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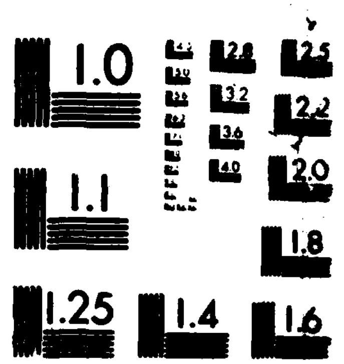

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DOD ADVERTISING MIX TEST

OFFICE OF THE ASSISTANT
SECRETARY OF DEFENSE
(FORCE MANAGEMENT
AND PERSONNEL)

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COMPARISON OF JOINT-SERVICE WITH SERVICE-SPECIFIC STRATEGIES AND LEVELS OF FUNDING

July 1987

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DoD Advertising Mix Test

Comparison of Joint-Service with Service-Specific Strategies and Levels of Funding

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Wharton Center for Applied Research

Office of the Assistant Secretary of Defense
(Force Management and Personnel)

JULY 1987

PREFACE

In the area of advertising research, the opportunity to develop a controlled experiment <u>and</u> implement it in the field is rare indeed. Few, if any, private sector companies could undertake such an ambitious project and sustain, over a period of several years, a research team and operational infrastructure to ensure its successful completion.

This report represents the efforts of participants from a broad spectrum of Department of Defense (DoD) organizations, and from several contractors serving in a supporting role. Limitations on space and, candidly, my ability to recall the respective contributions of all those involved in this four-year project do not permit complete recognition here. Yet, this in no way lessens my appreciation for their effort. I do want, however, to take particular note of a few individuals who deserve special recognition for their efforts.

Representatives in the Military Services were confronted with some of the most challenging aspects of this experiment. It was their charge to execute the experimental design in the field and to supply extensive data sets on the several measures used to evaluate the field experiment. By one count, more than 480 separate data submissions were required throughout the course of this experiment. Their cooperation and level of professionalism contributed immeasurably to this project's success.

From its original conception almost four years ago, through completion of this final report on the field experiment, representatives from the Office of the Assistant Secretary of Defense (Force Management and Personnel), Directorate for Accession Policy, provided continued guidance and support. I am especially grateful to Dr. W.S. Sellman, Captain Louise C. Wilmot, and Lieutenant Colonel John A. Ford, the project manager, from that office. Together, they served as a catalyst in gaining the cooperation of those in the many participating DoD organizations. In addition, Dr. Sellman and Lieutenant Colonel Ford made many contributions to the several drafts of this final report that improved immeasurably its appearance and readability.

Members of the Defense Manpower Data Center (DMDC), especially Mr. Robert C. Brandewie, Ms. Helen Hagan and Ms. Lynn Prince, provided much needed technical support in processing and retaining many of the data bases used in the analysis phase of this experiment. Through the efforts of these individuals, DMDC will serve as the permanent repository of all data collected.

In total, 72 media markets (i.e., collections of counties forming media areas defined by the Arbitron Company) from a universe of 214 possible markets were used in the experiment. I wish to extend my appreciation to the analysts at the RAND Corporation, especially Dr. Michael Polich, in providing the initial technical support to choose a set of statistically balanced media markets.

Miss Phoebe Weiner and her staff at PEP Systems, Inc., were responsible for collecting and processing the many files obtained from the Military Services and their advertising agencies covering the media activity in each of these 72 markets.

In addition to the analytical support provided by the Wharton Center, Dr. Ambar Rao and his colleagues at OR/MS Dialogue deserve much credit for their innovative analysis and insights into the findings offered throughout the many phases of this project.

Extensive management and logistical support was provided by CACI International Inc., and I am especially grateful to Mr. Dan Huck, Director of Market Analysis of CACI, and Mr. Jerry Allen, formerly of CACI, for their extensive assistance. Mr. Huck and his staff were responsible for the typing and printing of this report, as well as several earlier documents having to do with various phases of the project.

Ms. Lynn Lucchetti, Director of the Joint Recruiting Advertising Program (JRAP), was instrumental in executing successfully the field experiment's media plans developed for JRAP. Her strength of personality and spirit of cooperation were admirable assets.

Every precaution was taken to ensure accuracy, but any errors in the analysis, findings, and interpretations leading to the conclusions and recommendations depicted in this report remain the sole responsibility of the author and the Wharton Center.

Vincent Carroll
The Wharton Center for Applied Research
July 1987

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EXECUTIVE SUMMARY

This document describes the formulation and execution of a DoD-sponsored field experiment to test the effect of advertising on enlistments under alternative budget levels. It reports the research findings and addresses their potential budget implications.

The DoD Advertising Mix Test, implemented as an experiment in Fiscal Year (FY) 1984, revealed that those geographic areas subject to an approximate 40-percent budget reduction in total advertising produced enlistment results equal to, and occasionally better than, other geographic areas unaffected by budget reductions. Moreover, in explaining the enlistment performance of those geographic areas subject to large total budget reductions, differences in the share of the total budget allocated to Joint advertising appear to be a contributing factor.

Setting budget policy based solely on the empirical findings of the field experiment, however, does not take into account changes that may have occurred in enlistment requirements, in the level and mix of other recruiting resources (e.g., bonuses, pay, recruiters) or in changes in overall market conditions from the period of the experiment (FY 1984) to the present. These factors may affect the level of future advertising spending, but not necessarily the proportion allocated to the Joint program. The research findings suggest that the pattern of growth in Service-specific advertising during the past decade need not continue and could be reversed without adverse impact on recruiting.

REASONS FOR THE FIELD EXPERIMENT

Since the advent of the all-volunteer force, recruitment advertising spending has been a source of controversy among the Services, the Office of the Secretary of Defense, and the Congress. While no one disputes the fact that advertising remains an important component in the recruiting resource mix, differences exist over the absolute level of advertising required and the shares that should be allocated to the individual Services and the Joint Recruiting Advertising Program (JRAP). In FY 1981, for example, the Congressional Budget Office (CBO) recommended significant increases in the JRAP with concurrent reductions in Service-specific advertising. This CBO study sparked a dialogue between the Secretary of Defense and the Military Services about the level and mix of individual Service and Joint advertising.

During these discussions, it became apparent that additional research was needed and that an actual field experiment represented the best approach. A field experiment was chosen because, while logistically complex to implement, it overcame the difficulties of attempting to use historical data not well suited to forming an empirical basis for validating present or proposed advertising spending levels.

OBJECTIVE OF THE FIELD EXPERIMENT

Thus, a field experiment was designed and subsequently implemented to generate reliable, quantitative data on the contribution of advertising to the enlistment process. More specifically, the then-Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics, Dr. Lawrence J. Korb, stated that the experiment was expected to make a significant contribution in determining the optimum level and mix of Joint/Service-specific recruitment advertising for achieving active, enlisted, non-prior service recruiting goals.

The results of the experiment bring us considerably closer to answering this critical question. Yet, limitations on resources and restrictions on the design of the field experiment do pose legitimate questions as to how far one can extend the findings to derive, with an acceptable degree of confidence, point estimates of the optimum level and mix of Joint and Service-specific advertising. However, evidence gathered from the experiment does show that a reduced level of advertising spending would not adversely affect recruiting performance.

DESIGN OF THE FIELD EXPERIMENT

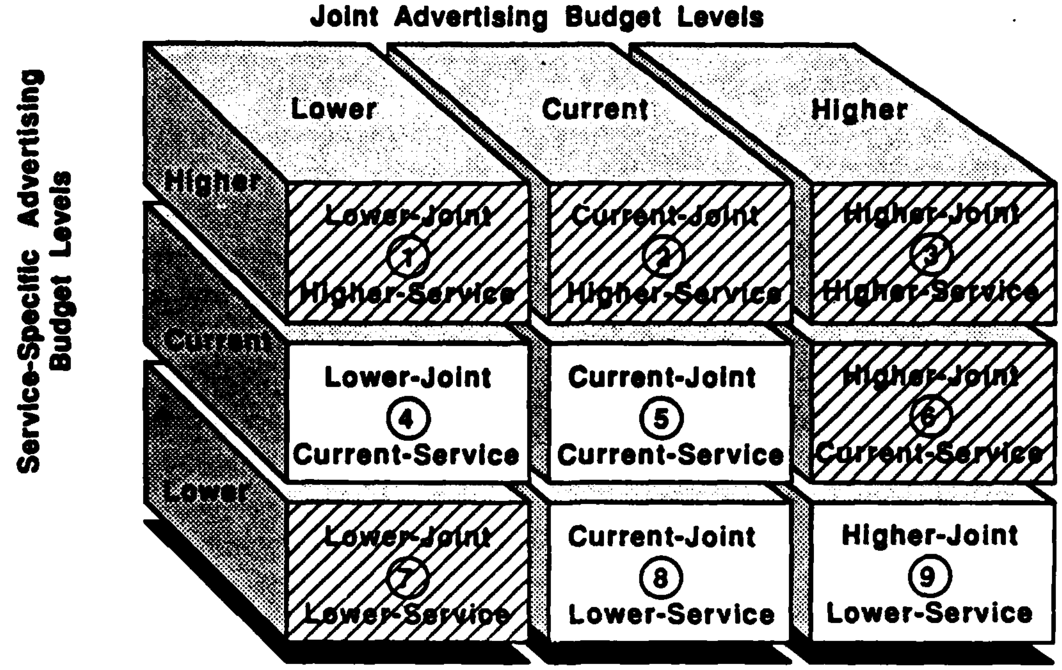
To respond to the stated objective, the Department of Defense designed a field experiment. The original concept was to implement a "full factorial design"; that is, one in which many feasible combinations of advertising spending levels and mix categories were tested. In essence, this involved test cells with three levels of Joint advertising spending and three levels of Service-specific advertising (nine test cells total).

As shown in Figure ES.1, the original design considered a greater range of budget combinations than were eventually executed. The original design, had it been implemented, would have provided a much richer database and would have permitted additional statistical analyses. This, in turn, would have allowed for more cross-validation of the findings presented in this report.

Because of the difficulty and cost involved in implementing such a design, the parties compromised on a four-cell design that included matching low and medium levels of Service expenditures with low, medium and high levels of Joint advertising spending as depicted on Figure ES.2. Although not a complete representation of the many spending combinations represented in the original design, this truncated design permitted testing of budget mixes relevant to future debates about advertising spending. From a statistical perspective, however, it did not permit the use of classical two-way analysis of variance to isolate the factors that may contribute to differences in enlistment response (as well as other measures) across the test cells. As an alternative, the empirical findings from this field experiment were derived primarily through cross-sectional regression analysis. This statistical approach for the truncated design proved adequate to develop and validate the empirical findings of the field experiment.

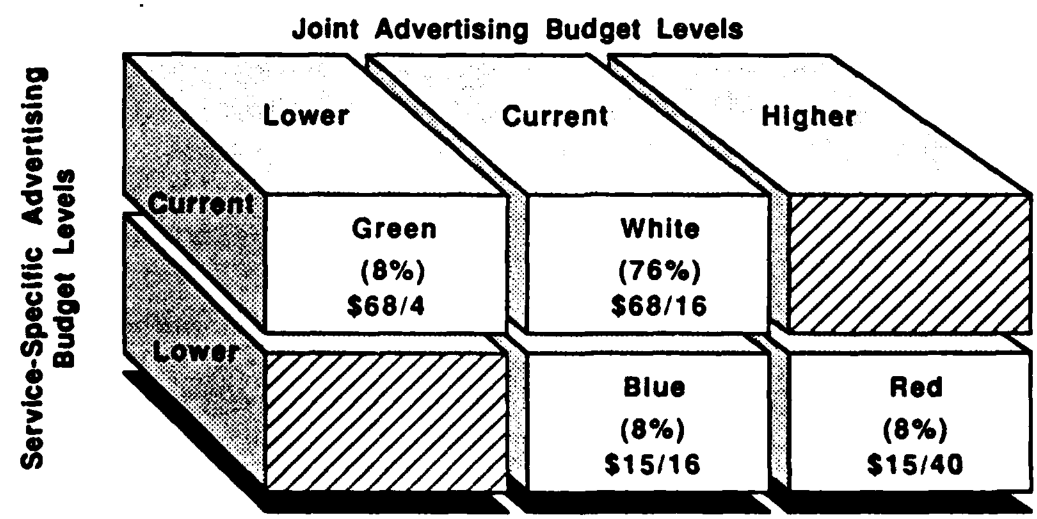
The geographical units comprising the experimental design were Areas of Dominant Influence (ADIs) developed by the Arbitron Ratings Company. These 214 ADIs, collectively covering the entire United States, consist of county groups reflecting predominant local television viewing patterns. Cell Blue depicted in Figure ES.2, for instance, consisted of fourteen ADIs, comprising about eight percent of the enlistable population. These fourteen ADIs were geographically dispersed throughout the nation to avoid any contamination from purely regional effects. The ADI markets selected for each test cell were statistically matched (balanced) on a number of variables, including size of population, enlistment rates, unemployment, and enlistment propensity. Balancing the ADI markets within a test cell limited the confounding influence of non-advertising factors in subsequent analyses. Lastly, for costs and administrative considerations, a matched subset of the original control cell (White) was devised. This new control cell, consisting of 31 ADIs, was identified as Cell Yellow.

Figure ES.1 Proposed Nine-Cell Test Design Concept



Note: Canter, Achenbaum and Associates proposed the above nine-cell design, components of which were actually implemented in the field as depicted in the following Figure 1.2. Cells containing diagonal lines were not part of the actual test implemented in the field.

Figure ES.2 Actual Four-Cell Design Implemented in the Field



Note: Percentages represent the proportion of 17-21-year-old males residing in the ADIs covered by the respective cells. Dollar amounts reflect simulated national spending levels in each cell for Service-specific (numerator) and Joint (denominator) advertising. "Current" spending refers to the amount expended in FY 1982, the baseline budget when the experiment was designed.

EVALUATION CRITERION AND CHOICE OF MEASURES

The following criterion provides the basis for evaluating the four advertising budget policies tested: The recommended advertising policy will be one providing the necessary short-term and long-term contributions to the attainment of the Services' enlistment requirements at the least advertising cost to the Department of Defense. Thus, the measures chosen to evaluate the field experiment against this criterion must take into account both near- and long-term enlistment response considerations.

