible specialties

[a]Respondents predicted to score at or above the 50th percentile on the AFQT who were high school graduates or high school students at the survey point.

Table 19 shows the enlistment increases predicted for the experimental programs from the survey approach—which relies on responses to enlistment intention and background characteristic questions—and the actual increases observed in the field tests of the programs. The predicted changes in the enlistment rate compare closely with the observed results. For example, according to the survey approach, the Ultra VEAP kicker program was predicted to increase enlistments by approximately 8 percent. The actual increase observed in the test was 8.7 percent (with a standard error of 2.8 percent). Similarly, the predicted enlistment increase for the $8000 cell in the Enlistment Bonus Test was just over 2 percent. This compares to an increase of 4.1 percent (with a standard error of 2.4 percent) determined in the analysis of the actual test results (see Polich, Dertouzos, and Press, 1986). The Enlistment Bonus Test analysis controls for changes in recruiting practices under more favorable market conditions that act to mask the full market expansion potential of the bonuses, statistically removing the effects of such changes on the observed enlistment rate.[7] This type of adjustment is beyond the scope of the current

[7]The 4.1 percent figure was derived by an analysis that controlled for observed recruiting practices under the actual market conditions elicited by the Enlistment Bonus Test programs. One effect of the improved recruiting market was an apparent reduction in recruiter effort. This reduction in effort acted to mask the full market expansion potential of the bonuses. Also, not all the additional enlistees brought in during the Enlistment Bonus Test period were high-quality enlistees; this too acted to reduce the observed enlistment increase for high-quality youths below 4.1 percent. The Enlistment Bonus Test analysis corrected for the effects of such recruiting practices statistically by adjusting the observed enlistment rate upward.

Table 19

Comparison of Enlistment Rate Changes Predicted from Survey Approach with Field Test Results

	Percentage Increase in Enlistments Compared to Control Cell	
Test Program and Cell	Predicted Increase[a]	Actual Increase
Educational Assistance Test Program, Ultra VEAP kicker cell	7.9	8.7
Enlistment Bonus Test, $8000 cell	2.1	4.1[b]

[a]N = 765.

[b]Assumes constant recruiting effort and market conditions. Observed increase lower.

survey approach, which produces approximations based on normal recruiting practices. For this reason, the survey approach can be expected to produce somewhat smaller estimates of the bonuses' effects relative to those reported in the test for more ideal conditions. Overall, the findings clearly suggest that the application of enlistment intention and demographic information—the "survey method"—can produce reasonable approximations of field test results.

5. CONCLUSIONS

We noted at the outset that the uses of data on stated intention to enlist in the military have followed three major themes: First, intention information has been used as a means of distinguishing individuals who are more likely to enlist from those who are less likely to do so. This "propensity" information has been used to examine issues such as advertisement awareness, knowledge of incentive programs, and the appeal of various job characteristics; the resulting insights provide guidance for advertising and recruiting efforts to increase enlistments. Second, intention information has been used at the aggregate level to provide a barometer of future enlistment rates. For example, by comparing national intention levels with those in the recent past, the recruiting community has attempted to anticipate changes in the ease or difficulty of meeting current quotas. Relatedly, regional analyses have used the relative intention levels of different geographic areas to help allocate recruiting resources, and, based on a presumed lagged effect of intention on enlistment, intention information has been used to evaluate the effectiveness of advertising campaigns that seek to change attitudes toward the military as a means of increasing subsequent enlistments. Third, to provide policy guidance, intention information has been used to predict changes in military enlistment and reenlistment behavior in response to alternative prospective options.

The results discussed in this synthesis document provide strong support for each of these applications of enlistment intention information in recruiting research. The results convincingly demonstrate both the relationship between stated intention and actual enlistment behavior and the potential usefulness of intention data in making enlistment predictions for a variety of purposes. Specifically, we have learned that

- Intention information is a significant predictor of enlistment behavior.
- Individual service enlistment intentions predict which service will be selected as well as whether an individual will enlist.
- Intention data provide information about a person's probability of enlisting not known from his demographic characteristics.
- Aggregated intention data are a significant predictor of geographical enlistment rates.

- The relationship between intention and enlistment depends on the frequency of enlistment in the population, the period between measurement of intention and enlistment, and demand constraints on enlistment.
- Because it represents a large percentage of the population, the negative intention group is an important source of enlistees.

