A RAND NOTE

FORECASTING ENLISTMENT ACTIONS FROM INTENTION INFORMATION: VALIDITY AND IMPROVEMENT

Bruce P. Orvis

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This Note documents a briefing on the initial phase of research concerning the validity of survey measures of enlistment intentions. A composite data base was formed which linked survey enlistment intention responses with the respondents' actual enlistment decisions following the survey. The survey data were from the 1981 Applicant Survey and 10 semi-annual waves of the Youth Attitude Tracking Study (YATS), covering Spring 1976 to Fall 1980. The enlistment data were obtained from Defense Manpower Data Center (DMDC) extracts of the AFEES Reporting System records maintained by the Military Enlistment Processing Command. Then the relationship between strength of enlistment intention and likelihood of enlistment was analyzed, both for applicants--persons who have taken the written test to enter the military--and for the YATS national youth samples. The results suggest that the enlistment intention measures in the Applicant and YATS surveys do a good job of discriminating the respondents' true probabilities of enlistment.

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PREFACE

This Note documents a briefing on the initial phase of Rand research concerning the validity of survey measures of enlistment intentions. The work was performed under the Manpower, Mobilization, and Readiness Program "Enlistment Intention Project," for the Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics. The purpose of the research is to investigate the relationship between survey enlistment intention measures and respondents' subsequent enlistment decisions, to assess the usefulness of including intention variables in enlistment decision models based on demographic and economic factors, and to provide guidance in designing intention measures for the particular enlistment issues of interest.

The initial step in this research was to link enlistment decision information with existing enlistment intention data. The merged results were then used to quantify the relationship between enlistment intentions and actual decisions. Additionally, the work compared the usefulness of several different intention measures, particularly in identifying propensity to serve in the military in general as opposed to propensity to serve in the individual services. This briefing was given to the Joint Marketing and Research Committee (JMARC) during its November 1982 meeting, to summarize the results of this initial work.

SUMMARY

Several current U.S. youth surveys ask about the likelihood that respondents will enter military service. The questions may address propensity for military service in general, or intention to join an individual service in particular. The information is used in a variety of ways, for example, to forecast future changes in enlistment rates or to help explain differences in enlistment rates across geographic areas. These applications of enlistment intention data presume a direct relationship between the strength of a person's intention to serve and the likelihood that he will actually enlist. Yet, there has been little systematic research to evaluate the validity of this assumption. The purpose of this project is to determine the extent of this relationship, to provide guidance in selecting and formulating intention measures for future survey work, and to investigate useful applications of intention data in enlistment projection models.

This briefing summarizes the results of the initial phase of the research. During this period, a composite data base was formed which linked survey enlistment intention responses with the respondents' actual enlistment decisions following the survey. The survey data were drawn from the 1981 Applicant Survey (Orvis and Hawes, forthcoming) and from 10 semi-annual waves of the Youth Attitude Tracking Study (YATS), covering Spring 1976 to Fall 1980. The enlistment data were obtained from Defense Manpower Data Center (DMDC) extracts of the AFEES Reporting System records maintained by the Military Enlistment Processing Command (MEPCOM). We then analyzed the relationship between strength of enlistment intention and likelihood of enlistment, both for applicants--persons who have taken the written test to enter the military--and for the YATS national youth samples.

The results suggest that the enlistment intention measures in the Applicant and YATS surveys do a good job of discriminating the respondents' true probabilities of enlistment. The data also indicate that, whereas applicants make enlistment decisions in the near term, many YATS respondents make their enlistment decisions several years after the survey. Thus, the evidence of correspondence between the

survey responses and actual enlistment decisions is especially encouraging for the YATS national youth samples. The results show that the YATS intention measures afford their greatest predictive power within the first 12 to 18 months following the survey; however, they continue to distinguish different propensities to enlist over the long term, at least three to four years. The results also indicate that different intention measures are optimal for different purposes. Overall enlistment propensity is best distinguished by asking about the respondent's intention to serve in the military, whereas propensity toward an individual service is best assessed by questions focusing on his intention to enlist in that particular service. The results also show that unaided mentions of plans to join the active duty military can be used in conjunction with the strength of respondents' enlistment intentions to improve the prediction of their actual enlistment decisions.

ACKNOWLEDGMENTS

I am grateful to my Rand colleagues Mike Polich, Jim Hosek, and Glenn Gotz for their valuable advice in preparing this briefing; to Jeff Garfinkle and Alisa Wilson for their assistance in analyzing the results presented; and to Ross Stolzenberg for his helpful review of this manuscript. I am also indebted to Dr. G. Thomas Sicilia, Director, and Commander Louise Wilmot, Deputy Director, Accession Policy, OASD (MRA&L), and to Zahava D. Doering, Chief, and J. J. Miller, Survey and Market Analysis Division, Defense Manpower Data Center (DMDC), for their advice and support. Special thanks must go to Helen Hagan, who merged the intention and enlistment information, and to Les Willis and Bob Brandewie, who answered my questions with precision and patience, all of DMDC. Finally, a great deal of credit goes to Linda Daly and Jan Iverson, who assisted in the preparation of this Note and the briefing charts contained herein.

FORECASTING ENLISTMENT ACTIONS FROM INTENTION INFORMATION: VALIDITY AND IMPROVEMENT

Bruce R. Orvis
Enlistment Intention Project

Chart 1

Policy analysts use the enlistment intention measures provided in youth surveys for a variety of purposes. This study's rationale was to match the intention results with the actual subsequent enlistment decisions made by the respondents, and to use this information to assess the value of the intention measures in forecasting these enlistment decisions.

Chart 1

PROJECT RATIONALE

- Surveys provide enlistment intention measures
  - Match enlistment intentions with actual enlistment actions
  - Assess value of intention measures in forecasting enlistment actions

Chart 2

The initial phase of the project focused on several objectives. First, we analyzed the enlistment actions of our survey samples in a general sense. We examined the distribution of these enlistment actions over time, and we compared the characteristics of the respondents who subsequently took the written test to enter military service with the characteristics of the total sample. Our second and most intensive focus was to investigate the validity of enlistment intention measures. This second analysis pertains to the general usefulness of intention measures in predicting actual enlistment decisions, and, specifically, to their validity for high- versus lower-quality youths[1] and for decisions made in the near versus longer term. Near-term decisions, for example, are those made by applicants for military service, who have already taken the written test and are well along the road to deciding whether or not to join the service. Longer-term decisions are those made by the persons represented in national youth samples; for such persons, the enlistment decision may be several years down the road. An additional research objective was to improve the accuracy of intention analyses. This refers both to the identification of different propensity groups, that is, those persons who are and are not likely to serve in the military, and also to the selection of the most appropriate measures for the prediction of DoD-wide enlistments as opposed to enlistments in the specific services.

[1] "High-quality" youths are persons with high school diplomas who score in the upper half of the AFQT distribution (i.e., categories I-IIIA); they are the individuals the services are most interested in attracting.