Evaluating the field experiment against this criterion involved collecting data on three types of measures:

- Observed behavior measures as output from the recruiting systems. These included the quantity and quality of applicants and contracts reported by the Military Services.

- Reported behavior measures relevant to the enlistment process as derived from the Youth Attitude Tracking Study. These included reported contacts with recruiters and reported conversations with peers and parents about the military.

- Attitudinal measures derived from the Youth Attitude Tracking Study. These included reported intentions to enlist in the military, as well as the strength of those intentions.

IMPLEMENTATION PLANS

To ensure that the field experiment was properly implemented, media plans were developed and executed by the Military Services and the JRAP. Comparison and tracking of actual media execution against the original plan revealed that these media plans conformed to the budget guidelines established in each test cell. In addition, actual execution of the media plans paralleled closely the plans submitted by the Services and the JRAP. These conformed to the design criteria for the field experiment.

DATA COLLECTION

The staff of Wharton Applied Research Center and its sub-contractors, with extensive cooperation from the Department of Defense, developed and executed a comprehensive data collection process. In addition to the media information, a variety of other data relevant to conditions in the marketplace, such as numbers of recruiters, unemployment rates and Service mission/goals, was collected.

APPROACH TOWARD ANALYSES OF THE DATA

Once sufficient data were collected on the measures used in the field experiment, several analytical approaches were undertaken. As stated before, because of the truncated nature of the field experiment's design, conventional two-way analysis of variance and covariance could not be used. Instead, cross-sectional statistical regression techniques and various standard non-parametric tests of significance were used.

The data collected for the 72 geographic markets (ADIs) comprising the three test cells and one control cell on the observed behavior measures (i.e., applicants and enlistments) were further sub-divided by quality and Service. Quality applicants were either seniors or high school diploma graduates who performed in the top half of the aptitude range on the Armed Forces Qualification Test (AFQT).

For each subset of the data, a series of cross-sectional regression analyses was performed in an effort to determine whether the differences in budget levels (and mix) across the cells correlated with any differences in the observed behavioral measures across the same cells. More than 100 regressions were performed on subsets of the data representing the observed measures of behavior. Predictor variables included not only advertising, but also unemployment, race, degree of urbanization, number of recruiters, and a dummy variable for the appropriate test cell. The functional forms for most of the equations used were non-linear. In addition, all the variables were standardized to rates using a population variable. Regressions were also run by pairing cells together and using predictor variables which reflected changes between FY 1983 and FY 1984 (the period of the test).*

Responses on the Youth Attitude Tracking Study regarding reported conversations with parents and reported contact with recruiters were also analyzed. Data on these measures were examined in an effort to determine whether a relationship existed between reported behaviors incidental to the enlistment process and differences across the cells in advertising spending. The responses were split by Service, with changes examined between the test period (FY 1984) and a pre-test period (FY 1983). For the most part, a two-tailed "t" test was used to determine whether statistically significant differences occurred in various subsets of response data between and among the cells.

Lastly, various responses on the Youth Attitude Tracking Study intended as measures of likelihood or propensity to enlist in the military were examined. Prior research suggests that these data, purported to measure propensity to enlist, do in fact represent lagged indicators of future enlistment behavior. Parametric and non-parametric statistical tests were performed on these data in a manner similar to those described above for measures of reported behavior (i.e., conversations with parents and contact with recruiters).

These three sets of measures were analyzed to cross-validate the findings from one set of measures using another set. Of concern was the fact that analyzing only data representing measures that reflected primarily near-term results (applicants and enlistments) would overlook equally important long-term effects of advertising. Hence, the measures on purported behaviors and expressions of interest in military service were also included. Response data on these measures, which typically lead enlistment results, were analyzed to determine if they were affected by changes in advertising spending.

*The models and estimation methodology used in this study are consistent with those of previous research on factors affecting enlistment supply. However, more recent efforts suggest that recruiter behavior variables might be important in manpower supply models (Dertouzos, 1985; Carroll, Lee and Rao, 1986). Systematic changes in recruiter behavior can alter the quantity and quality of enlistments and can make estimating the impact of recruiting resources, including advertising, difficult. To the extent that changes in recruiter behavior are correlated with changes in advertising expenditures, the magnitude of the advertising effect may be underestimated. Accounting for such factors simultaneously for all four Services is a demanding task well beyond the scope of this study. Accordingly, any effects that recruiter behavior variables might have had on the findings of this experiment are unknown.

EMPIRICAL FINDINGS FROM THE ANALYSES

The findings reported in this section emerged from the analyses of the data on the three types of measures used to evaluate the field experiment. Conclusions drawn from these findings as well as possible budget implications are described in a subsequent section of this Executive Summary.

Observed Measures of Behavior

With respect to subsets of data on enlistments, applicants and the rate of applicant conversion to contracts, the analyses revealed that:

- The test cell with the lowest total advertising spending (Cell Blue) produced applicant and enlistment results equal to, and occasionally better than, the control cell.

- Other test cells with considerably larger total spending than Cell Blue (but still somewhat less than the control cell) produced results no better than, and occasionally poorer than, the control cell (Cell Yellow).

- None of the test cells provided results in terms of enlistment or applicant share by Service that differed to a statistically significant degree from the shares observed in the control cell.

- In the first year of significant changes to advertising spending levels, it appears that the contribution of advertising to recruiting system performance is either quite small or virtually non-existent.

Reported Measures of Behavior

With respect to data on reported measures, such as conversations with parents or contact with recruiters, the analyses revealed the following:

- The reported incidence of conversations with parents about enlistment did not differ between and among the test cells and the control cell to a statistically significant degree.

- The reported incidence of recruiter contact occurred to a greater degree (also statistically significant) in the test cell with the lowest total spending (Cell Blue).

- When responses were analyzed by reference to a specific Service, the findings noted in (1) and (2) above did not differ for references to the Army but did differ for the other three Services. References to the Air Force, for example, declined in the test cells to a greater extent than in the control cell. This decline also occurred in one test cell for the Navy but not for the Marine Corps.

Reported Measures of Attitudes

Because prior research suggests that expressions of interest in eventual military service by the prospect audience appear to lead trends in actual enlistment results, these data were examined as part of the field experiment. Three separate variables purporting to measure interest in military service as derived from the Youth Attitude Tracking Study were employed. These are referred to generally as: (1) unaided mentions of joining the military; (2) after interviewer prompting, an expression of likelihood of joining the military; and (3) after interviewer prompting, a variable representing a composite of favorable responses to interest in joining any one or more of the individual Services. The variable used in each case represented a proportion of respondents who stated that they would "definitely" or "probably" join the military.

The findings that resulted from analyses of the attitudinal data were inconclusive. While differences did occur to a statistically significant degree between and among test cells and the control cell, no clear pattern emerged. Any attempt to cross-validate the findings of one approach with another only served to reinforce the inconsistency and inconclusiveness of the results. Therefore, expressions of interest in military service, while possibly a valid predictor of future enlistment response, do not appear to be correlated in any meaningful or predictable manner with changes in advertising spending as reflected in the test cells. This is not to say that advertising bears no relationship to attitudes toward military service, but only that the field experiment did not reveal any consistent pattern permiting conclusions to be drawn from the results.

BUDGET IMPLICATIONS OF THE FINDINGS

As noted before, the field experiment employed different advertising spending levels under conditions as they existed in FY 1984. Assuming recruiting resources and policies and overall market conditions have not changed dramatically during the intervening years, results of the field experiment suggest that a lower level of total advertising spending could be adopted nationally than that proposed for FY 1987. More specifically, the proposed FY 1987 total advertising budget could be reduced by 17-25 percent. (In fact, Congress reduced that budget request by 18 percent.)

While an estimate for total advertising spending in FY 1987 can be inferred from the spending level used in Cell Blue (after appropriate adjustments for inflation and adjustments for the non-media portion of the budget), a mathematical model was subsequently developed to simulate plausible combinations of Joint and total Service-specific advertising at different total spending levels. Basically, the model showed that the mix of Joint and total Service-specific advertising employed in Cell Blue (at a national level in FY 1984 of $15 million for Service-specific and $16 million for Joint) was actually sub-optimal. That is, a somewhat different mix of Joint and total Service-specific advertising budgets would have produced better results for the same total spending. This model assumes that an interaction with respect to recruiting system performance exists between Joint and total Service-specific advertising spending. Likewise, the total budget in FY 1987 is both too large (based on the empirical findings from the experiment) and sub-optimal in its mix (based on the modeling employed).

RECOMMENDATIONS

The empirical findings of the field experiment suggest that the Department of Defense can reduce its total advertising spending without adversely affecting recruiting performance. However, precise spending levels cannot be determined solely from the field experiment. The data do, however, show the most cost-effective direction for future spending on advertising and provide approximations of the size of short-term budget adjustments.

The size of the Joint advertising budget should be increased as Service-specific budgets are scaled back. The present mix at current total spending levels, as well as at reduced levels, is sub-optimal and inefficient.*

Based on the one-year duration of the experiment, the longer-term consequences of changed advertising spending levels could not be adequately addressed. As a result, the testing of alternative spending levels, perhaps on a less ambitious scale, should be continued.

In spite of the difficulties encountered in attempting to quantify the effectiveness of advertising, the sizeable amounts spent by the Department of Defense on advertising and its importance to the recruiting effort are sufficient grounds to warrant continued research in this area. More specifically, this research would best serve the Department of Defense by developing a better understanding of the relationship between advertising, enlistment intentions and subsequent enlistment behavior.

Regardless of the Department of Defense's intention to continue research and testing, every effort should be made to continue collecting relevant market and recruiting resource information at geographic levels allowing continued post-test tracking of the measures evaluated in the field experiment.

*In July 1986, the Deputy Secretary of Defense reviewed the findings of the DoD Advertising Mix Test. He agreed with the study conclusions that cost savings could be achieved by reducing Service-specific and slightly increasing Joint advertising. After full consideration of many factors including the successful recruiting environment, he decided to reduce the total DoD advertising budget by 25 percent over the FY 1988 - FY 1991 period. (See footnote on p. 94.)

CHAPTER 1
INTRODUCTION

BACKGROUND

During the past several years, Congress has increasingly been concerned about the advertising costs incurred for the recruitment of military personnel. Historically, inquiries have been made by the Secretary of Defense concerning the level of such advertising, its appropriate allocation between the Joint and Service-specific programs and its effectiveness. Unfortunately, insufficient data were available to address adequately these concerns.

In 1981, the Congressional Budget Office (CBO) recommended significant increases in the Joint Recruiting Advertising Program (JRAP) with concurrent reductions in Service-specific advertising to produce an overall savings in advertising expenditures. The Secretary of Defense agreed with CBO's concept and proposed to double the size of the Joint Service Program in 1982 while reducing Service-specific advertising. (See Appendix A for additional details[1].) Such cutbacks were viewed by the individual Services as detrimental to their ability to meet recruitment goals and to sustain the gains made in the quality of recruits. Joint advertising was viewed as "corporate" or umbrella advertising complementing the main advertising thrust by the individual Services. The Services contended that the projected increase in Joint advertising could not adequately compensate for the reduction in total Service-specific advertising.

In the summer of 1981, the Secretary of Defense continued to review the issues concerning the proper Service-specific/Joint advertising mix and the most efficient total advertising level. Because of the lack of research in these areas, the Secretary decided to conduct a major field test. In the meantime, the advertising mix and total funding remained at the Fiscal Year (FY) 1981 levels. The test was conducted throughout FY 1984 (October 1983 - September 1984). Data were collected, validated and collated during FY 1985. The analysis began in FY 1986 and was completed in FY 1987.

NEED FOR THE TEST

As indicated, insufficient data were available to provide direction concerning the appropriate level of DoD advertising and the specific mix of Joint and Service-specific spending. Indeed, historical data on DoD advertising were difficult to analyze for the following reasons:

- Historical data did not provide independence of variables. The amount of advertising and number of recruiters frequently varied simultaneously. As a result, it was difficult to disentangle their independent effects. Further, it is often unclear whether advertising affects recruitment (sales) or if the level of recruitment (sales) affects the level of advertising. Both positions have historically been argued (e.g.,

[1]Memorandum dated 8 July 1983 from Lawrence J. Korb, Assistant Secretary of Defense (Manpower, Reserve Affairs & Logistics) to the Assistant Secretaries of the Army, Navy, and Air Force.

"we need more advertising to maintain high sales" or "in markets with low sales, we need advertising to increase sales").

- Historical data did not provide sufficient variance. Advertising expenditures frequently vary in only a narrow range. The prevalent budgeting practice keeps the Services and the Joint shares of the total budget relatively constant from year to year. Hence, evaluation of alternative policies which differ significantly from past practice requires extrapolation beyond the range of observed data.

- Historical data are under no uniform system of measurement. Recruiting system data, such as number of recruiters and quotas levels, are often not available in the same unit (geography, time, etc.) of observation across Services. This makes analysis and comparisons difficult. The effect of advertising on the enlistment process may be small when compared to the effect of other variables such as recruiters or unemployment. Omitted variables or profound measurement errors in historical data can seriously bias results or completely obscure the effect of advertising.

For these reasons and for the lack of conclusive research in the area of industry and brand advertising and their respective applications to military recruiting, the Secretary of Defense established this advertising experiment.

OBJECTIVE OF THE TEST

The DoD Advertising Mix Test was initiated because "the Department of Defense does not have a methodology relating and quantifying the effect of varying levels of advertising to actual enlistments."[2] The objective was to respond to the following question: "What is the optimum mix of Joint/Service-specific recruitment advertising for achieving active, enlisted, non-prior service (NPS) goals at different levels of total DoD recruitment advertising?"[3] The experiment was designed as an in-market test which would generate the necessary quantitative data.

The aim of the test was to capture and quantify the impact of different budget policies on the recruiting system's performance. These issues, pertaining specifically to active, enlisted, non-prior service advertising were:

- What is the impact of the size of the advertising budget on recruiting system performance?

- What is the impact of different proportions of Service-specific and Joint advertising budgets on recruiting system performance?