THE INTENTION-BEHAVIOR RELATIONSHIP

Enlistment Intention Results Predict Enlistment Actions

We have presented a great deal of evidence that survey respondents' stated enlistment intentions are significantly related to their actual enlistment behavior. This applies to their likelihood of taking the written test to qualify for military service as well as to the probability of subsequent enlistment. The findings thus provide direct support for the use of intention data to distinguish groups with different probabilities of joining the military in research conducted to help target recruiting or advertising efforts. For example, each group could be probed concerning factors that promote and inhibit enlistment, postsecondary school plans, patterns of recruiter contacts, and so forth. The results also indicate that respondents can discriminate among the individual services in stating their intention and thus that service-specific intention measures can be applied in predicting written testing and enlistment actions for the individual services. In addition to the uses just noted for market research, if such information were available for potential recruits, it could facilitate enlistment by matching them with recruiters from their preferred service. More important, perhaps, the results suggest that aggregated data from service-specific measures could be better barometers of the upcoming recruiting environment for those services than aggregated data from general intention measures. (See below.)

When intention information from national youth samples is used, unaided mentions of plans for military service appear helpful in distinguishing persons especially likely to enlist among all who express positive intentions. In contrast, differences in enlistment between persons expressing definite enlistment intentions and those with probable intentions may depend on national economic conditions pertaining to youth employment.

Intention Data Reveal More Than Demographics Alone

Our regression analyses suggest that intentions give additional information about a person's likelihood of enlisting in comparison with his or her demographic characteristics alone. Large and significant differences in enlistment and testing rates among the intention groups remain even after we account for the different demographic characteristics of persons with different enlistment intentions. And after controlling for demographics, we also found that the first-term attrition rate is significantly lower among enlistees who had the most positive intentions of enlisting. Intention measures thus appear to capture an underlying attitudinal or taste-for-service dimension not captured by demographic characteristics. These findings provide further support for the use of intention data in recruiting research.

Aggregated Intention Information Predicts Regional Enlistment Rates

Our evaluation of the relationship between aggregated regional intention information and enlistments provides evidence that aggregate intention levels are significantly related to concurrent high-quality enlistment rates. These analyses—based on a time series of cross-sections for 16 geographical areas covering the United States—found significant effects of the regional positive intention level on enlistments in each of the four services. There also is somewhat weaker evidence of a lagged intention effect on enlistments; that is, intention levels appear to be significantly related to enlistment rates 12 months later. These results support the use of aggregated intention information to help anticipate the ease or difficulty of meeting recruiting goals, help allocate or target resources accordingly, and help evaluate the effects of campaigns to change attitudes toward the military as a means of increasing enlistments.

Intentions to Enlist Under Hypothetical Options Provide a Useful Addition to Field Test Results

Our analysis of survey enlistment intention responses to questions about the likelihood of enlisting under specific hypothetical options suggests that survey data can provide consistent predictions of the effects of certain options relative to others and, moreover, can be used to explore how these effects vary among subpopulations of special interest. This finding implies that survey analyses could be useful in helping to select among alternative options to get the best results for available funds. The findings also suggest that the survey method

can produce reasonable approximations of field test results. Such information, were it available in the development phase, might save a considerable amount of time and money in test design and execution. Furthermore, survey results could be used as a supplemental data source to approximate the effects of a broader spectrum of potential options than is feasible to test directly in the field.

FACTORS AFFECTING THE INTENTION-ENLISTMENT RELATIONSHIP

Several aspects of our analysis suggest that the relationship between stated intention and actual enlistment is affected by the frequency of enlistment in the population of interest, by the period between intention assessment and expected enlistment, and by demand constraints. For example, our analyses show that the main findings for women are similar to those for men. Their enlistment intentions are significantly related to their actual enlistment decisions and, as is true for men, regression analyses suggest that women's enlistment intentions generally provide information about their likelihood of enlisting that is unknown from their background characteristics. However, fewer women express positive intentions to serve. Moreover, women expressing positive intentions are less likely to enlist than their male counterparts. The intention-behavior link is more similar for the two sexes for testing than for enlisting, and in general, similarity increases with positivity of enlistment intention. These results probably reflect an incomplete downward adjustment of stated intention among women in response to their much lower true likelihood of enlisting, as well as military job restrictions and lower recruiting goals for women (i.e., demand constraints). The demand constraint argument receives some support from regression results which indicate that enlistment behavior is reasonably similar for women and men in a given intention group when demographic characteristics—which are related to eligibility—are accounted for.