Chart 2

RESEARCH OBJECTIVES

- Analyze enlistment actions of survey samples
  - Distribution over time
  - Characteristics of enlistment applicants
- Investigate validity of enlistment intention measures
  - High- and lower-quality youths
  - Near- and longer-term decisions
- Improve accuracy of intention analyses
  - Identification of propensity groups
  - Prediction of DoD versus specific service enlistments

Chart 3

To examine these issues, we drew from two different data bases. The first data source was the 1981 Applicant Survey (Orvis and Hawes, forthcoming), which was administered to a sample of males who took the written test to enter military service (ASVAB) in April 1981. We then followed up these persons using Defense Manpower Data Center extracts of Military Enlistment Processing Command (MEPCOM) records to determine their actual enlistment decisions after the survey. The follow-up extended through the end of March 1982, providing approximately a one-year follow-up. Our second and larger data base consisted of 10 semi-annual survey waves of the Youth Attitude Tracking Study (YATS), administered to 16 to 21 year old males between Spring 1976 and Fall 1980.[1] We again used MEPCOM records to determine these persons' enlistment actions. The follow-up extended through December 1981, providing approximately a five and a half year follow-up for the earliest wave (Spring 1976) and about an 18 month follow-up for the most recent wave (Fall 1980). The Applicant Survey and each YATS wave provide approximately 3,500 respondents for matching purposes.

[1] The Fall 1980 wave included a female sample as well. This sample was not analyzed.

Chart 3

DATA BASES

- Applicant Survey
  - ASVAB examinees, tested April 1981
  - Matched with MEPCOM records 1 year later

- Youth Attitude Tracking Study (YATS)
  - 10 surveys, 1976-1980
  - Matched with MEPCOM records through December 1981

Chart 4

We can summarize the data bases in several ways. We begin with the YATS data, and look at the distribution of the respondents' enlistment actions over time following the survey. The results shown are based on the first five YATS survey waves combined, covering the period Spring 1976 through Spring 1978. The curves indicate the cumulative percentage of the sample that had enlisted and also the percentage that had taken the written test to enter the military at six-month intervals following the survey, from six months after the survey to 42 months later (three and a half years).[1]

There are two notable findings on this chart. First, about half of the total contacts, in the form of both enlistments and written exams, occurred within the first 12 to 18 months after the survey. However, the data also show that both enlistments and written exams continued to increase substantially throughout the entire follow-up period. This second finding suggests that studies which attempt to determine the relationship between enlistment intention data and actual enlistment rates should use long-term follow-ups. It also suggests that recruiters might benefit from long-term follow-up of their contacts.

[1] This analysis and all subsequent analyses are limited to enlistments and written tests for the active duty Army, Navy, Air Force, and Marine Corps.

Chart 4

ENLISTMENT STATUS BY LENGTH OF FOLLOW-UP
COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

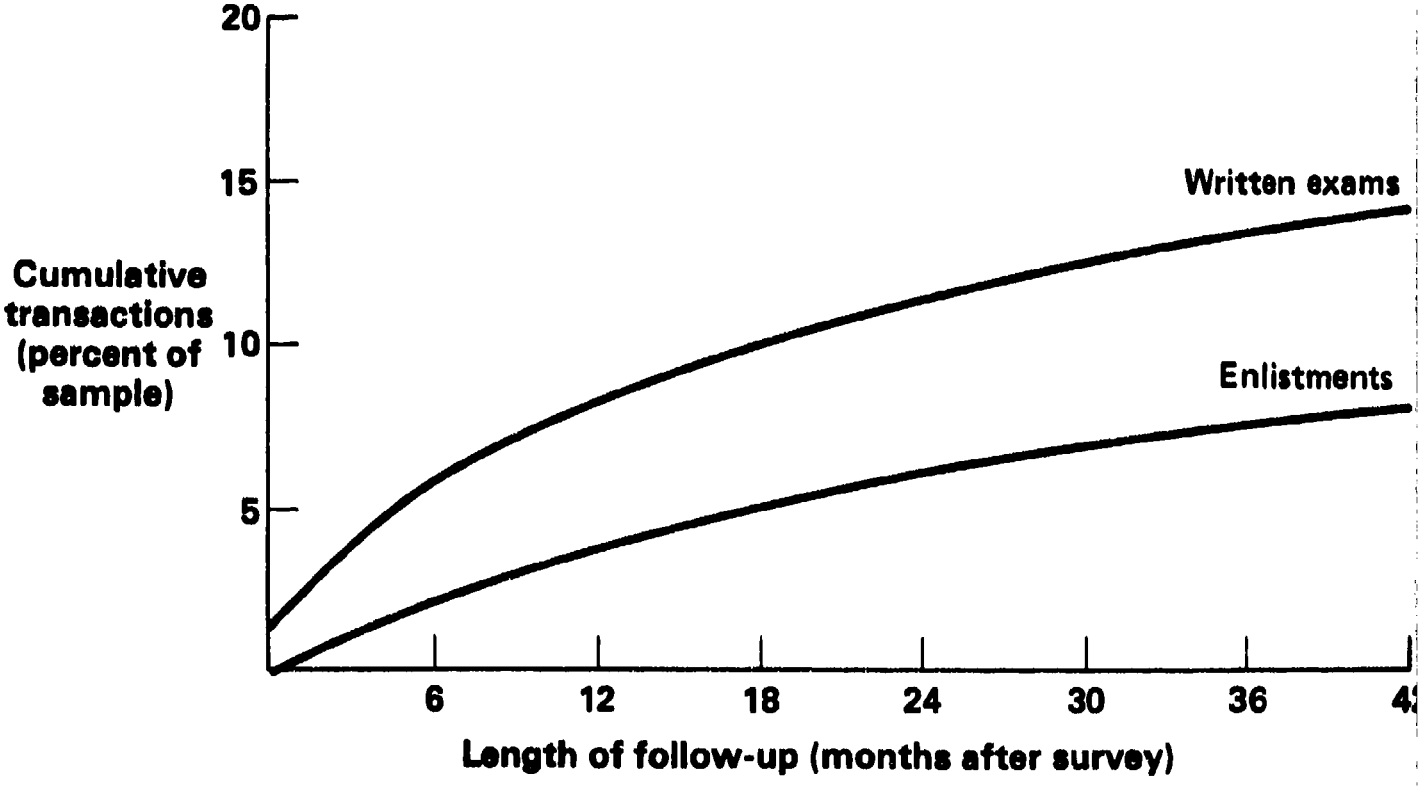

Chart 5

This chart illustrates the same analysis for the individual survey waves as was seen for the combined data base alone in Chart 4. It is clear that the exam and enlistment results are quite constant across the five individual survey waves making up the combined data base.