- Does an effective mix between Service-specific and Joint advertising budgets depend on the size of the overall advertising budget?

Since only one actual national budget policy could be implemented in a given year, these budget policy issues were addressed by using per capita advertising expenditure levels. These were based on systematically different budgets in each of four sets of television markets. The performance of the recruiting system was assessed through both short- and long-term measures. In

[2]Korb, op.cit.

[3]Korb, op.cit.

the short term, the contribution of advertising to the recruitment effort was measured by its effect on meeting accession missions, contract objectives and quality goals. In the longer term, these budgets were to be reviewed with regard to their contribution to maintaining favorable attitudes toward the Military Services.

REPORT OVERVIEW

This report describes the design, implementation, results and implications of the DoD Advertising Mix Test. This study was a collaborative research initiative spanning a four-year period. It focused on the effectiveness and efficiency of military recruiting advertising. The research centered on a one-year, controlled experiment conducted in sets of matched television markets from October 1, 1983 until September 30, 1984. The total level of recruiting advertising expenditures and the mix of expenditures between Service-specific and Joint advertising were systematically varied in the experiment. Sharply different advertising budget policies were implemented (on a pro-rata basis) in each of four different sets of markets. Recruiting system performance measures were established and computed across the four sets of markets to assess the comparative effects of the different advertising budget policies on shorter and longer term recruiting system performance.

The report is organized as follows: Chapter 2 presents the research perspective, the design of the experiment and the actual advertising expenditure levels achieved in the year of the experiment. Chapter 3 discusses the development of a criterion for evaluating the experiment. The measures used to assess recruiting system performance are described in Chapter 4. Chapter 5 reviews the approach taken in analyzing the experiment and discusses related methodological and statistical issues. The results of the experiment and their direct implications are explained in Chapter 6. Chapter 7 presents additional analyses of the experimental data and discusses the implications of the results. Finally, a summary of the experiment and recommendations is presented in Chapter 8.

ISSUES NOT ADDRESSED

The DoD Advertising Mix Test was NOT designed to measure or evaluate the following issues:

The effectiveness of the media mix, i.e., the combination of media utilized (e.g., television, radio, magazines, direct mail, etc.). This test allocated budget levels to each cell for Service-specific and Joint advertising. The Services and the Joint program director then independently decided how to allocate those budgets across various media. Thus, this test cannot evaluate whether the advertising resources would have been better spent in radio, for instance, rather than in TV. This test also cannot categorically determine whether the results obtained in one market were a function of a more effective media mix than that used in another market.

The appropriateness of the share of total advertising budget allocated to each individual Service. In designing the test, each Service received the same proportion of the total Service-specific budget that it had received in the recent past. Thus, this test cannot address whether the results would have changed if, for example, the Air Force had received a larger share of the Service-specific budget. Nor can the test results resolve the appropriateness of the budget levels historically allocated to each of the Services.

The effectiveness of the creative content of the various advertising messages. During the test period, the Services and the Joint program maintained the then current thematic and creative content of the advertising campaigns. Thus, this test cannot comment on whether the results would have been different if the creative content had changed or if the results observed were predominantly a function of the differences in creative content.

PROJECT TEAM

In May 1983, on behalf of the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), the Office of Naval Research awarded a contract to perform the DoD Advertising Mix Test to the Wharton Applied Research Center of the University of Pennsylvania. Because of the massive scope and complexity of the test, a project team from a consortium of contractors, consultants and advisory personnel was assembled. Each of the five major contractor groups had special areas of expertise essential to the completion of the project. These contractors were:

Wharton Applied Research Center (WARC, now the Wharton Center for Applied Research), as the primary contractor, was responsible for the entire scope of the project. This included participation in the development of the final experimental design, identification of data to be collected and development of systems for its collection. With assistance from the RAND Corporation, WARC also selected and assigned Areas of Dominant Influence (ADIs-the geographic unit used to define television markets) into their respective test and control cells, developed the evaluation criterion, identified the measures of effectiveness, selected the research methods to analyze the test, and reported the test findings. In addition, WARC documented and maintained the data base.

CACI, Inc.-Federal coordinated the complex management tasks involved in the preparation of the DoD Advertising Mix Test. CACI provided the administrative and facility support for all meetings and briefings. They prepared the graphic artwork, typing and report production support for all contract deliverables.

PEP Systems, Inc. collected from the Services and JRAP historical and experimental national advertising data. PEP produced post-buy analyses of these advertising data and prepared a database containing total national advertising expenditures and impressions by market (ADI), by advertiser, by month and by media type. PEP Systems constructed the database from detailed data submissions by each advertiser covering each separate national advertising media purchase.

Arthur D. Little, Inc. (ADL) developed two interview protocols administered to industry associations and their advertising agencies to ascertain the use and benefits of industry advertising.

OR/MS Dialogue, Inc. (now Rao Associates) prepared a report on the conceptual models to evaluate military enlistment advertising effectiveness and provided a report reviewing the empirical studies of enlistment response to advertising. They conducted a series of independent analyses of the experimental data and participated in the development of the final report.

CHAPTER 2

RESEARCH DESIGN AND IMPLEMENTATION

As discussed in the prior chapter, the objective of this study was to relate various DoD advertising budget levels to actual enlistment behavior. In doing so, the study aimed to identify the appropriate mix of Joint/Service-specific recruitment advertising at different levels of total DoD expenditures. This chapter reviews the research perspective from which this objective was investigated and the constraints which conditioned the study's design. The planning and fielding of the experiment as well as the allocation of advertising expenditures are described. In addition, the chapter includes an analysis of the general performance of the enlistment process during the period of the test.

RESEARCH PERSPECTIVE

The military manpower recruiting system is a large and complex one. Recruitment performance depends strongly on broad economic and social conditions. It is also influenced by factors such as military pay and bonus levels, recruiter efforts, etc. However, previous studies would seem to indicate that advertising is not a major determinant of performance. Overall, the recruiting system is a dynamic one, changing as requirements, policy, and the environment change, and as multiple decision makers compete and cooperate within a fairly rigid resource allocation process. In this environment, controlled advertising experimentation and data analysis are unlikely to yield the crisp, clean results that are obtained in the physical or social sciences. Major sources of variation can be largely controlled in the laboratory while military advertising researchers clearly cannot control unemployment. Econometric analyses and other methods for evaluating historical data suffer even more from these system complexities. In this experiment, system complexities have been addressed by establishing tight and uniform controls. This was accomplished by matching treatment cells for historical performance and by repeating advertising treatments in multiple markets.

The research challenge was to produce managerially useful guidelines to evaluate the level and mix of advertising for the Department of Defense. These guidelines should be revised and enriched as the system evolves over time. The study was approached in the following ways:

- By using multiple measures of performance: observed behavior such as contracts and applications, reported behavior such as recruiter contacts and conversations with parents, and attitudinal measures such as intentions to join the armed services.

- By placing less dependence on specific individual analyses and more emphasis on consistency among a variety of analyses using the above multiple measures.

- By searching for the direction and ranges of expenditures which can be modified over time rather than by seeking precise and static decision rules.

DESIGN CONSTRAINTS

To assess the relationship between advertising budgets and enlistment system performance in an ideal world would involve several sequential steps. Criteria for evaluating the impact of advertising budgets on recruitment would first be developed. Then, measures for evaluating the criteria would be created, validated, tested for reliability and sensitivity, and finally selected. Next, an experiment, incorporating different budget combinations, would be designed. The test would allow each budget level to be implemented many times. Relevant data protocols and definitions would be developed. Then, each test budget would be implemented simultaneously on a nationwide basis for a prolonged period. Data would be collected, validated and collated and the experiment analyzed. Finally, recommendations based on the analyses would be made.

Clearly, practical realities such as time, budget and personnel limitations conspire against this ideal. As a result, the definitive assessment of all possible budget combinations and policy options cannot be undertaken. However, improvements in budgeting policy can be achieved by the systematic assessment of a subset of practical alternatives to the current budget policy. In addition, prudent modifications to the idealized research process can be made to accomplish the objective within a managerially useful time frame.

As a result of these constraints, the criteria- and measures-development phases were carried out simultaneously. At the same time, data were being collected in the field. The tasks could not have been undertaken in this way if the members of the research team had not had previous experience in the field of recruitment advertising. This experience enabled the team to make reasonable judgments about the data specification as well as the projected outcomes of the criteria and measures.

Many test budgets could not be implemented simultaneously on a nationwide basis for prolonged periods. As a result, the experimental budget levels were carried out on a pro-rata basis in matched sets of television markets over a one-year time frame. This was possible because each military advertiser involved in the test was required to provide a systematic set of implementation plans (discussed later in this chapter). Another modification to the "ideal" study dealt with limiting the number of budget policies to be examined. As stated in the following paragraphs, ultimately four budget levels were tested.

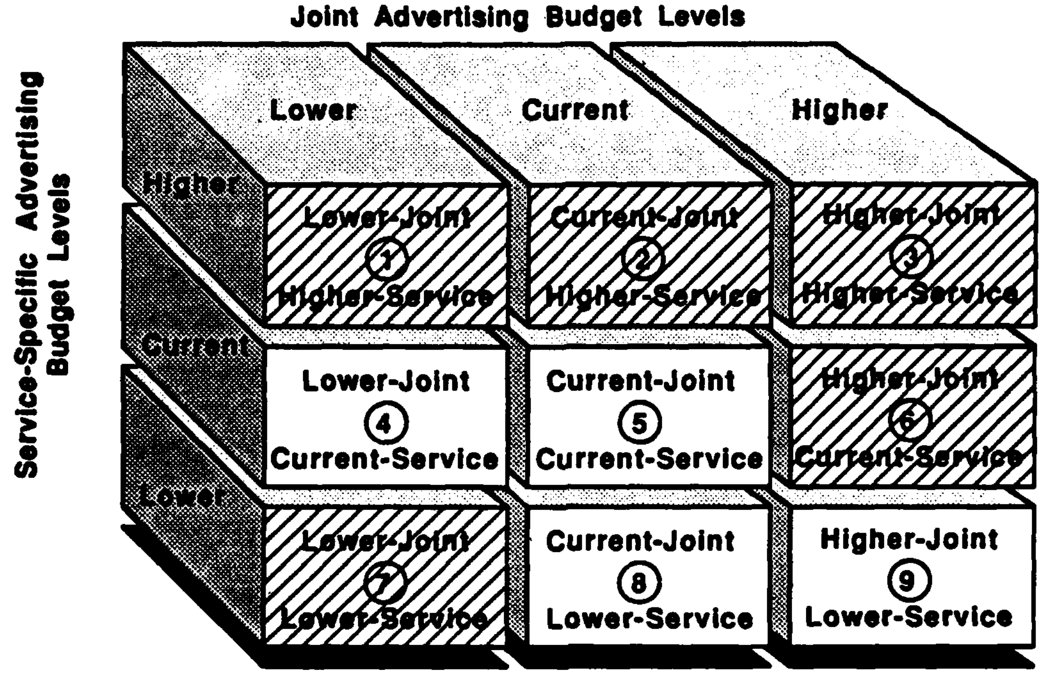
Number of Test Cells

Design consultants - Canter, Achenbaum and Associates - initially developed a nine-cell, two-factorial design which incorporated low, current and high levels of both Joint and Service-specific advertising (Figure 2.1). However, the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) [OASD (MRA&L)] recognized in the early stages of this effort the importance of involving the Services and the Joint Recruitment Advertising Program in the development of the research design. Through the sponsorship of OASD (MRA&L), the Wharton Center then held a series of meetings with Joint and Service representatives to discuss and revise the design of the experiment.

Spending Levels in Each Cell

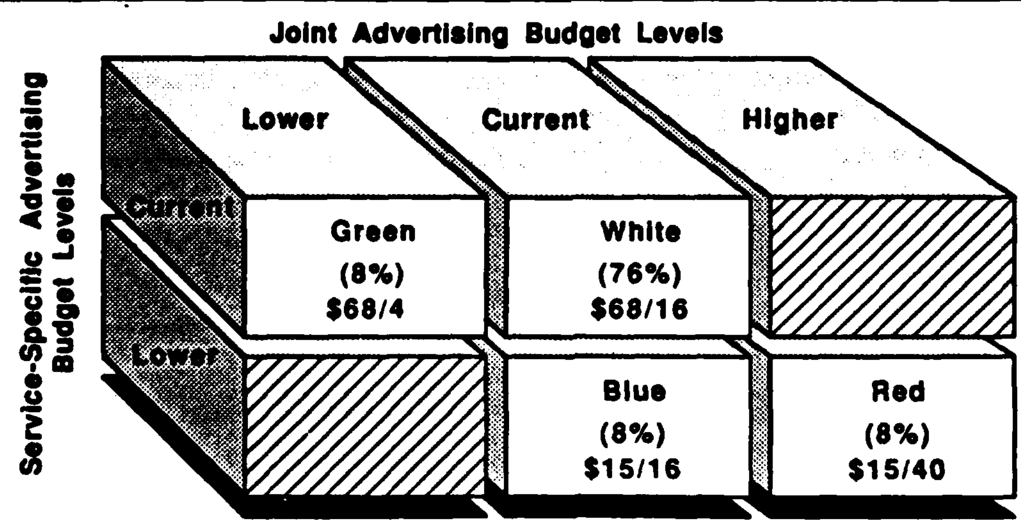
Because of the difficulty and cost involved in implementing such an experiment, the parties compromised on a four-cell design. It included matching current and lower levels of Service

Figure 2.1
Proposed Nine-Cell Test Design Concept



Note: Canter, Achenbaum and Associates proposed the above nine-cell design, components of which were actually implemented in the field as depicted in the following Figure 2.2. Cells containing diagonal lines were not part of the actual test implemented in the field.

Figure 2.2
Actual Four-Cell Design Implemented in the Field



Note: Percentages represent the proportion of 17-21-year-old males residing in the ADIs covered by the respective cells. Dollar amounts reflect simulated national spending levels in each cell for Service-specific (numerator) and Joint (denominator) advertising. "Current" spending refers to the amount expended in FY 1982, the baseline budget when the experiment was designed.

expenditures with low, current and high levels of Joint spending as shown in Figure 2.2. While not a complete representation of all the spending combinations proposed in the original design, this truncated design does permit testing of budget mixes relevant to future advertising budget levels.