Results concerning enlistment in the specific services show a similar pattern. Fewer men indicate they are likely to serve in a particular service than indicate they are likely to serve "in the military." This would be expected, given the lower enlistment rates of the individual services as compared to the military as a whole. However, as is true for enlistments among women, the shift in intentions is not sufficient to offset the full difference in enlistment behavior, and individual service enlistment and testing rates are lower at each intention level than they are for the services taken as a whole. In contrast, enlistment results among military applicants—for whom enlistment is both

considerably more likely and immediate—show the opposite pattern. Not only are their enlistment intentions more positive, but the enlistment rates for the positive intention groups are higher as well. Moreover, the analysis indicates that apparent differences in the intention-enlistment relationship between higher- and lower-quality applicants vanish when eligibility for enlistment is controlled; this provides additional evidence of the impact of demand constraints on the intention-enlistment relationship.

An implication of these results is that the correspondence between intention data and actual enlistment behavior will be greatest to the extent that the enlistment rate is high, the decision is near term, and demand constraints are low for the population of interest. The true parameters on these dimensions should be understood when intention data are applied in a particular analysis. A related implication is that if one wishes to apply the intention-enlistment relationship for one population to another population's intention data to predict enlistments for the latter, one should account for potential differences in the frequency, immediacy, and demand for enlistment. For example, application of the overall men's results to women or simple comparisons of intention results for the two sexes would overstate women's likelihood of enlisting. The same would be true for application of the overall men's results to male enlistments in the specific services, whereas generalization to the applicant population would understate the likelihood of enlistment. When the purpose of the analysis is to examine trends in enlistment or to distinguish individuals who are more likely to enlist from those less likely to do so, these implications are not crucial. However, they are quite important when the purpose is to estimate actual enlistment rates, as, for example, when we seek to approximate the results of field tests of potential enlistment options. As discussed in Sec. 4, such predictions are most accurate when founded on known baseline enlistment rates for the population of interest and when the influence of background factors on intention and the translation of intention into actual enlistment—including eligibility—are accounted for.

THE NEGATIVE INTENTION GROUP IS AN IMPORTANT SOURCE OF ENLISTEES

There is very strong evidence that persons stating positive enlistment intentions are more likely to enlist than those stating negative intentions. Nonetheless, the very large size of the negative intention group makes it an equally important source of enlistees. In particular, the great concentration of women in the negative intention group results

in the majority of female enlistees being drawn from that group: about two-thirds of the female YATS enlistees initially expressed negative intentions, compared to about half of the male enlistees. These results have important implications and indicate that focusing exclusively on women and men with positive intentions is misguided. Even a small upward shift in the enlistment rate among people with negative intentions could represent an important source of additional recruits. Moreover, the results discussed in Sec. 2 suggest that such persons are no more likely than most other recruits to attrite during the first term of service. Thus, marketing research should identify factors that promote enlistment among persons at all intention levels, not simply factors that distinguish persons with different enlistment intentions or that motivate persons with positive intentions to enlist. Such efforts are especially important when the proportion of persons expressing intentions to enlist is very small, as is true for women, or for analyses of enlistment in the individual services.

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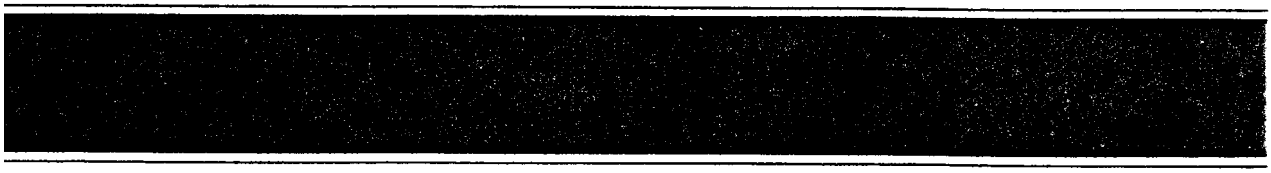
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