Chart 5

ENLISTMENT STATUS BY LENGTH OF FOLLOW-UP
COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

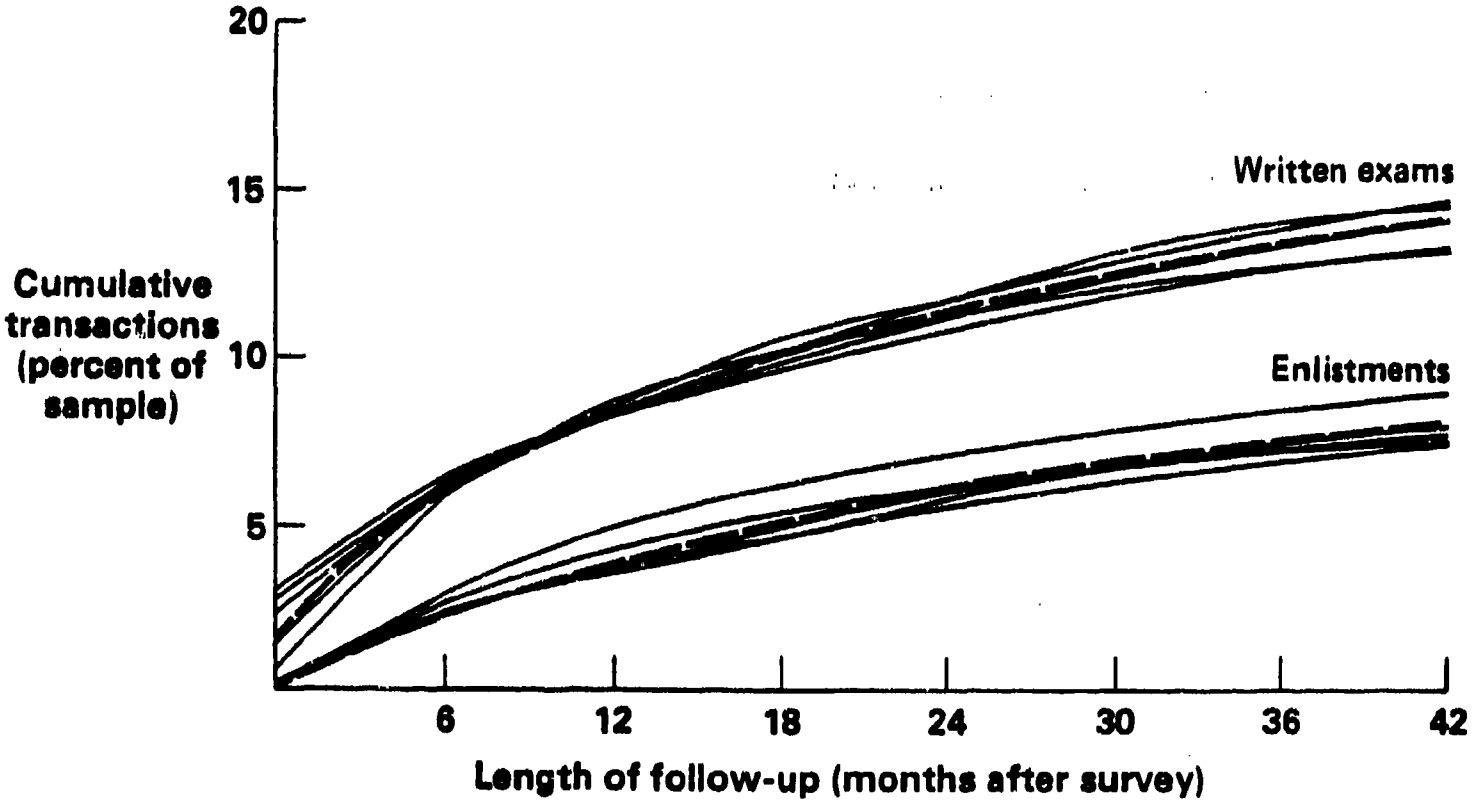

Chart 6

As noted earlier, a second way in which we summarized the data was to look at the characteristics of that subset of respondents who went on to take the written test and compare them with the characteristics of the sample as a whole. The chart shows this type of comparison for several different characteristics, including the age of the respondent, whether or not the respondent had graduated from high school, and his race. Respondents who went on to take the written test tended to be younger than the sample as a whole. Note that 58 percent of the respondents who subsequently took the test fell in the 16-17 year old age group, compared with 47 percent for the sample as a whole. We also find that the persons who took the test were less likely to be high school graduates (47 percent versus 59 percent) and were less likely to be white (73 versus 83 percent).

Chart 6

BACKGROUND CHARACTERISTICS FOR ALL RESPONDENTS AND RESPONDENTS WHO TOOK WRITTEN TEST[a]

COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

Characteristic	All respondents (percent)	Respondents taking test (percent)
Age		
16-17	47	58
18-19	34	31
20-21	19	11
High school graduate		
Yes	59	47
No	41	53
Race		
White	83	73
Black	11	19
Other minority	6	8

[a]Characteristics at time of survey. High school seniors were included as graduates. Total N = 16,763, with 2,342 taking test.

Chart 7

In another general analysis of the sample characteristics, we distinguished the AFQT scores of those persons who went on to take the written test according to the length of time they waited between taking the survey and taking the test. There had been some thought that persons waiting long periods of time to take the test tended to be those scoring at the higher AFQT percentiles. We do find some evidence consistent with that notion, although it is not compelling. As we see, persons who waited more than two years to take the written test, i.e., over 24 months, had a mean AFQT score at the 51st percentile. This is somewhat higher than the mean score for those who waited lesser periods of time, which stood at about the 46th or 47th percentile. However, this difference is not particularly large, and, moreover, we find no association between AFQT score and length of waiting period for persons waiting less than two years to take the written test.

Chart 7

MEAN AFQT BY TIME OF WRITTEN TEST

COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

	Months between survey and written test			
Characteristic	1-6	7-12	13-24	Over 24
Mean AFQT	46	47	46	51
(N)	(672)	(359)	(482)	(652)

Chart 8

We now turn to the enlistment intention results. The Applicant and YATS surveys have a general enlistment intention question that asks about the strength of the respondent's intention to serve in the military. The YATS surveys also have several specific service intention questions, concerning 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 military service.

Chart 8

TYPES OF ENLISTMENT INTENTION MEASURES IN SURVEYS

- General enlistment intention question (Applicant and YATS surveys)
  - Intention to serve in military
- Specific service intention questions (YATS surveys)
  - Intention to serve in
    - Army
    - Navy
    - Air Force
    - Marine Corps
- Unaided mention question (YATS surveys)
  - Plans to join active duty military

Chart 9

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?" In response to this question, the individual is asked to choose among four alternatives: that he definitely will serve, probably will serve, probably will not serve, or definitely will not serve. If he is unable to choose among the four alternatives, he is allowed to say that he doesn't know the strength of his intention. In fact, a very small percentage of the sample do so--about 3 percent--and are coded as "don't know." In some analyses in the past, the definitely and probably categories have been combined and referred to as the positive propensity groups, and the remaining categories have been combined and referred to as the negative propensity groups. The results in this briefing will be shown separately for the definitely and probably groups. However, the results for the three negative propensity groups will be combined, because of the similarity of the data for these groups.

Chart 9

DEFINITION OF PROPENSITY
GENERAL INTENTION MEASURE

"How likely is it that you will be serving in the military . . ."

Definitely Probably	Positive propensity
Probably not Definitely not Don't know	Negative propensity

Chart 10

We first look at the intention results for applicants, using the 1981 Applicant Survey. The numbers shown represent the actual enlistment rates of the respondents within one year following the survey, according to strength of the respondents' enlistment intentions. The results are shown separately for high-quality and lower-quality applicants.

The results for high-quality applicants indicate that among persons who said that they definitely will serve, 53 percent did enlist within the one-year follow-up period. The enlistment rate for those saying that they probably will serve was about half as great, at 27 percent. Finally, the enlistment rate for those expressing a negative propensity to serve was much lower, at only 7 percent. The results for lower-quality applicants show a pattern that is very similar to that for high-quality applicants. Again, we find that the enlistment rate for those saying that they definitely will serve is about twice as great as that found for those saying that they probably will serve, and, again, we find that the enlistment rate for the negative propensity group is between 5 and 10 percent.