As noted in Figure 2.2, Cell White was designated the control cell, maintaining FY 1982 levels of both Joint ($16 million) and Service-specific ($68 million) advertising. Later, Cell Yellow, a subset of Cell White, was designated as the control cell. The existence of such a cell was the result of budget cuts which the Navy and the Joint program sustained during the period of the advertising experiment. This required a reduction in the size of the control cell. As a result, the burden of field data collection was reduced. Cell Blue had the same FY 1982 level of Joint spending ($16 million) but a lower Service-specific ($15 million) budget. Cell Green had lower levels of Joint advertising ($4 million) and the FY 1982 levels of Service-specific ($68 million) spending. And finally, Cell Red had much higher levels of Joint spending ($40 million) and much lower levels of Service-specific advertising ($15 million) than the control cell. Once the total Service-specific budget levels were established for each cell, individual Service budgets were established. Those were based on the proportion historically achieved by each Service in the allocation process.

ADI Matching Process

The Area of Dominant Influence (ADI), a television market, was the unit of analysis for this test. A county-based geographic unit commonly used in advertising analysis, an ADI is a group of one or more counties, the plurality of whose households receive electronic media from one common location. Taken together, ADIs uniquely account for each county in the continental United States. Specifically, the 1981-82 Arbitron ADIs were used as the basis for this test. Thus, Cell White consisted of ADIs which included 76 percent of the country's young men between the ages of 17 and 21 inclusive. The three other cells each comprised 8 percent of that age group. Cell Yellow (a subset of the control cell) consisted of 16 percent of the country. Cell Yellow subsequently became the strict control cell as a result of budget cuts. These budget cut adjustments occurred in those Cell White ADIs not included in the Cell Yellow subset. The remaining Cell White ADIs were considered unacceptable for analysis because the spending level in these ADIs fell below FY 1982 budget levels.

Clearly, individual ADIs differed from one another on many characteristics which could impact recruiting system performance. These sources of performance variation needed to be controlled or accounted for to assess accurately the impact of advertising on the recruiting system. Two steps were taken to do this. First, data on major known sources of variation (such as differences in unemployment rates, levels of recruiter effort, civilian income levels, etc.) were collected for each ADI and were explicitly included as co-variates in the analysis of the experiment. These efforts are described in Chapters 5 and 6 of this report. Second, the four advertising cells in the experiment were closely matched to each other on a variety of these characteristics. The objective was to develop four cells which were as much alike as possible so that differences in recruiting system performance could be directly attributed to differences in the advertising induced during the experiment.

The RAND Corporation provided technical assistance in assigning markets (ADIs) to test cells. The primary market-matching criteria included the market's previous enlistment rate and the market share for each Service within the ADI. The secondary matching criteria consisted of the level of unemployment, the percentage of non-whites and the propensity of youth to join the military. The ADIs represented in each test cell exhibited a fairly uniform geographic distribution and appeared roughly balanced according to ADI market sizes. Various cell configurations (groups of ADIs) best conforming to these matching criteria were developed and reviewed by the Services and JRAP. Finally, one configuration was selected. The matched sets of ADIs were then randomly assigned by Wharton to be Cells Blue, Red, Green, and White (Control). Descriptions regarding the matching criteria of the test ADIs and cells are provided in Appendix B.

DEVELOPING IMPLEMENTATION PLANS FOR EACH TEST CELL

Once all parties agreed with the research design, the Wharton Center requested each Service and JRAP to submit advertising, media and translation plans for each of the budget levels. The purpose of these plans was to assure that the experimental budget levels were consistently implemented on a pro-rata basis in the test ADIs. In addition, the plans guaranteed that all decisions concerning the uses of the budget funds were made by the advertisers. This information explained in detail how each, in collaboration with its advertising agency, planned to spend the advertising funds at each budget level. There were three steps to this process.

The advertising plans reflected the nationwide effect of each cell's budget. They specified, for each budget level, how funds would be allocated to local versus national advertising. They provided information regarding production, agency and market research costs. Lastly, the plans included data about the number of markets which were to receive advertising support for each budget level. Appendix C discusses in detail the planned advertising expenditures.

The media plans provided further details. These plans specified the allocation of national funds across markets (ADIs) and across media (television, radio, print, direct mail). In addition, the media plans provided advertising schedules.

Translation plans then converted the national and local media plans into actual schedules of planned advertising for each test cell and test market. These market-by-market, planned advertising schedules formed the basis for advertising purchasing actions during the test year.

To achieve the desired pro-rata advertising levels in each market, a number of quite detailed decisions and implementation steps were required to purchase advertising time, space, and material. Purchasing actions were based on projected advertising exposures rather than strictly on costs because of the price structure of advertising and its availability. The translation plans then spelled out other detailed steps to be taken including: (1) national buys -which media would be bought on a network or national basis; (2) cut outs (the deletion of advertising messages, usually in electronic media) - which national (network) buys would be cut out in which markets; (3) spot or market buys (buy-ups) – which additional media were needed in which markets; (4) confirmation and control mechanisms - for both buy-ups and cut-outs; (5) make-good procedures - how would preemptions be made good or compensated for; and (6) cost of execution - media costs, media savings, and cut-out costs (additional television network charges for deletion of an announcement in selected ADIs).

Representatives from the Joint and the four Service advertising programs compiled these plans into "factbooks" which Wharton and OASD (MRA&L) reviewed. Wharton's principal investigator and the project manager then met to discuss these plans with JRAP, each of the Services, and representatives of their respective advertising agencies. These meetings succeeded in resolving remaining difficulties involved in planning for the implementation of the test.

The advertising implementation plans produced different advertising and media configurations in the various tests cells. For example, national television advertising was not an effective

Table 2.1

Planned vs. Actual Advertising Deliveries (Dollar Expenditures per 17-21-Year-Old Male)

	PLANNED			ACTUAL		
	JOINT	SERVICES	TOTAL	JOINT	SERVICES	TOTAL
			CELL WHITE			
National	$1.48	$4.34	$5.82	$1.61	$4.32	$5.93
Local	-	$1.17	$1.17	-	$0.87	$0.87
Total	$1.48	$5.51	$6.99	$1.61	$5.19	$6.80
			CELL BLUE			
National	$1.55	$0.79	$2.34	$1.63	$1.80	$3.43
Local	-	$0.55	$0.55	-	$0.53	$0.53
Total	$1.55	$1.34	$2.89	$1.63	$2.33	$3.96
			CELL GREEN			
National	$0.39	$4.49	$4.88	$0.41	$4.07	$4.48
Local	-	$1.16	$1.16	-	$0.89	$0.89
Total	$0.39	$5.65	$6.04	$0.41	$4.96	$5.37
			CELL RED			
National	$3.91	$0.83	$4.74	$3.92	$2.21	$6.13
Local	-	$0.51	$0.51	-	$0.64	$0.64
Total	$3.91	$1.34	$5.25	$3.92	$2.85	$6.77

National - *Media is purchased on a national basis. The advertising agency is executing the media plan.*

Local - *Media is purchased on an individual market basis. The execution is made by the local advertising agency representative and/or the market's commanding officer.*

alternative for some advertisers at low budget levels. In general, the Services with low budget levels tended to spend proportionally more on local and print advertising. These decisions were made by the advertisers. The DoD Advertising Mix Test was not designed to assess directly the effect of these media-mix decisions. Rather, the test takes these media decisions as outcomes of the prevailing practices in the military advertising system. It is possible, of course, that different media-mix choices would have resulted in different test outcomes.

PLANNED VERSUS ACTUAL ADVERTISING DELIVERED

Table 2.1 presents the working media expenditures planned and actually delivered for each test cell during the study. It is expressed on a per capita basis. This is calculated by dividing the advertising and recruiter variables by the population of 17-21-year-old males in that ADI.

Considering the difficulties of implementation and the vagaries of media delivery, the total deliveries by cell are remarkably close to the planned deliveries. In the cells receiving the 1982 level of Service-specific advertising (Yellow and Green), the per capita expenditures are roughly equivalent. Similarly, the Blue and Red cells had low levels of Service-specific advertising. Overall, the advertising deliveries also achieved the desired levels of variance. Figure 2.3 shows a plot of Joint versus Service-specific spending by ADI. As can be seen, only two markets received inappropriate levels of advertising. One Red cell market (Grand Junction, Colorado) received much more advertising than planned for any cell. As a result, it was eliminated from the analysis. Another market in Blue cell (Harrisburg-York, Pennsylvania) had advertising levels similar to Yellow cells. Consequently, it was analyzed as part of the Yellow cell group.

Data Collection

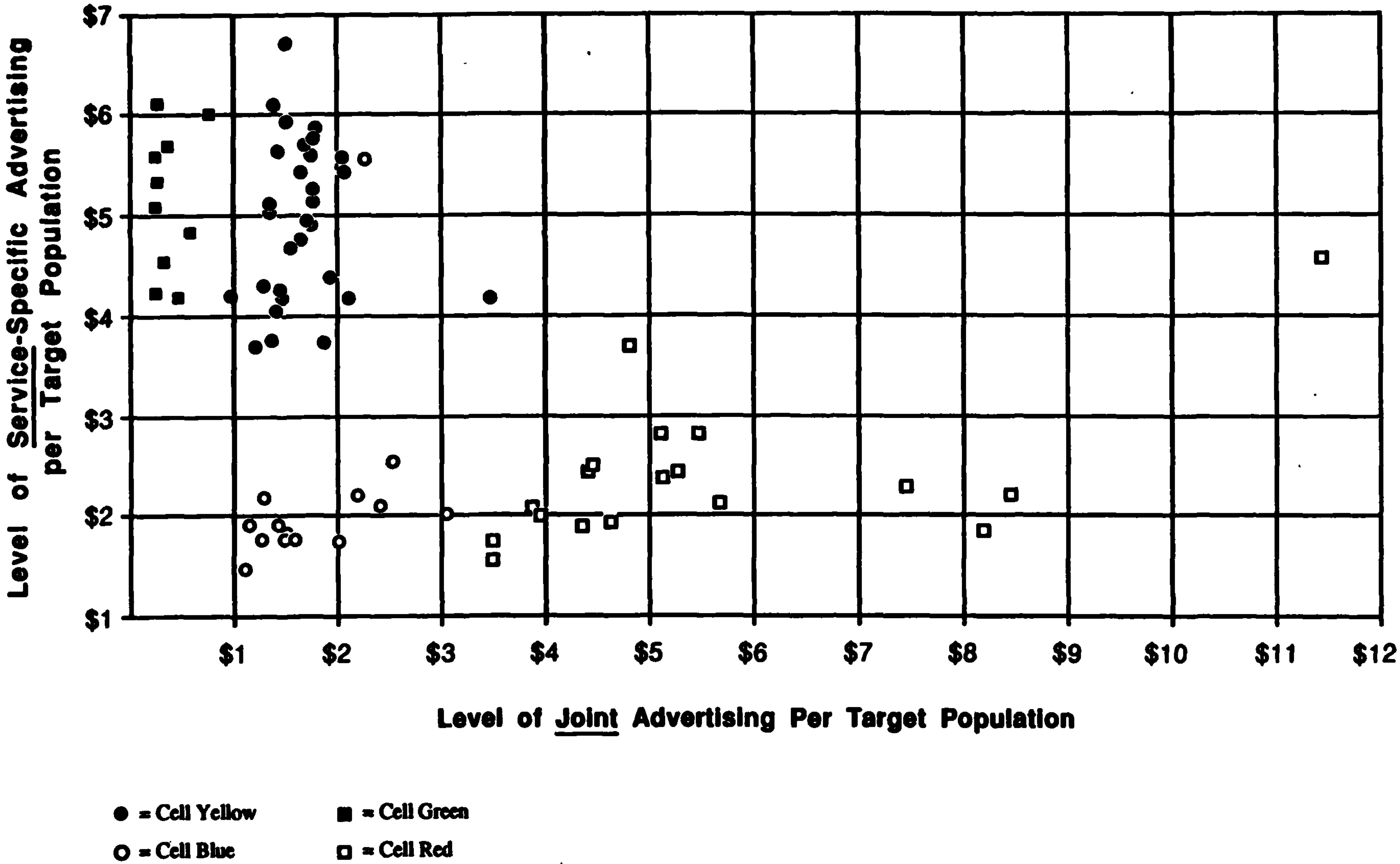
The full significance of the close adherence of actual to planned delivery levels can only be appreciated when one considers the magnitude of the data collection effort. The data collection involved coordination among OSD, JRAP, the advertising directors, recruiter management personnel and accession policy personnel of the four Services, in addition to five advertising agencies, five direct mail fulfillment houses*, the Defense Manpower Data Center (DMDC) and three project subcontractors.

In all, the data collection involved 508 separate project input submissions including the following: recruiter data (number of recruiters, location, etc.); local and national advertising data; contract and accession goal information; applicants, contracts and individuals in DEP (Delayed Entry Program) by quality level; gross and qualified national leads information; and a variety of exogenous variables such as unemployment data, racial composition, urbanization, and household income. (Some data, such as that for the DEP, were collected only for historical purposes and were not a factor in the final analysis.) A copy of the data collection plan is included in Appendix D. The data collection was a major undertaking both in size and scope. The Services and JRAP are commended for the level of cooperation and collaboration they demonstrated throughout the implementation and data collection phases of this test.

*Direct mail fulfillment houses are those firms which prepare and mail various types of advertising material to households using selected lists.

Figure 2.3

Advertising Delivery by Market



From these data submissions, the Wharton Center assembled a monthly database covering the period from FY 1981 through FY 1984 (October 1980 through September 1984). These were converted, where necessary, from main station* to ADI observations. The conversion program was developed by the Wharton staff and was based on the number of 17- 21-year-old males in the specific counties across the country. This conversion program is documented in a user's manual. The FY 1983 and FY 1984 data used in the analysis are complete. However, in the FY 1981 and FY 1982 time period, some of the data items were either missing or not available. The Wharton Center has included only what was received. Other researchers should take note that some data elements are missing in earlier years across some of the Services.

The benefits of this comprehensive data collection effort extend beyond its original intention. The Services and JRAP have continued to collect and report recruiting and advertising data on a formal basis in a standardized format. The data are maintained by DMDC and provide an invaluable database for use in advertising plan analysis and budget justification.

TEST ENVIRONMENT

The performance of the military recruiting system during the year of the test, FY 1984, declined compared to the previous year. Nationally, the economy improved, unemployment declined, and military enlistment contracts for all categories of recruits also dropped. Broader measures of recruiting system performance went down as well. There were declines in the size of the delayed entry pools of the Services and the number of applicants tested. In addition, smaller proportions of youths indicated a positive propensity to join the military. They also reported fewer contacts with military recruiters and a reduction in the number of conversations with their parents about enlistment in the military.

These decreases in recruiting system productivity during the year of the test occurred in all cells including cells White and Yellow where no changes in advertising budget policy were tested. As a result, it is most reasonable to infer that the decreases in recruiting system performance were not caused by the advertising changes but were the result of the overall economic conditions in the United States during the year of the test. These environmental fluctuations require that the study's findings be evaluated by comparing recruiting system performance in markets where advertising was changed with cell Yellow (control) where advertising was not changed. This is the purpose of a control cell. The approach to and results of these analyses are described in Chapter 5 and 6 of this report.

*Main Station - Army Recruiting Battalion, Navy Recruiting District, Marine Corps Recruiting Station or Air Force Recruiting Squadron.

CHAPTER 3

A CRITERION FOR EVALUATING ADVERTISING POLICIES

The objective, scope, design and implementation of the DoD Advertising Mix Test have now been described. This chapter reviews the criterion by which the study was evaluated. To develop this criterion, the Wharton Applied Research Center (WARC) undertook research in three areas. These were:

- A literature review of advertising and marketing research relevant to evaluating advertising effectiveness.

- Primary exploratory research in the form of semi-structured interviews, conducted to identify and categorize prevailing motivations for collaborative advertising.

- A study of mathematical models pertaining to the effects of advertising on military enlistments.

Although the following pages will provide an overview of the findings, further detailed discussion of these results is provided in the report produced in September 1984 entitled A Criterion for Evaluating Advertising Policies (Appendix E).

FINDINGS OF THE LITERATURE REVIEW

Although several studies have focused on generic or commodity advertising for agricultural projects, the overwhelming majority of advertising research has been conducted at the corporate or brand level. This research has dealt with two areas. The first attempts to relate aggregate phenomena, such as corporate or brand sales, to advertising resources. The second investigates the impact of advertising resources on consumer attributes such as advertising awareness, copy recall, and intention to buy.

Although there is no clear consensus as to the role of consumer attribute variables, there is some significant evidence that stated purchase intention measures are valid predictors of purchase behavior. The literature review reinforces the requirement that any intermediate variables employed in evaluating the test must be rigorously tested for both validity and reliability.

No guidance is provided in the literature concerning the simultaneous evaluation of industry advertising and firm-specific advertising. Several studies have estimated the effect of advertising on sales for a number of corporations in the same industry. However, results of these investigations have differed sharply. In addition, none considered a collaborative or jointly sponsored advertising campaign. Other studies have estimated the effects of advertising on sales for generic or commodity advertising campaigns but have not simultaneously considered firm-specific campaigns.

A distinction between national, corporate advertising and cooperative (largely trade channel) industry advertising was identified. In a recent book on this topic, Young and Greyser (1983) assert that:

> There exists very little in the way of formal evaluation methods for assessing cooperative advertising effectiveness. The usual advertising tracking services and evaluation services offer no systematic way of helping managers assess co-op's effectiveness[4].

Previous studies of military recruiting advertising are of limited usefulness. The focus of the effort to understand the effects of military recruiting advertising has been primarily at the individual Service level. A substantial number of enlistment supply models have been developed since the inception of the All Volunteer Force in 1973. However, very few of these studies estimate the effects of advertising on enlistments. Those models which do make these estimates disagree about the underlying model structure and about the effects of advertising on enlistments. Despite the lack of consensus about the magnitude of advertising effects, the literature on military advertising indicates that marketing variables do have significant impact. The fielding of a controlled experiment such as the DOD Advertising Mix Test is advocated in this literature.

The underlying themes in the evaluation literature are sales effectiveness and economic efficiency. In the private sector, these competing factors are incorporated into profit maximization models. These models set advertising budgets so that the incremental contribution from the last sale just equals the advertising cost of achieving the sale.

Unfortunately, a mechanism for measuring recruiting "sales" in terms of dollars is lacking. As a result, the concept of profit maximization cannot be applied directly to evaluating military recruiting advertising policies.

FINDINGS OF INDUSTRY INTERVIEWS

Collaborative advertising occurs when a group of manufacturers or suppliers of a similar product or service join together to advertise in a generic way their product, service or industry. Although collaborative advertising is not rare in the marketplace, the literature dealing with its evaluation offers little guidance for evaluating the DoD Advertising Mix Test. To gain a better understanding, the WARC project staff interviewed 20 industry trade associations. The associations were selected using the following guidelines: (1) multi-million dollar advertising budgets; (2) a strong representation by industries providing financial services (because of their comparability with each other); (3) industries competing with other industries for market share (e.g., the beef or pork industry); and (4) a diverse mixture of industries.

Of the 20 candidate organizations, one was excluded from the sample because its advertising campaign was not collaboratively funded. The remaining 19 organizations were:

Florida Department of Citrus
National Pork Producers Council American
American Dairy Association
Florida Fruit and Vegetable Association
National Live Stock and Meat Board
American Florists Marketing Council

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[4]Young, R.F. and S.A. Greyser. 1983. Managing Cooperative Advertising: A Strategic Approach. Lexington, Massachusetts.

Quality Bakers of America
Investment Company Institute
Communication Workers of America
U.S. Committee for Energy Awareness
The American Bankers Association
American Council of Life Insurance
International Ladies' Garment Workers Union
Savings and Loan Foundation, Inc.
Independent Insurance Agents of America
American Sheep Products Council, Inc.
American Gas Association
American Heart Association
Linen Supply Association of America

Directors of Advertising, Directors of Marketing, or Executive Directors of the organizations, as deemed appropriate by the responding organization, were interviewed. In one case, the advertising agency was viewed as most knowledgeable for responding to interview questions.

Five major objectives for collaborative advertising were identified:

- ***To achieve economies of scale*** - This was the most common reason given. As long as the industry members share a common message, an association can purchase a larger, more professional advertising campaign than its individual members. Production of a series of advertisements is less expensive per unit than production of individual ones. Media costs become more efficient because of volume discounts and greater negotiating power. In addition, economies can be realized when advertising is placed on a national vs. a regional or local basis.

- ***To address secondary target groups*** - In some cases industry members advertise collectively because as a group they can reach audiences that will influence the behavior of the primary target group. In these instances, collaborative advertising is a more effective means of indirect advertising.

- ***To address the primary group from a new perspective*** - A number of industry groups perceive collaborative advertising as being more credible than individual advertising. In many cases, the goal of collaborative advertising was described as the "creation of an appropriate image" which allows the member firms to take a different posture when advertising.

- ***To eliminate "free riders"*** - The "free rider" problem arises in a non-branded, commodity industry where there is little product differentiation. Advertising by one producer inadvertently benefits its competitors. Collaborative advertising eliminates this problem since all industry members contribute to the advertising campaign.

- ***To stimulate goodwill*** - Collaborative advertising was reported as contributing to goodwill within an industry. Seeing positive advertising makes industry members "feel good" about the industry and encourages members to improve their efforts and industry support.

These objectives fall naturally into the efficiency/effectiveness dichotomy familiar from the literature review. They translate almost directly into hypotheses about the roles of Joint and Service-specific advertising.

Economies of scale may support the use of Joint advertising. This is based on the extent to which potential recruits view similarities between the various Services. Joint advertising may allow savings in production and media costs when all purchases are made through one agency or channel. However, the perceived requirement for Service differentiation may not be satisfied by generic Joint advertising. Therefore, a potential recruit's differential response to Joint and Service-specific advertising must be measured to determine if economies of scale and effectiveness of Joint advertising outweigh the effectiveness of Service-specific advertising.

Reaching secondary target groups with the same message may be hypothesized to be done more effectively with Joint advertising than with Service-specific advertising. A Joint campaign, designed to enhance positive attitudes about military service by giving the common benefits of all the Services, may more readily appeal to the general population. Parents, friends and guidance counselors may be motivated to encourage members of the primary target group to consider contacting a military recruiter. This indirect advertising may also encourage enlistment of non-target group individuals. As a result, Joint advertising may be hypothesized to encourage more enlistments from older or non-primary-individuals.

In the context of the Department of Defense, it can be hypothesized that Joint advertising reaches the primary target group with a more generic message than Service-specific advertising. Within certain segments of the youth population, this broader message for the Military Services may be perceived as having greater credibility. As a result, it may be seen as more effective in enhancing the image of the military and in improving basic attitudes toward enlistment.

Joint advertising may prevent a free-rider problem which may be hypothesized to exist when one Service conducts a generic advertising campaign which could benefit other Services. Collaborative (Joint) advertising removes the need to reallocate budgets among the Services. However, it is not clear whether a free-rider problem can arise at the Department of Defense. Each of the four competitive Services essentially represents a "branded" Service. If the advertising compaigns are sufficiently different from one another, a free-rider problem will not occur when one Service uses a generic advertising message. Spillover effects may be insufficient to require Joint advertising.

Instead, Joint advertising may control the extent to which the Services can differentiate themselves from one another. If only Service-specific advertising existed, the Services could concentrate their advertising on gaining market share rather than expanding the market by improving basic attitudes toward enlistment. The Services may differentiate themselves to such an extent as to be dysfunctional. One can hypothesize that less Service differentiation occurs with more Joint advertising.

Joint advertising may have substantial goodwill effect for the Department of Defense. It may be hypothesized that Joint advertising helps generate a sense of pride in the military service both among service personnel and civilians. This goodwill may help stimulate enlistments and reenlistments among the active and reserve components of the military.

FINDINGS OF CONCEPTUAL MODELS

Four conceptual models were developed to aid in understanding the contribution of advertising to the enlistment process. Two of these were reported by Ambar S. Rao in A Model for Joint and Service Advertising Budgets (October 1983) and two by Hau L. Lee in A Generalized Model for Joint and Individual Service Advertising on Enlistment for the Armed Forces (November 1983). All four models are discussed in detail in A Criterion for Evaluating Advertising Policies (September 1984) (Appendix E). The models hypothesize two kinds of contributions from military recruitment advertising:

- Direct contributions to the signing of enlistment contracts (closing the sale).
- Indirect contributions to improving attitudes toward military service among youth who are approaching or in the prime enlistable age group, and among the individuals who may influence them.

The conceptual models minimize the sum of Service-specific and Joint advertising expenditures (efficiency) while assuring sufficient advertising expenditures for each Service to meet its enlistment contract requirements (effectiveness).

In addition to the recurring themes of efficiency and effectiveness, several unique elements of the recruiting environment were highlighted in the formulation and evaluation of these conceptual models:

- Repeat purchases, an important aspect of product sales, is a negligible feature of the enlistment process.
- A strictly sequential buying cycle occurs: exposure to the possibility of military service, recruiter(s) contact, testing, and signing of enlistment agreements.
- Service quotas and quality standards promote "brand switching" by potential applicants among the Services.
- The importance of the enlistment decision encourages discussions with influencers, and these influencers may therefore constitute an important advertising target.
- The primary target group is a small (narrow) segment of the population and a highly transitory group not easily reached by existing media.
- An intermediate stated intention to enlist can be hypothesized to precede actual enlistment and serve as a useful and valid predictor for subsequent behavior.

CONCLUSION

The literature review, the survey of industry advertisers and the conceptual model development support the use of both efficiency and effectiveness criteria for evaluating the DoD Advertising Mix Test.

Aggregate sales response (or responses of intermediate variables which accurately predict sales) was found to be an appropriate base for the effectiveness criterion. Short-term contributions of advertising include meeting accession and contract missions and maintaining quality standards. Longer-term enlistment contributions of advertising include maintaining favorable attitudes toward the Military Services. Another long-term contribution concerns promoting the consideration of military service among high-quality potential candidates.

An economic efficiency criterion was also found to be useful in evaluating advertising effectiveness. In the private sector, economic efficiency is typically conceptualized as profit maximization. Because recruiting "sales" cannot be translated into dollars, profit maximization is replaced by cost minimization as an economic efficiency criterion for evaluating the test.

In the private sector, a firm will encourage and accept <u>all</u> additional sales generated by advertising. The only limitation is the amount of product that can physically and economically be produced to satisfy the new demand. In contrast, the military is limited, by quotas, from accepting <u>all</u> enlistment contracts (sales) potentially generated as a result of advertising. In consequence, the goal of advertising for the military is to maintain military strength (sales) at the lowest advertising cost possible. In addition, this advertising is to develop and maintain a favorable attitude among potential candidates and the people who could influence them.

Consequently, the following criterion will be used to evaluate the advertising budget policies being tested in the DoD Advertising Mix Test:

Evaluation Criterion: The recommended advertising policy will be one providing the necessary short-term and long-term contributions to the attainment of the Services' enlistment requirements at minimum advertising cost to the Department of Defense.

CHAPTER 4

EVALUATION MEASURES

The previous chapter reviewed the overall criterion chosen to evaluate the various DoD advertising budget strategies implemented in the experiment. This chapter takes the next logical step in the research process by describing the selection and validation procedures used in choosing a set of evaluation measures. Chapter 5 will cover the analytical approaches that employed these measures to evaluate the data collected from the field experiment.