Chart 10

ENLISTMENT RATES BY INTENTION
1981 APPLICANT SURVEY

Enlistment intention in survey	Percent enlisting within 1 year	
	High-quality applicants[a]	Lower-quality applicants
Definitely will serve	53	35
Probably will serve	27	17
Negative propensity	7	9

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

Chart 11

Although the patterns of enlistment rates for the two groups are quite similar, we do notice a difference in the absolute level of enlistments between high- and lower-quality applicants. At least two possible explanations come to mind for why this might be so. The first is that the validity of the intention measure may depend on applicant quality. Lower-quality applicants simply may be less able to accurately forecast their eventual enlistment decisions than are high-quality applicants. A second possible explanation is that the data reflect the effect of some constraint on lower-quality enlistments, and that when this constraint is accounted for the intention measure is equally valid for both groups.

To help us choose between these alternative explanations, we repeated essentially the same analysis, with one important difference--we now concentrated 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.[1] We then compared enlistment rates for the high- and lower-quality applicants who qualified to enlist, to determine whether the enlistment rate found at each intention level was similar for the two groups. If it were similar, this would suggest that the intention measure was valid for both groups. The data show very clearly that when we look at those applicants who are qualified to enlist, the results for high- and lower-quality applicants are very similar, and, indeed, do not differ statistically.

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[1] 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 panel of Chart 11.

Chart 11

ENLISTMENT RATES BY INTENTION
1981 APPLICANT SURVEY

Enlistment intention in survey	Percent enlisting within 1 year	
	High-quality applicants[a]	Lower-quality applicants
Definitely will serve	53	35
Probably will serve	27	17
Negative propensity	7	9

	High quality, qualified[a]	Lower quality, qualified
Definitely will serve	52	52
Probably will serve	26	21
Negative propensity	7	11

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

Chart 12

We have seen thus far that the enlistment intention measure does a very nice job of tracking the aggregate enlistment decisions of applicants. Recall, however, that these persons are well along in the enlistment decision process. They have all taken the written test to enter the military, and, in some cases, have taken the physical exam as well. Let us now look at the results for a national youth sample, such as YATS, where, as we saw earlier, the enlistment decision may be several years down the road.

The results shown here combine the data from the first five waves of our YATS data base, covering Spring 1976 through Spring 1978. We have concentrated on the initial half of the YATS data to provide a reasonably long follow-up period, given the continual increase in cumulative enlistments over the long term. The results represent the enlistment rate through the end of the follow-up, extending through December 1981. 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.

Looking at the numbers above the parentheses, we see that the enlistment rates for the different intention levels show a pattern very similar to the pattern for applicants. Again, comparing the 33 percent enlistment rate for the definitely will serve group with the 17 percent rate for the probably will serve group, the enlistment rate for the definitely group is about twice as large as for the probably group; we also find, again, that the enlistment rate for the negative propensity group is about 5 to 10 percent. In this case, it is exactly 5 percent. These results are particularly encouraging when we recall that in many instances the enlistment decisions are being forecast several years before they take place and that there is no control here for respondent quality. We might presume that were we able to restrict our analysis to those qualified to enlist, as we did for applicants, that the enlistment rates for persons in the positive propensity groups would be even higher than those shown here.

Chart 12

YOUTH POPULATION ENLISTMENT RATES BY INTENTION

COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

Enlistment intention in survey[a]	Percent enlisting by December 1981
	General measure
Definitely will serve	33 (.03)
Probably will serve	17 (.24)
Negative propensity	5 (.73)

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

Chart 13

Persons familiar with YATS analyses may be aware that the measure we have looked at thus far, the general intention measure, differs from a measure used in some past analyses to determine overall enlistment propensity. That measure combines results for the intention measures concerning enlistment in the individual services. For example, anyone indicating that he definitely will serve in the Army or the Navy or the Air Force or the Marine Corps is classified in the definitely will serve group. If he does not say that he definitely will serve in any of the four services, then, provided he says he probably will serve in any of the four services, he is classified in the probably will serve group, and so forth. We now look at the results for that measure and compare them with those just shown.

Overall, the results are similar to those shown earlier. However, the results for the four-service combined measure differ in two respects from those for the general measure. First, the enlistment rates for the positive propensity groups on the simpler, general measure are several percentage points higher than those found on the four-service measure. For example, for the definitely will serve group on the general measure 33 percent enlisted, compared with 29 percent for the definitely will serve group identified by the four-service measure. The second and larger difference between the two measures concerns the size of the group classified at each intention level. Note, for example, that the definitely will serve group represents 6 percent of the population for the four-service combined measure. This compares with just 3 percent of the population so classified by the general measure. In other words, twice as many persons are classified in the definitely will serve group by the four-service measure as by the general measure. We also find a large relative increase in the size of the probably will serve group between the two measures, from 24 percent for the general measure to 29 percent for the four-service combined measure.

Why do these differences exist? The explanation is fairly straightforward. The four-service measure gives the individual four chances to be classified in each propensity group, starting with the definitely will serve group. That is, as long as he says that he

Chart 13

YOUTH POPULATION ENLISTMENT RATES BY INTENTION
COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

Enlistment intention in survey[a]	Percent enlisting by December 1981	
	General measure	4-service measure
Definitely will serve	33 (.03)	29 (.06)
Probably will serve	17 (.24)	14 (.29)
Negative propensity	5 (.73)	5 (.65)

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

definitely will serve in any one of the four active duty services, he is classified in the definitely group, and so forth. As a result, we move individuals from the negative propensity group on the general measure into the positive propensity groups on the four-service combined measure.[1] Looking at the bottom row of the chart, there are 73 percent in the negative propensity group on the general measure, compared with only 65 percent on the four-service measure. The 8 percent of the sample moved into the positive propensity groups account for both the larger size of these groups and for the lower enlistment rates associated with these groups, due to the fact that these individuals are, in fact, less likely to enlist then are the persons classified in the positive groups by the general measure.

[1] This movement may be simply the result of asking the respondent a similar question repeatedly or, more likely, the cumulative effect of the random components of the four responses when classification begins with the most positive intention level.

Chart 14

The enlistment results have been quite consistent over the individual YATS survey waves. One way of seeing this is to look at the individual results for the Spring 1976 wave, the first of the five waves we combined, and for the Spring 1978 wave, the last of the five waves. The results are quite similar both to each other and to the results of the five survey waves combined. There is a slight decrease in the enlistment rate associated with each intention level. This, of course, is because the follow-up period for the Spring 1978 survey wave is two years shorter than for the Spring 1976 survey wave--about three and a half years compared with about five and a half years.

Chart 14

ENLISTMENT RATES BY INTENTION FOR SPRING 1976 AND SPRING 1978 YATS SURVEYS

Enlistment intention in survey	Percent enlisting by December 1981	
	Spring 1976 survey	Spring 1978 survey
Definitely will serve	32	30
Probably will serve	20	15
Negative propensity	6	5

Chart 15

We have seen that the simple, general intention measure does a very nice job of tracking the actual enlistment rates of the respondents. We can, however, discriminate among different propensity groups even better by taking advantage of some of the other intention measures in the YATS surveys. In particular, we can identify the different propensity groups better by combining the results of the unaided mention question with those of the general intention measure. The responses to both questions are combined to form a new intention variable that is a composite intention measure with four groups. Those classified at the first or most positive intention level are persons with unaided mentions of plans for military service and a definite intention to serve. These are persons who when asked, "What do you think you might be doing in the next few years?" said "joining the active duty military," and who when later asked specifically about the strength of their intention to serve said they definitely intended to do so. Persons in the second category are those with an unaided mention, who subsequently said that they probably intended to serve. The persons in the third group are those who said that they definitely or probably will serve, but who did not have an unaided mention of plans to join the active duty military. The remaining group is the same negative propensity group we have seen previously; it consists of persons who said that they probably will not or definitely will not serve in the military.

Chart 15

COMPOSITE INTENTION MEASURE DEVELOPED IN STUDY

- What do you think you might be doing (in the next few years)?
- How likely is it that you will be serving in the military (in the next few years)?

Unaided mention and definite intention

Unaided mention and probable intention

Positive propensity, no unaided mention

Negative propensity

Chart 16

Let us look at the results of the follow-up for the four intention groups. The first column shows the percentage of each intention group that enlisted within the follow-up period. The second column shows the percentage of each group that took the written test. Looking at the enlistment results, we find that the four-category composite measure does a better job of discriminating enlistment propensity than the three-category measure shown earlier, and find substantial correspondence between intention level and the actual enlistment rate. For example, among persons with an unaided mention of plans to join the active duty military and a definite intention to serve, nearly half, or 49 percent, actually enlisted within the follow-up period. Among those with an unaided mention and a probable intention to serve, nearly one-third, or 32 percent, enlisted within the follow-up period. The enlistment rate for those who expressed a definite or probable intention to serve but who did not have an unaided mention was 15 percent. Again, as we saw previously, the rate for those with a negative propensity was just 5 percent.

There is a very similar pattern concerning the percentage of the sample that went on to take the written test to enter military service. For example, among those in the most positive group--those with an unaided mention and a definite intention to serve--we find that nearly two-thirds, or 62 percent, took the written test. Among those with an unaided mention and probable intention to serve, nearly half, or 48 percent, took the written test, and so forth.

Looking again at the enlistment results, we note that the relationship between the intention level and enlistment rate is quite linear. As we move from the topmost category--an unaided mention and a definite intention to serve--to the second or probable intention category, we find a decrease in the enlistment rate of some 17 percentage points. There is another decrease of 17 percentage points as we move down to the third category, those with a positive propensity and no unaided mention. Thus, at least for the positive intention levels, there is a linear relationship between intention level and enlistment rate, rather than a very large enlistment rate for the most positive group which then diminishes very rapidly.

Chart 16

ENLISTMENT RATES FOR COMPOSITE INTENTION MEASURE

COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

Composite enlistment intention	Percent enlisting by December 1981	Percent testing by December 1981
Unaided mention and definite intention	49	62
Unaided mention and probable intention	32	48
Positive propensity, no unaided mention	15	25
Negative propensity	5	10

Chart 17

The good correspondence between the composite intention categories and the enlistment rate and the fact that enlistments continue to occur over a long period of time, as we saw earlier, raise a natural question concerning the predictive usefulness of the composite measure over time. Given that the measure helps us identify persons with different likelihoods of enlisting, does it do so only in the short term, or does the measure continue to help us discriminate over longer periods? To examine this question, we looked at the enlistment actions undertaken during the 42-month period following the survey, and assessed the rates of these actions separately for the persons classified at each intention level. The chart shows the cumulative percentage of each intention group that had enlisted at various points following the survey.

The results have two notable features. The predictive power of the intention measure appears to be greatest within the first 12 to 18 months following the survey. Note that the slopes of the enlistment curves for the various intention groups are most different in this initial period. However, the results also show that the intention measure continues to distinguish persons with different enlistment rates throughout the entire follow-up period. This can be seen by comparing the slopes of the curves for the four intention groups between the 36 and 42 month points. Even then, after three years, the slopes of these curves remain different.