THE SET OF MEASURES CHOSEN

The set of measures selected to assess the contribution of various advertising budget strategies implemented in the experiment includes aggregate enlistment response measures (observed behavior) and aggregate intermediate measures (reported behavior and attitudinal data). The hypothesis is that a change in advertising (total dollars and mix of Service-specific and Joint) will have a noticeable effect on the following measures:

Observed Behavior Measures

- Quantity and quality of enlistment contracts by Service
- Quantity and quality of applicants taking the qualifying test by Service
- Conversion ratios of applicants into contracts

Reported Behavior Measures

- Reported recruiter contact
- Reported conversations about the military

Attitudinal Measures

- Reported intentions to enlist in the military
- Reported strength of intentions

APPROACH TOWARD SELECTION OF THE MEASURES

The choice of measures used to evaluate the field experiment depends on four factors: first, the degree of consistency between the experiment's overall evaluation criterion and the chosen measures; second, the extent to which the measures adequately capture the potential effects of advertising along each stage of the enlistment decision process; third, the availability of data sets which adequately serve as the chosen measures; and fourth, whether the measures themselves conform to acceptable standards of validity and reliability. The next sections review each of those four factors in turn.

Consistency Between the Evaluation Criterion and Chosen Measures

The overall criterion for the field experiment entailed an evaluation as to how well each tested advertising strategy provided the necessary short- and long-term contribution to the Services' enlistment requirements at the least cost to the Department of Defense. Thus, the set of measures chosen must collectively support an analysis that spans a sufficiently long planning horizon for the respective advertising strategies to be evaluated under this criterion.

Under ideal circumstances, using a single measure to evaluate the field experiment would be the clearest and simplest approach. For example, the marketing literature is replete with studies of purchase situations that use sales (in DoD terms, enlistment contracts) as the single best outcome measure.

However, two difficulties exist in military recruiting that argue against the use of a single measure. First, self-imposed enlistment quotas may bias this measure of advertising's effect by obscuring its true underlying contribution. Second, given the length of the enlistment decision (purchase) cycle, a measure of advertising's effect on only current enlistments may overlook important leading indicators of its longer-term impact on enlistments.

Measures that Span the Enlistment Decision Process

Because the criterion for evaluating the experiment demanded that the longer-term consequences of changed advertising policies be taken into account, a set of measures was chosen that collectively spanned the entire range of the enlistment decision process.

Figure 4.1 portrays a schematic representation of the enlistment process and the associated data sources for each stage in that process. Thus, the observed and reported behavior measures and the attitudinal measures reflect conditions at each stage throughout the enlistment decision process.

Data Sets as Sources for the Measures

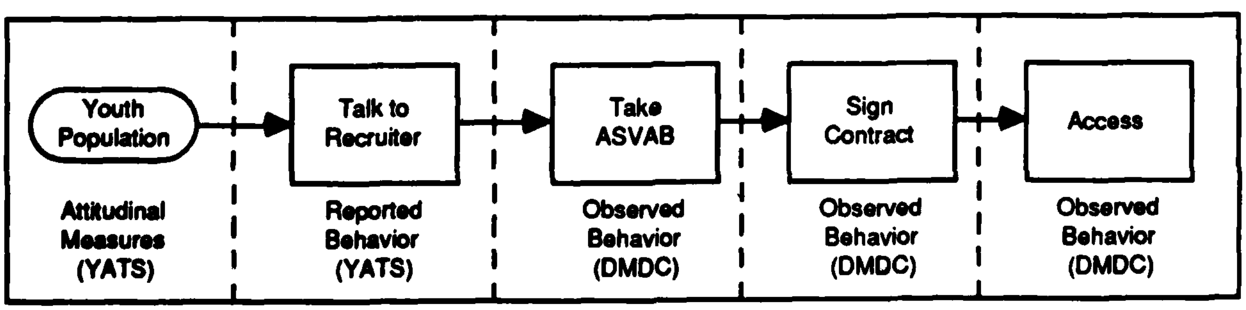
Data already collected by the Department of Defense facilitated the development of these measures that reflect the changes at each stage of the enlistment process. For example, the annual DoD-sponsored Youth Attitude Tracking Study (YATS) provides a useful comparison over time of youth attitudes toward military service.

The YATS also served as a source for the measures on reported youth behaviors, such as contact with recruiters or discussions with parents. The Defense Manpower Data Center (DMDC) provided data on subsequent stages in the enlistment decision process. Specifically, DMDC provided statistics on potential applicants for military service and subsequent counts of actual contracts signed to enter military service.

These sets of measures are described in more detail in the next section.

Figure 4.1

The Enlistment Process and Data Sources



ASVAB - *Armed Services Vocational Aptitude Battery*
YATS - *Youth Attitude Tracking Study*
DMDC - *Defense Manpower Data Center*

Validity and Reliability of the Measures

Each measure was subjected to various reviews and tests to assess its validity and reliability for use in evaluating the field experiment. More findings are reported in considerable detail as each measure is described and analyzed in the next two sections of this chapter.

Validity in its broadest terms refers to the degree to which each chosen measure actually represents that characteristic of the phenomenon under study. Does, for example, reported intentions to enlist on the YATS represent a valid measure (i.e., leading indicator) of an eventual enlistment decision? Can the relationship be "validated" through rigorous statistical procedures or must some other standards be used?

Once a measure's validity has been established, then its reliability or extent of "consistency" must also be quantified. Validity addresses the "truth" of a measure while reliability addresses the measure's consistency in performance or outcome through repeated use. Returning to reported intentions to enlist for a moment, the measure's reliability can be judged by the consistency of the outcome through replication of the measure's use in the field experiment. This issue is addressed in more detail in the final section of this chapter.

WHY OBSERVED MEASURES OF BEHAVIOR WERE CHOSEN

Enlistment contracts were chosen because advertising budget strategies can be partially evaluated by their relative effect on military enlistments. The number of contracts was chosen as the appropriate measure rather than enlistments because of the latter's highly seasonal component, a phenomenon influenced largely by the availability of training slots. Furthermore, any measure using enlistments (represented by the date of entry to active duty) may lag for as long as one year after a contract is signed. This lag is not only a function of training seat availability, but also of the high school graduation cycle and, to a lesser extent, of youth preferences for delayed entry dates to active duty. To avoid these largely administrative factors confounding a measure using only enlistments, the number of contracts was chosen.

Most prior research on recruiting and the enlistment process also used a measure of contracts signed as the dependent variable. These studies have entailed both econometric analyses (e.g., Army Research Institute, RAND, UCLA and Duke University) as well as experimental approaches (e.g., WARC, RAND) and studies employing an econometric approach analyzing historical data (e.g., Epps, 1971, Hernandez, 1979; Goldberg, 1982; Hanssens and Levien, 1983; Morey and McCann, 1980) in various controlled experiments (e.g., Carroll, et al, 1985). In general, these studies concluded that marketing efforts are statistically related to enlistment contracts.

On the face of it, widespread use of enlistment *contracts* in prior research lends validity to its use as a more appropriate measure in this research project. Contract data collected during the period of the experiment cannot, however, serve as a valid predictor of the long-term consequences of changed advertising budget strategies on enlistments. Other measures must be used for that purpose.

Applicants and the conversion ratio of applicants into contracts represent the second and third observed measures of behavior. These measures were chosen for several reasons. First, the number of applicants who take the qualification test is less constrained by enlistment standards than contracts. Indeed, not all those who take the test eventually sign contracts. Second, test-taking is also less influenced by direct recruiter efforts than are contracts, suggesting that the flow of applicants may be more sensitive to the effects of advertising. Third, because test-taking is one of the earliest and most accurately measured indicators of advertising's effect on the recruiting process, this variable can serve as a leading indicator of advertising's longer-term effect on contracts.

These reasons help substantiate the choice of applicants and the related applicant conversion ratio as appropriate and valid measures for evaluating the effectiveness of the various advertising budget strategies.

Validating the Use of Applicant and Conversion Ratio Measures

As is evident from the prior discussion, a considerable body of research documents enlistment contracts as a valid measure of advertising effectiveness. Yet, a notable absence of prior research attempting to correlate applicant flows and advertising spending requires a different approach to validate these measures as appropriate for the field experiment.

As part of the validation effort, the statistical relationship between enlistment contracts, applicants taking the test, and advertising spending levels by Service was investigated.

DMDC provided monthly data on applicants taking the test and enlistment contracts, for each Service, by county and by education and aptitude. These data sets covered the period October 1978 through March 1980. Marketing and environmental data (e.g., unemployment rate, percent black), originally developed for the Wharton-Navy Field Marketing Experiment for 43 markets, covering the period October 1978 through September 1979, were included. These data were combined with additional data collected on the same variables for the remaining period October 1979 through March 1980.

Since the statistical models estimated involved the use of lagged variables (specifically contracts and applicants), only data for the first quarter of 1980 were used to examine the relationship between advertising, applicants and contracts. The dependent variables consisted of male applicants taking the test and male enlistment contracts, both expressed on a per-capita basis (17-21-year-old males). These dependent variables were further disaggregated by education and by a measure of general ability.

The first group (dependent variable) disaggregated were either seniors or High School Diploma Graduate (HSDG) males who performed above average on national norms (see Table 4.1) for the Armed Forces Qualification Test (AFQT). The second group disaggregated simply consisted of all remaining male applicants and enlistment contracts.

The first disaggregated group represented the target market of interest. The independent or predictor variables included dollar expenditures for Joint and Service-specific advertising, the number of recruiters by Service, and certain environmental variables.

The results of the analysis, depicted in Table 4.2, show that both Joint and Service-specific advertising had a positive effect on the high-quality group of applicants and contracts.

Taken in total, the literature and results of the statistical analysis presented here provide considerable evidence that the chosen measures of observed behavior (i.e., contracts, applicants and the conversion ratio of applicants to contracts) possess sufficient validity to warrant their use in the evaluation of the field experiment.

Table 4.1

Percentage Distribution of Civilian Youth Population by AFQT Category, 1980[a]

AFQT Category	Percentile Score Range	Percent of Civilian Youth Population[b]
I	93-100	8
II	65-92	28
IIIA	50-64	16
IIIB	31-49	18
IV	10-30	21[c]
V	1-9	9[d]

[a] *On the basis of AFQT scores, examinees are divided into six categories representing a range from high trainability (Category I) to low trainability (Category V). By law, test scores below 10 (Category V) disqualify an individual from military service. Those scoring between the 10th and 30th percentiles (Category IV) are considered by the Services to require a longer period of training and are less productive in jobs requiring a high level of technical skill. There is, therefore, a 20-percent ceiling on the enlistment of personnel in Category IV, and all such personnel must be high school diploma graduates.*

[b] *The reference population is based on the testing of a nationally representative sample of young people, ages 18 to 23 (more details can be found in Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery, Department of Defense, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics), March 1982).*

[c] *Effective 1 October 1981, the number of Non-Prior Service (NPS) enlistees who score at or above the tenth percentile and below the thirty-first percentile on the AFQT, may not exceed 20 percent of the total number of NPS enlistments per Fiscal Year (10 USC 520(a)). In any case, a person who is not a high school graduate may not be accepted for enlistment with an AFQT score below the thirty-first percentile (10 USC 520(b)).*

[d] *Individuals in Category V do not meet minimum standards for enlistment.*

Table 4.2

Correlations between Advertising Efforts and Applicants/Contract Measures

APPLICANTS					
MALE HSDG/AFQT I-III A:	Total	ARMY	NAVY	AIR FORCE	MARINES
Service-Specific Advertising	+	+	o	o	o
Other Service Advertising	N/A	+	o	+	o
Joint Advertising	+	+	o	+	o
ALL OTHER MALES:	Total	ARMY	NAVY	AIR FORCE	MARINES
Service-Specific Advertising	o	o	o	o	-
Other Service Advertising	N/A	-	+	-	o
Joint Advertising	o	o	o	o	-

CONTRACTS					
MALE HSDG/AFQT I-III A:	Total	ARMY	NAVY	AIR FORCE	MARINES
Service-Specific Advertising	+	+	-	-	+
Other Service Advertising	N/A	o	-	o	o
Joint Advertising	+	+	+	+	o
ALL OTHER MALES:	Total	ARMY	NAVY	AIR FORCE	MARINES
Service-Specific Advertising	o	-	+	+	+
Other Service Advertising	N/A	o	+	o	+
Joint Advertising	o	o	+	+	+

+ = significant positive correlation - = significant negative correlation o = no significant correlation N/A = Not Applicable

Total — Sum of all Service advertising.
Service-Specific Advertising — Advertising geared only to promote one Service.
Other Service Advertising — Advertising promoting a Service other than the one indicated at the top of the column.

Example:
- *There is no significant correlation between male HSDG/AFQT I-IIIA Air Force applicants and Air Force-specific advertising.*
- *There is a significant positive correlation between male HSDG/AFQT I-IIIA Air Force applicants and advertising promoting Services other than the Air Force.*

WHY REPORTED BEHAVIOR AND ATTITUDINAL MEASURES WERE CHOSEN

The observed behavior measures capture only the relatively short-term effects of advertising. Thus, the potentially long length of the enlistment cycle argues for additional measures assessing the longer-term effects of advertising. For example, prospects may talk to a recruiter and/or have conversations with their parents about military service as a result of exposure to advertising. This behavior may subsequently contribute to an actual enlistment decision. In addition, advertising may have the effect of changing the prospect's attitudes toward the military, that may in turn result in a favorable enlistment decision.

Three measures were selected to address these issues: reported recruiter contact, reported conversations with parents, and stated intentions of joining the military.

The analysis focused on firmly establishing these measures as valid predictors of eventual enlistment behavior. Both reported behavior measures (reported recruiter contact and reported conversations with parents) and attitudinal measures (stated intentions of joining the military) were tested for their ability to predict actual enlistment behavior during a period of several years. Moreover, the independent and potential interactive effects of recruiter contact, conversations with parents and youths' stated intentions were also considered.

All three measures - stated intentions to enlist, reported recruiter contact, and conversations with parents by potential recruits - are measured by the YATS, conducted regularly since 1975. Stated intentions to enlist is used as an indicator of youth attitudes toward the military and each Service, as is reported recruiter contact. Reported recruiter contact is also used as an indicator of the effectiveness of the recruiter salesforce. The specific YATS questions are described as follows:

Conversations with Parents

Conversations with parents was based on the responses to YATS questions in 1984 and 1983. Respondents were first asked: "Within the last year or so, have you discussed with anyone the possibility of serving in the military?" More detail was solicited from those who answered "yes," including: "With whom did you discuss serving in the military?" Respondents could indicate that they had had recent discussions about joining the military with either or both parents. Mentions of "mother" or "father" were independently recorded in 1984 and 1983.