Chart 17

ENLISTMENT STATUS BY INTENTION OVER TIME
COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

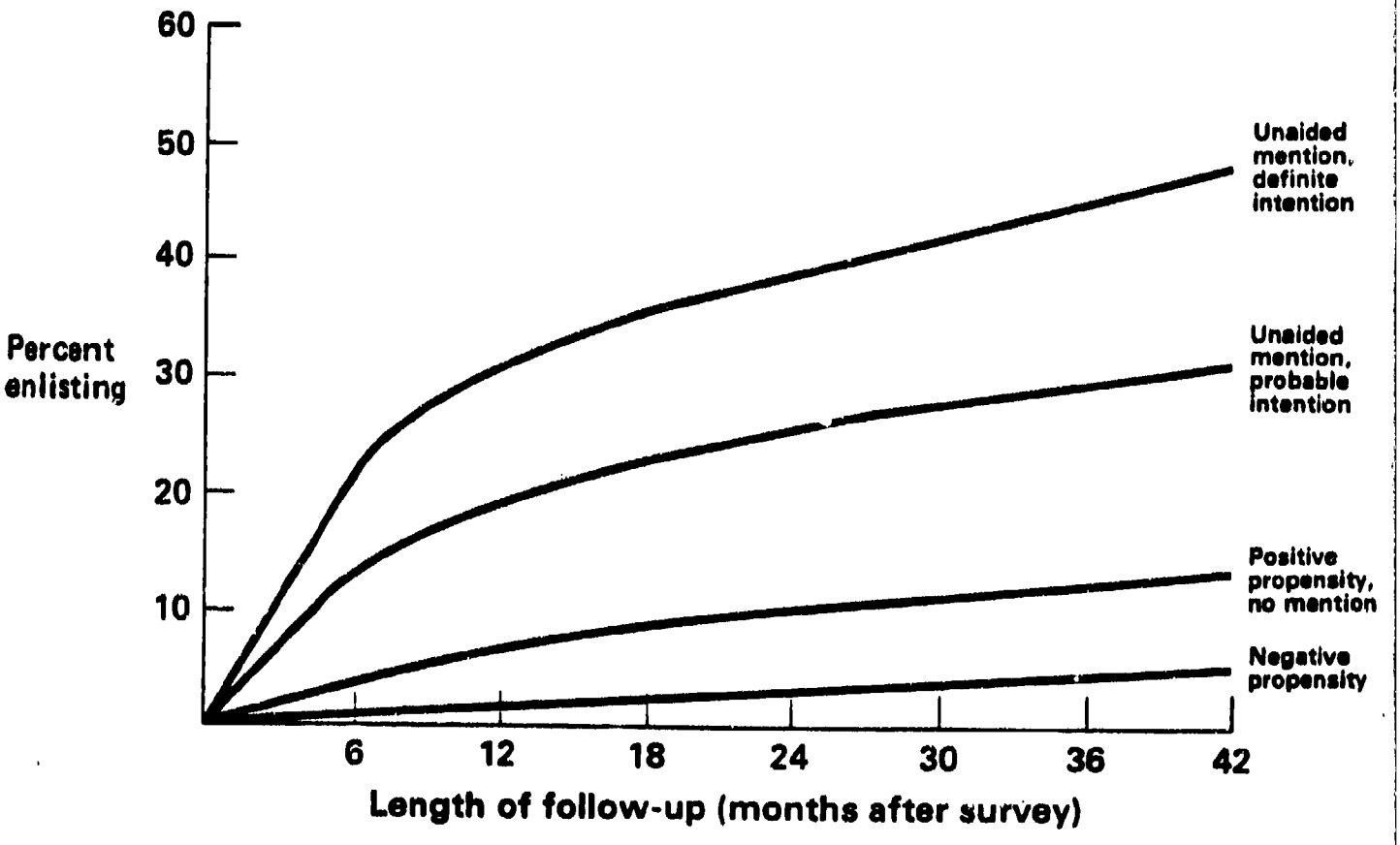


Chart 18

A corresponding analysis for the percentage of the sample taking the written test yields similar results. Again, the slopes of the curves for the four intention groups are most different within the initial 12 to 18 months following the survey. However, the slopes of these curves remain different throughout the entire follow-up period, i.e., the measure continues to track contacts over the long term.

Chart 18

TESTING STATUS BY INTENTION OVER TIME
COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

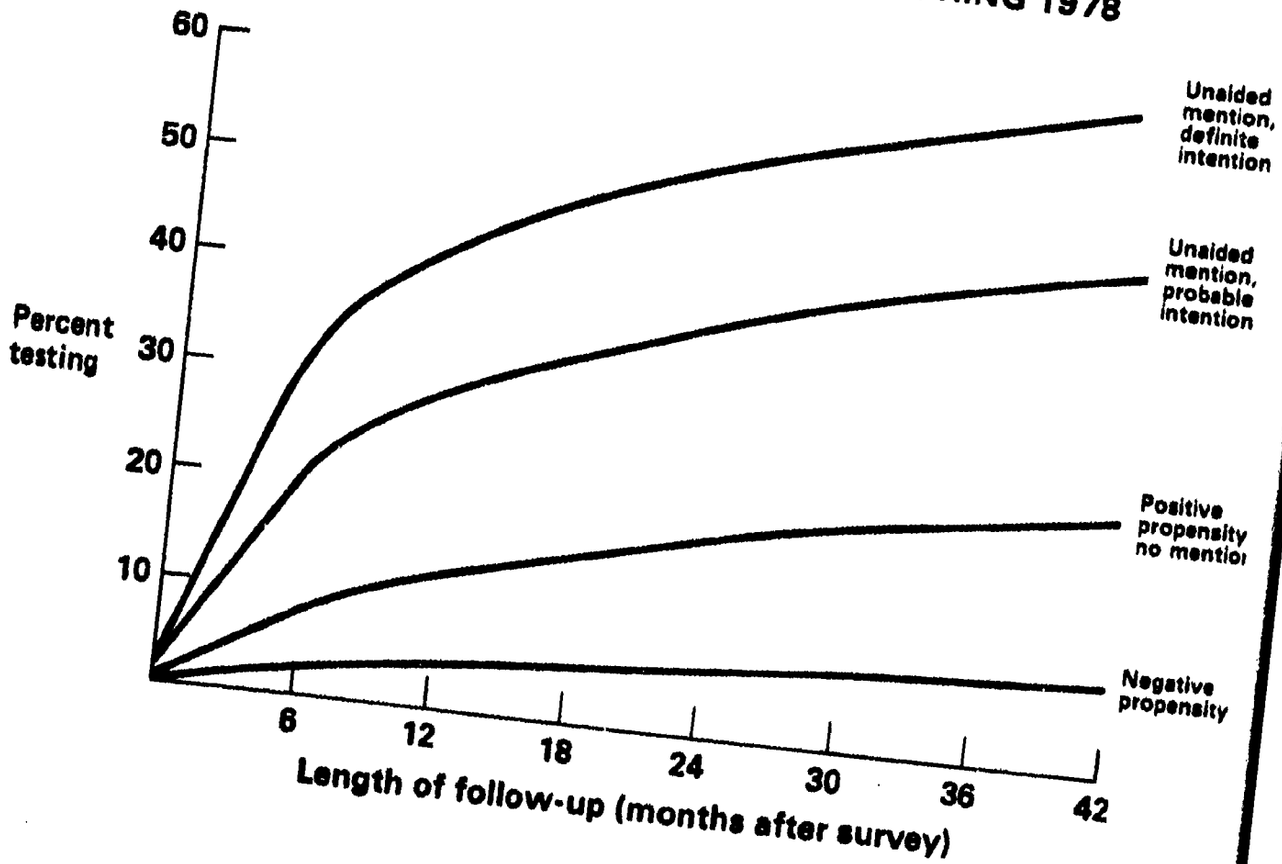


Chart 19

Thus far we have looked at the relationship between the strength of respondents' enlistment intentions and the actual enlistment rate for each intention group, and have found a very nice correspondence. However, this is only part of the picture. In determining the total number of enlistments associated with different strengths of intentions to serve in the military, we must look at both the enlistment rate associated with a given intention level and the number of persons or portion of the population that is classified at that intention level. We now consider both factors. The first column in Chart 19 shows the percentage of the combined YATS sample classified at each intention level. The second column shows the percentage of enlistments among sample members that is accounted for by the persons classified at that level. For example, 2 percent of the sample have an unaided mention and a definite intention to serve in the military, and such persons account for 9 percent of all enlistments among sample members. The numbers inside the bars show the total results for the three top or positive propensity categories combined. We find that persons expressing a positive enlistment propensity account for 27 percent of the sample and for 58 percent of all enlistments.

The magnitudes of the numbers draw our attention to the bottom of the chart. Recall, as we saw in Chart 16, that the enlistment rate for the most positive group, the unaided mention and definite intention group, was nearly 50 percent, and was some 10 times larger than the 5 percent enlistment rate found for the negative propensity group. Nonetheless, the negative propensity group accounts for 42 percent of all enlistments. This result is explained by the very large size of the negative propensity group, which represents nearly three-quarters of the total sample. Moreover, by far the next largest group in terms of total enlistments is the third or lowest of the positive groups, consisting of persons without an unaided mention. Such persons account for 38 percent of all enlistments, so that the bottom two groups--the negative propensity group and the positive propensity no unaided mention group--account for 80 percent of all enlistments. This third, lowest of the

Chart 19

ENLISTMENT DISTRIBUTION BY COMPOSITE INTENTION MEASURE

COMBINED YATS SURVEYS, SPRING 1976-SPRING 1978

Composite enlistment intention	Percent of sample[a]	Percent of enlistments[b]
Unaided mention and definite intention	2	9
Unaided mention and probable intention	3	11
Positive propensity, no unaided mention	22	38
Total positive propensity	27	58
Negative propensity	73	42

[a]N = 16,707 for the combined YATS sample.
[b]There were 1,432 enlistments among sample members by December 1981.

positive propensity groups may be particularly interesting from the standpoint of recruiting. The data suggest that the persons in this group account for between one-fifth and one-quarter of the total population, and they have indicated a positive propensity toward serving in the military, saying that they definitely or probably will serve. Nonetheless, as we saw in Chart 16, the actual enlistment rate for this group is just 15 percent.

Chart 20

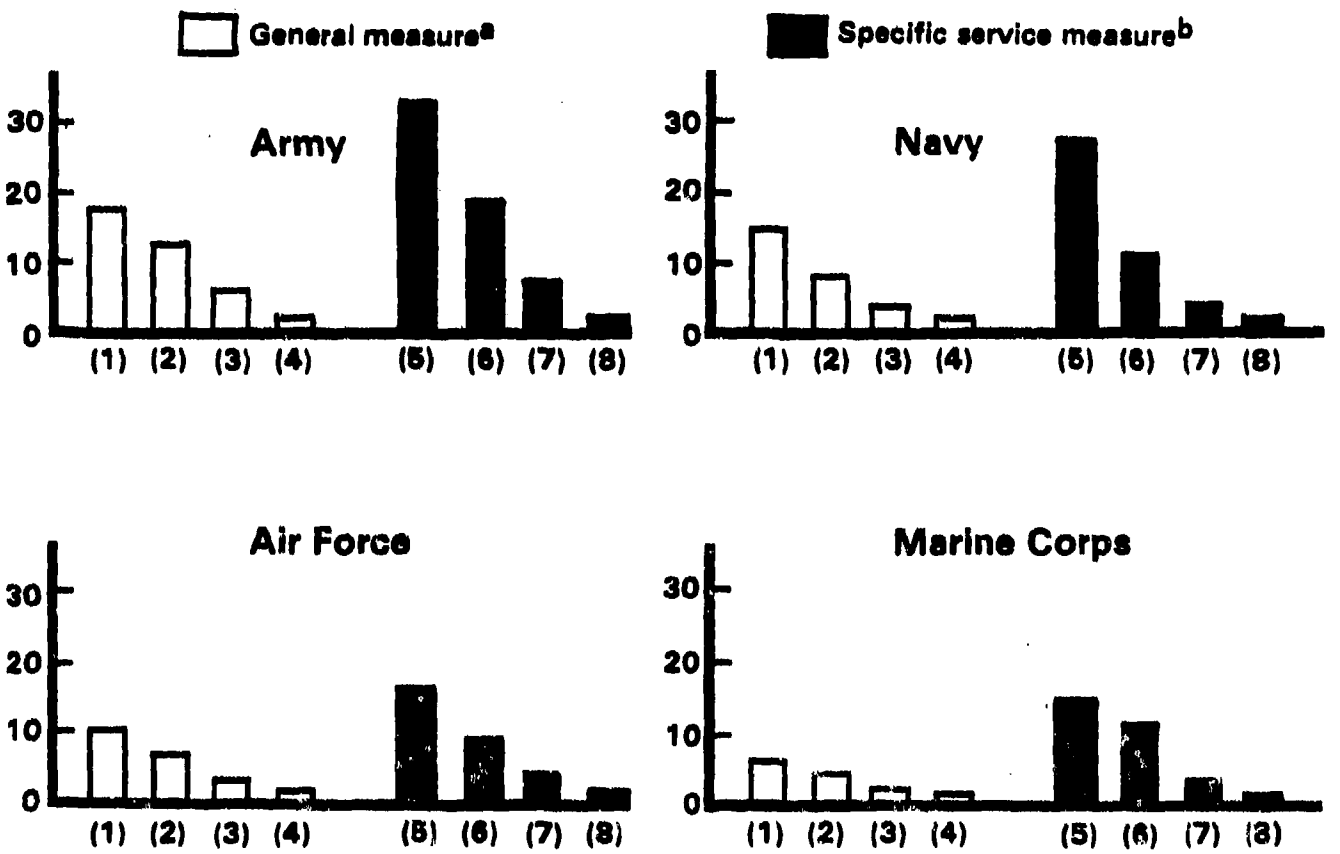
We have looked thus far at enlistment in the military service as a whole. Let us now examine enlistments in the individual services. The general composite measure has succeeded well in tracking enlistments, so we might ask whether this measure also may be adequate for predicting enlistments in the specific 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. We will now compare the results for the two types of composite measures.

The unshaded bars on the left of the graph for each service show the enlistment rates for that service according to the four-category general composite measure we have examined so far. For the Army, for example, we see above "(1)" the enlistment rate in the Army for persons with an unaided mention and a definite intention to serve in the military. The shaded bars on the right show the corresponding results for a specific service composite measure that combines the unaided mention results with intention to serve specifically in the Army. For example, above "(5)" we see the Army enlistment rate for persons who have an unaided mention and who indicate that they definitely intend to serve in the Army in particular.

The results for all four services are quite similar, and indicate in each case that the specific service composite measure does a better job of forecasting enlistment propensity for the individual service than does the general composite measure. For the Army, for example, among those with an unaided mention and a definite intention to serve in the Army in particular, 33 percent did enlist in the Army during the follow-up period. This compares with only an 18 percent enlistment rate in the Army for persons with an unaided mention and a definite intention to serve in the military. Making the analogous comparison for groups (6) and (2), we find that among persons with an unaided mention and a probable intention to serve in the Army, 19 percent enlisted in the Army within the follow-up period. In contrast, among persons with an unaided mention and a probable intention to serve in the military, we find that just 13 percent enlisted in the Army. The results for all four services are very similar.

Chart 20

PREDICTING SPECIFIC SERVICE ENLISTMENTS
PERCENT ENLISTING IN SPECIFIC SERVICES



[a]The intention categories are (1) unaided mention, definite intention; (2) unaided mention, probable intention; (3) positive propensity, no mention; (4) negative propensity. Intention is intention to serve in the military.