Conversations with Recruiters

This measure included share conversations with recruiters from the Army, Navy, Air Force and Marine Corps. Conversations with recruiters was based on the YATS question: "Have you ever talked with any military recruiter to get information about the military?" Shares of conversations with recruiters were derived from those who responded "yes" to the question: "What military service did the recruiter represent?" Note that the share measure may sum to more than 100 percent since the same respondent could have met with recruiters from more than one Service.

Intentions to Enlist

The intention measures are derived from a composite of two YATS survey questions. One question asks respondents for their planned activities in the next few years (unaided mention - definite and probable intentions). The second question asks respondents to indicate their intentions to enlist in the military using a five-point scale ("definitely" to "definitely not"). The specific questions are described in more detail as follows:

Unaided Mention of Joining the Military
The YATS questionnaire begins with general questions about the youth's demographic and educational background. Soon thereafter, the youth is questioned about his career plans without any specific mention of the military. A response indicating interest in a military career indicates inclusion of the military in the respondent's main choice set and may reflect top-of-mind awareness on part of the youth about military career alternatives. The measure of unaided mention of joining the military is based on the YATS question: "Now, let's talk about your plans for the next few years. What do you think you might be doing?" The response records whether "Joining the military/service" was mentioned by the youth. This measure is referred to as "unaided mention of joining the military" in this report.

Aided Mention of Joining the Military
Respondents are next asked about their responses to specific career opportunities. The questions begin with the mention of non-military careers such as construction worker and office worker. Soon thereafter, a mention of the military is made in the question: "How likely is it that you will be serving in the military?" This measure is referred to as "likelihood of joining the military."

Composite Likelihood of Joining the Military
The respondents are probed about their intention to join specific Services. A measure of composite likelihood of joining the military is constructed based on the response to these questions. The YATS questions are: "How likely is it that you will be serving on active duty in the Army/Air Force/Marine Corps/Navy?" If the answer to any of these four questions was recorded as "probably" or "definitely," the respondent was considered to have a favorable attitude toward serving in some specific branch of the military. The number of respondents with favorable attitudes relative to the total number of respondents in any particular cell is referred to as the "composite likelihood of joining the military." Shares of composite likelihood for each Service were derived by taking the proportion of respondents with favorable attitudes toward a specific Service to the total respondents having favorable attitudes toward all Services. These shares do not necessarily add to 100.

WHAT THE ANALYSES SHOW ABOUT THE REPORTED BEHAVIOR MEASURES

The marketing literature supports the use of these measures to capture the longer-term effects of advertising. Reported behavior measures have been used in several studies and are reviewed in Silk and Kalwani (1982). Orvis, at RAND, has conducted extensive analyses using stated enlistment intentions (1982; 1984). His results reveal that stated enlistment intentions are highly correlated with future enlistment behavior. Orvis and his colleagues also report that recruiter contact and conversations with parents discriminate between individuals with positive and negative intentions. Finally, Bayus (1985) presents evidence that conversations about the military are statistically related to changes in advertising expenditures.

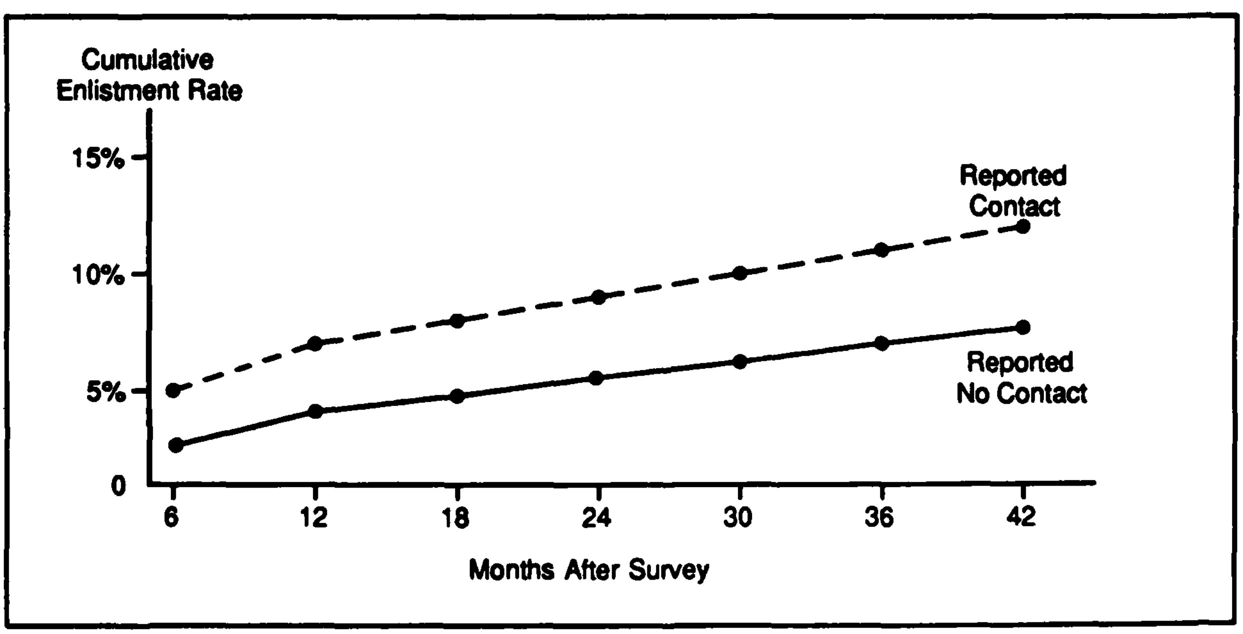
The power of reported behavior and attitudinal measures to predict enlistments was analyzed using the longitudinal follow-up to the Youth Attitude Tracking Study. Matching the social security number of respondents for each survey wave allowed tracking of actual enlistment behavior and comparison to the reported behavior and attitudinal measures. Orvis and his colleagues at RAND assembled these data for the years 1976 - 1979, encompassing more than 23,000 respondents. Test-taking status and final enlistment behavior were tracked for each individual for up to four years, a sufficient time interval for assessing enlistment activity (Orvis, 1982).

Figures 4.2, 4.3, and 4.4 summarize the results for reported recruiter contact, reported conversations with parents, and stated enlistment intentions, respectively. The cumulative enlistment rate for respondents stating they had face-to-face recruiter contact is about five percent after six months, increasing to about 13 percent after 42 months (Figure 4.2). For respondents not having recruiter contact, the cumulative enlistment rate is signficantly lower over time (seven to eight percent after 42 months).

Reported conversations with parents follows a similar pattern (Figure 4.3). This measure is a better predictor over time than the recruiter contact measure (the difference between the reported conversations with parents and no conversation with parents curves (Figure 4.3) is greater at any point in time than the difference between the reported recruiter contact and no recruiter contact curves (Figure 4.2)).

Figure 4.2

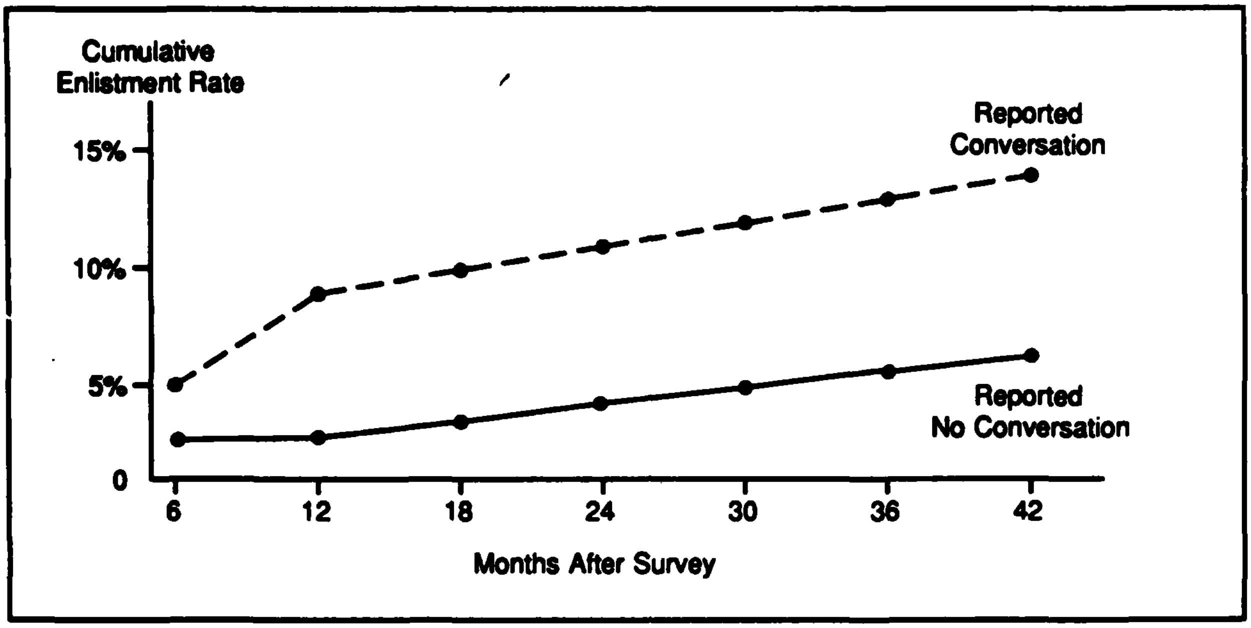
Cumulative Enlistment Rate by YATS Respondents Reported Face-to-Face Recruiter Contact



Source: Longitudinal Follow-Up to 1976-79 YATS

Figure 4.3

Cumulative Enlistment Rate by YATS Respondents Reported Conversations with Parents



Source: Longitudinal Follow-Up to 1976-79 YATS

Orvis (1982) discusses these measures in greater detail. Additional analyses indicate that the single measure of stated intentions to enlist also performs very well. The enlistment rate per six-month period for respondents who have not yet enlisted and who have positive intentions of joining the military, ranges from about 29 percent after six months to about 1.5 percent after 42 months. The enlistment rate for respondents with negative intentions is significantly lower (Figure 4.4).

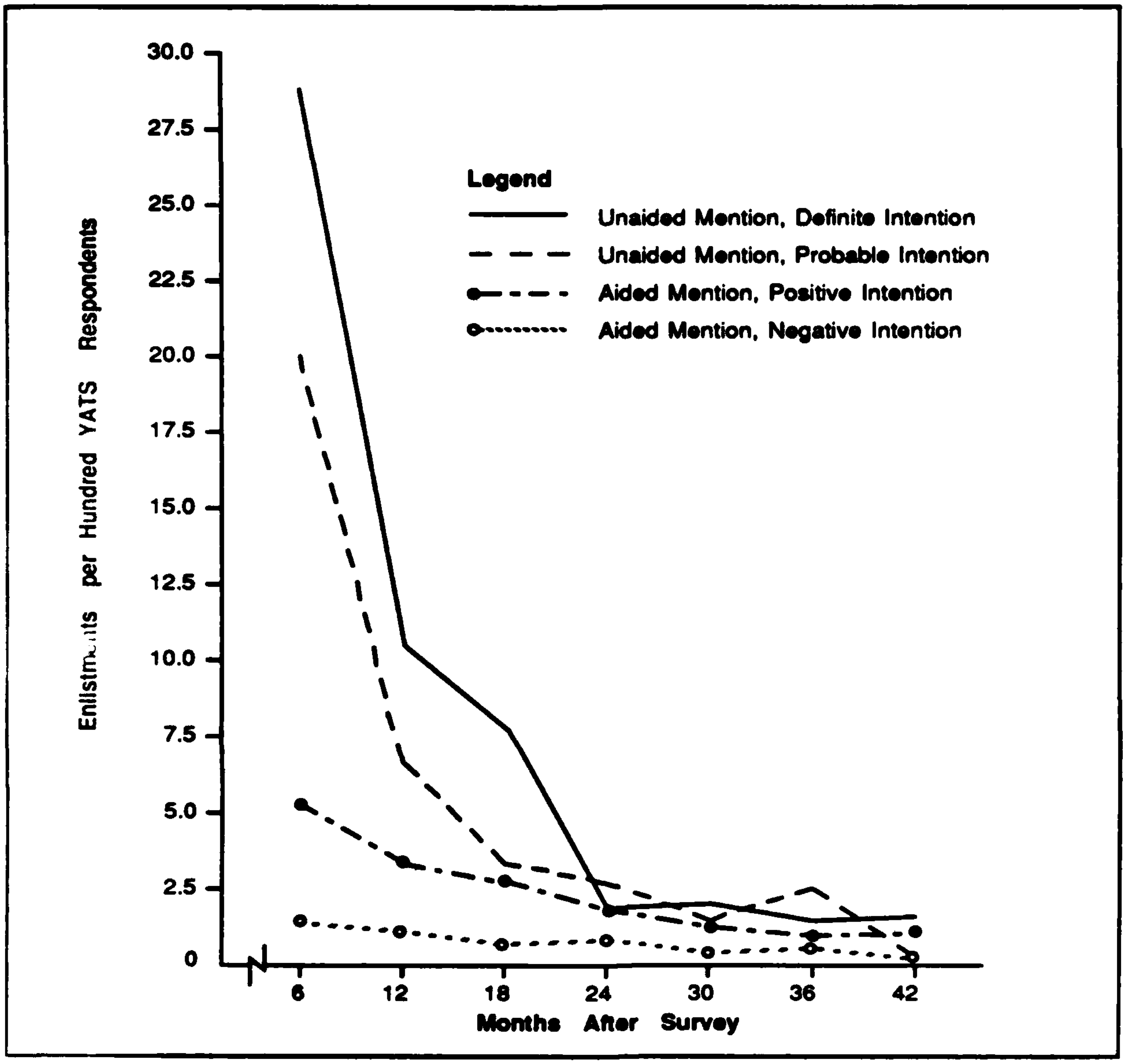
Table 4.3 presents the marginal effects of these variables on final enlistment behavior and on test-taking activity (without eventual enlistment). These values give an estimated elasticity of the reported measures. For example, a one-percent increase in the target population having conversations with parents would result in a 0.66 percent increase in enlistments. These results further indicate that of the three variables, stated intentions is the most significant predictor of eventual enlistment and that conversations with parents is a better predictor than recruiter contact. Details are described in Bayus and Carroll (1985).