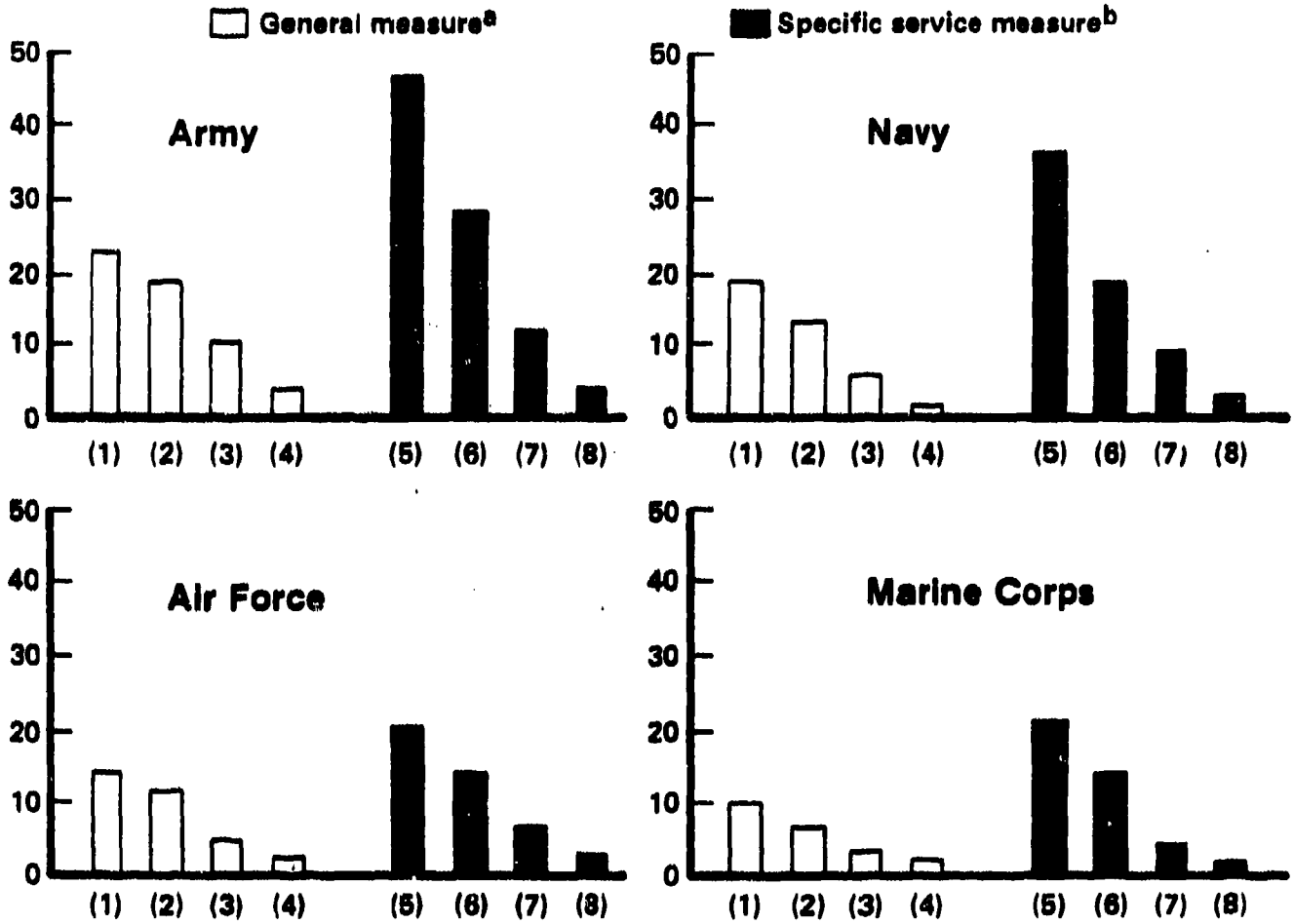
[b]Categories (5)-(8) are defined similarly to categories (1)-(4); the question assessing intention to serve in the military is replaced by the question assessing intention to serve in the specified service.

Chart 21

The same kind of comparisons between service specific composite measures and the general composite measure can be made for the percentage of respondents taking the written test for each service. We see on Chart 21 the same pattern of results as was seen on the prior chart, perhaps even more clearly here. We might expect this to be the case, since there are probably fewer restrictions on who can take the written test than on who is eligible to enlist in each service. Once again, we find that the service specific measures do a better job of tracking the actual contacts with the individual services than does the general composite measure. For example, looking at the results for the Army and comparing rates for groups (5) and (1), we find that among persons with an unaided mention and a definite intention to serve in the Army in particular, nearly 50 percent went on to take the written test for the Army. In contrast, of those with an unaided mention and a definite intention simply to serve in the military, only 23 percent took the written test for the Army. Again, the results for all four services are quite similar; in each case, the service specific measure provides better discrimination of the actual contact rates with the individual service than does the general composite measure.

Chart 21

PREDICTING SPECIFIC SERVICE ENLISTMENTS
PERCENT TAKING WRITTEN TEST FOR SPECIFIC SERVICES



[a]The intention categories are (1) unaided mention, definite intention; (2) unaided mention, probable intention; (3) positive propensity, no mention; (4) negative propensity. Intention is intention to serve in the military.

[b]Categories (5)-(8) are defined similarly to categories (1)-(4); the question assessing intention to serve in the military is replaced by the question assessing intention to serve in the specified service.

Chart 22

The data support several conclusions. First, based on the YATS results, enlistment decisions in national youth samples appear to be made over a period of several years. About half the written tests and enlistments occur within 12 to 18 months after the survey point. Many new contacts, however, occur over the long term. The results suggest that persons who go on to take the written test, compared with the youth population as a whole, are more likely to be young, from ethnic minorities, and to be non high school graduates.

Second, there is a great deal of evidence that enlistment intention results predict the eventual enlistment actions of the survey respondents. The data suggest that enlistment intention measures are valid for both high- and low-quality respondents, once qualification or eligibility to enlist is controlled for. The data also support the conclusion that the intention measures are valid for national youth samples, who may face enlistment decisions several years down the road, as well as for military applicants, who will make their enlistment decisions in the near term. The power of the YATS or general population intention measures appears to be greatest within the first 12 to 18 months following the survey point. That is, we get the greatest discrimination of enlistment rates according to intention level within that initial period. However, these measures continue to distinguish different enlistment rates according to intention level for at least three to four years.

Finally, different intention measures have different uses. Specific service intention measures predict enlistments in the specific services more accurately than does a general intention measure. On the other hand, overall or general enlistment propensity is better tracked by a simple overall measure than by a measure that combines results concerning intentions to enlist in each of the individual services.

Chart 22

CONCLUSIONS

- **Enlistment decisions made over several years**
  - **Half of written tests and enlistments occur within 12-18 months of survey**
  - **Applicants more likely to be young, from ethnic minorities, and non high school graduates**
- **Enlistment intentions predict actions**
  - **Valid for high and lower quality respondents**
  - **Accurate for national youth samples and applicants**
  - **Power of YATS intention measures greatest within first 18 months, but continue to predict for 4 years**
- **Different intention measures have different uses**
  - **Specific service measures predict specific service enlistments better than general measure**
  - **General intention measure predicts overall enlistment propensity better than specific service measures**

Chart 23

We will continue our work in the coming year, moving in several different directions. First, we will extend our YATS data base to include the 1981 YATS survey wave results and extend the follow-up for all waves from December 1981 through December 1982. Second, we plan to quantify the usefulness of including intention data in enlistment projection models that are based on demographic or economic factors. The question is whether adding intention information to such models increases their predictive power. We will examine the usefulness of intention data in predicting individuals' enlistment decisions as well as in modeling differences in enlistment rates across tracking areas or recruiting districts. Third, we will investigate whether specific year enlistment forecasts are improved by the inclusion in the model of intention data from several prior survey waves. As we have seen, cumulative enlistments continue to increase substantially in national youth samples over the long term. Thus, if we want to predict enlistments at a specific future point, predictive power might be improved by including the data from several survey waves prior to that point. Finally, we plan to model first-term attrition based on strength of enlistment intention. To do this, we will concentrate on those respondents who went on to enlist in the active duty military, and determine whether or not they completed their first terms. We then will analyze this information according to the strength of their initial enlistment intentions, to determine whether persons with the most positive intentions to serve in the military prior to enlistment are more likely to serve out their first terms than are those with less positive initial intentions.

Chart 23

UPCOMING WORK

- Extend YATS data base
  - Include 1981 YATS survey wave
  - Extend follow-up through December 1982
- Quantify usefulness of including intention data in enlistment projection models
  - Individual-level models
  - Tracking area/recruiting district models
- Determine whether specific year enlistment forecasts are improved by multi-year intention data
- Model first-term attrition based on strength of enlistment intentions