As a further test of the predictive power of the three selected measures, the possibility of interactive effects between them was investigated. Table 4.4 shows the enlistment rates of YATS respondents who indicated positive and negative intentions to join the military. These were further analyzed with respect to their behavior concerning conversations with parents regarding the military and recruiter contacts.

Depending upon how they report their intentions toward possible enlistment and on any preliminary contacts with recruiters and discussions with parents, the data on Table 4.4 reveal a marked difference in subsequent enlistment rates.

Figure 4.4

Enlistments Per Hundred YATS Respondents Aged 17.5



Source Longitudinal Follow-Up to 1976-79 YATS

Moreover, visual inspection of the data reveal a clear pattern between the YATS respondent's stated involvement in the enlistment process and subsequent enlistment. Specifically, the more active the individual's search process and the more positive his orientation, the more likely eventual enlistment becomes. These data appear to confirm one's intuitive notions about prior behaviors and dispositions toward the military as a leading indicator of subsequent enlistment.

Although not immediately apparent, differences in the enlistment rates across the YATS response groups suggest that search behavior and attitudes reinforce each other. In the right combination, these measures can lead to an even greater enlistment rate. For example, the

Table 4.3

Estimated Elasticities of Reported Behavior and Attitudinal Measures

	Stated Enlistment Intentions	Conversations with Parents	Recruiter Contact
Enlistment Activity	1.09%	0.66%	0.41%
Test-Taking Activity (without enlistment)	0.79%	0.59%	0.45%

Table 4.4

Percentage of YATS Respondents Subsequently Enlisting by Response Category

Reported Measures of Behavior:	**Attitudinal Measure: Intentions to Join the Military**	
	Positive	Negative
Conversation with Parents and Recruiter Contact	26.6%	10.4%
Conversation with Parents Only	20.7%	7.0%
Recruiter Contact Only	12.0%	4.4%
No Parental Conversations or Recruiter Contract	11.1%	4.1%
Enlistment Rates by Prior Intention to Join the Military	**19.2%**	**5.4%**
Total enlistment rate regardless of intention:	**9.2%**	

Source: Longitudinal Follow-up to 1976-1979 YATS

subsequent enlistment rate on Table 4.4 for the YATS respondent group who spoke with their parents, contacted a recruiter and had a positive intention to enlist, amounts to 26.6 percent. This is more than twice the rate (10.4 percent) for those in the same parent conversation and recruiter contact category, but expressing negative intentions toward enlisting.

SENSITIVITY OF THE MEASURES

Evaluating the DoD Advertising Mix Test requires assessing whether differences in advertising policy (budget levels and mixes) result in differences in enlistment behavior. As reviewed in the prior section, the measures have been substantiated for their validity. Now the level by which the measures must differ before the resulting differences can be attributed to advertising policy (within appropriate error tolerances) must be established. This range of differences is referred to as a measure of sensitivity.

Reliability of Measures

The reliability of a measure refers to the sensitivity of the measure in capturing the effects on enlistment of different advertising policies. Knowing how much the measures must change, to yield a statistically significant result, enables an assessment of the relative power of the measures. The reliability of the measures can then be inferred by assessing the likelihood of actually observing this range of movement. A measure which must double or triple to yield statistically significant results is less sensitive, and thus less reliable, than one which must change only 10 or 20 percent.

The results of several studies using monthly and quarterly historical time series data (e.g., Fernandez, 1979; Goldberg, 1982; Hanssens and Leiven, 1983; Morey and McCann, 1980) and an experimentally induced variation (Carroll, et al, 1985) have revealed that the observed behavior measures are very sensitive to changes in advertising and recruiter efforts.

Measures of Statistical Error

Before discussing the results of the sensitivity analyses, the statistical concept of error requires elaboration.

No experiment, no matter how carefully controlled, can reduce the chances of error to zero within reasonable cost boundaries. Conducting a DoD advertising experiment with the chances of error reduced strictly to zero would require creating four separate United States of America, conducting the experiment over an extensive time period, and gathering complete data from every member of the youth population under study. This is obviously impossible. Instead, researchers in both the physical and social sciences rely on concepts of statistical inference to set appropriate error tolerances for interpreting experimental data.

Two types of error must be avoided when designing and evaluating a comparative study (Fleiss, 1981). The first error, called Type I error, occurs when the differences in responses under examination are declared to be real, when in fact there are no differences. For example, this type of error could arise if a difference in enlistment behavior were attributed to an advertising policy when no such difference existed. More specifically, this error would occur if an observed decline in enlistments in a treatment cell were attributed to the advertising policy in that cell, when in fact the decline in the treatment cell was no different from that in other treatment cells. This kind of error is generally prevented by simply setting the statistical test at a small level of probability (alpha level) such as 0.10, 0.05, or 0.01. This kind of control is not entirely adequate since populations underlying the observed responses will generally differ to some extent. These differences can be substantially reduced by careful population or market matching procedures. This has been done in the cell design of this test.

The second kind of statistical error, Type II, occurs when the two responses under examination are not declared significantly different when in fact they are different. This type of error would arise in the test if the same effects of advertising on enlistments were attributed to treatment cells when, in fact, the advertising policies in these cells led to different enlistment behavior. Such an error is less serious when the responses differ by a small amount. It becomes critical when the difference is large. The researcher can control Type II error by specifying what difference is of sufficient importance to be detected, and what the desired probability is of detecting it. This probability, denoted as one minus beta, is called the power of the statistical test. Beta is the probability of failing to declare the specified difference to be statistically important.

The sensitivity of the reported behavior and attitudinal measures must be evaluated for predetermined alpha and beta values. Cohen (1977) suggests that in the typical case, Type I error is approximately four times as serious as Type II error. Based on the experimental design of the DoD Advertising Mix Test, the costs for Type I and Type II errors can be roughly computed.

Type I error (declaring that a difference between treatment conditions exists when there is no real difference) would result in a maximum annual cost of $53 million to the Department of Defense. This figure is derived from the difference between the test cell with the highest cost (Cell White with a total advertising budget of $84 million) and the cell with the lowest cost (Cell Blue with a total advertising budget of $31 million). Determining the maximum cost of a Type II error (declaring that no difference between treatment conditions exists when there is a significant difference) requires developing the cost of recapturing lost enlistment contracts. That loss would be the result of choosing a cell with less advertising than would be efficient and effective.

These results imply that the cost of Type I and Type II errors are about the same for the DoD Advertising Mix Test. Both types of errors need to be prevented at similar levels of statistical assurance. This means a tighter constraint for Type II errors. The sensitivity analyses used various values for alpha and beta to obtain a sensitivity range for each selected measure.

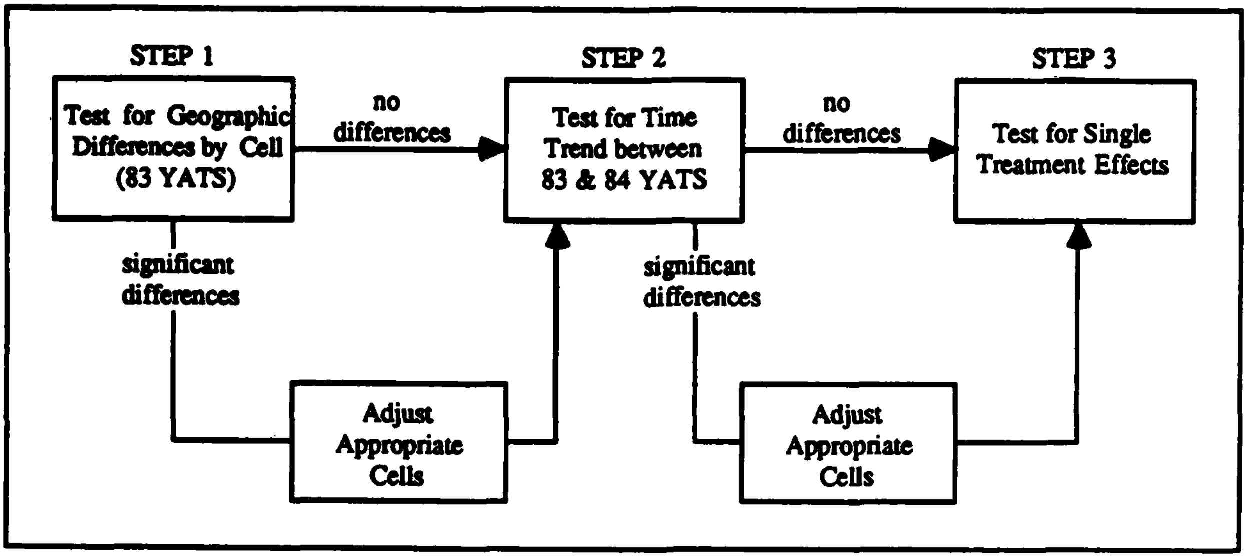
Sensitivity of Reported Behavior and Attitudinal Measures

The sensitivity of reported recruiter contact, reported conversations with parents, stated enlistment intentions, and the interactive effect between recruiter contact and parent conversations was computed by using the pre-intervention survey (1983 Youth Attitude Tracking Study) responses as a base. This information was compared to the results from the post-intervention survey (YATS study done after the experiment) to determine the statistical significance of the changes in the measures. The sensitivity of each measure differs by treatment cell and by sample size. With the relative changes in baseline responses known, the likelihood of those differences can be assessed.

Prior to evaluating the sensitivity of the YATS measures (in responding to changes in recruitment advertising), several issues had to be considered. The first concerns the effects of geographic and

Figure 4.5

General Approach for Calculating the Sensitivity of Evaluation Measures



sampling differences between the cells. For example, one test cell may have a greater proportion of its population exposed to recruiters than another test cell. In another case, because of differences in samples, the level of recruiter contact may be 25 percent of respondents in one sample while 26 percent in another sample. The second issue to be considered, regarding evaluating the sensitivity of the YATS measures, concerns time trends. Different values for a measure may be obtained within a market at various points in time. For example, recruiter contact in a cell may change from the 1983 to the 1984 YATS results. Consequently, differences in the YATS measures were investigated to ensure that any observed differences were actually attributable to advertising policy differences. The steps to accomplish this goal are represented in Figure 4.5.

Table 4.5 contains the pre-intervention (prior to experiment) responses for the 1983 YATS by test cell for each of the evaluation measures. These results were positive in that, with the exception of enlistment intentions which is mildly significant for Cell Blue, none of the main effect measures were significantly different across the treatment cells. The interactive effect between conversations with parents and recruiter contact was significantly higher in Cell Blue (and correspondingly lower in Cell Yellow) indicating that the 1984 YATS responses required adjustment when studying this interactive effect.

Sampling differences for demographic and covariate variables were evaluated by cross tabulating responses across treatment cells for the 1983 YATS. With the exception of race, these results revealed no major differences. Results for

Table 4.5

Pre-Intervention Statistics for Evaluation Measures by Cell

VARIABLE	CELL A1 YELLOW	CELL B BLUE	CELL C GREEN	CELL D RED	POOLED ACROSS CELLS
Positive Intentions	27.1%	*23.1%	28.5%	29.1%	26.0%
Conversations with Parents	26.5%	27.1%	31.5%	25.7%	27.4%
Recruiter Contact	43.5%	44.4%	46.0%	43.0%	44.1%
Interaction between Conversations with Parents and Recruiter Contact Effects	**16.3%	**18.7%	19.9%	16.6%	17.5%
Sample Size	640	690	387	415	

Source: 1983 YATS Weighted Responses

* Significant difference from pooled value at 0.10 level
** Significant difference from pooled value at 0.05 level

Reading the Table: In the pre-intervention YATS survey, 27.1% of Cell Yellow's respondents had positive intentions. This compares to Cell Blue's 23.1% positive intentions.

the race variable indicate a higher proportion of Caucasian respondents in Cell Green. Thus, the 1984 YATS population statistics for this variable required adjustment for the demographic variable.

To establish the existence of a time trend, detailed calculations of the response ranges were made. These computations identify the 1984 YATS response level necessary in the control cell (Cell Yellow) to infer statistically the existence of an overall time trend for each measure (see Table 4.6). Positive intentions to enlist in the military must change by 19 percent from its 1983 pre-intervention (baseline) response (26.0 percent); conversations with parents must change by 18 percent from its 1983 baseline response (27.4 percent); and recruiter contact must change by 13 percent from its 1983 baseline response (44.1 percent) for Type I and Type II error of 0.05.

Table 4.6 presents the percent change required to conclude that statistically significant treatment differences exist for each of four different variables. These changes concern the pre-intervention 1983 YATS responses and their 1984 post-intervention levels. Various Type I and Type II error probabilities are included. For example, when alpha (Type I error tolerance) equals 0.05 and the tolerance for Type I error is the same as for Type II error, stated enlistment intentions must either increase from the base of 0.26 (i.e., 26.0 percent of respondents had positive intentions of joining the military) to 0.32 or decrease to 0.20 - a change of 6.0 percentage points. The 6.0 percentage-point increase or decrease required is about 23 percent of the original 26.0 percent response level observed in 1983.

Table 4.6

Percent Change in the 1983 Pre-Intervention Measure Required for Statistical Significance between Advertising Treatments

Variable	Type I	0.1			0.05			0.01			Pre-Intervention Responses
	Type II	0.1	0.2	0.4	0.05	0.10	0.2	0.01	0.02	0.05	
Positive Intentions		19	17	13	23	21	18	28	27	25	26.0%
Conversations with Parents		18	15	12	21	19	17	27	25	24	27.4%
Recruiter Contact		13	11	9	15	14	12	19	18	17	44.1%
Interactions between Conversation with Parents and Recruiter Contact Effects		22	20	16	26	24	21	33	32	30	17.5%

SUMMARY AND CONCLUSIONS

The set of evaluation measures selected to assess the short- and long-term contributions of various advertising mixes toward the attainment of the Services' enlistment requirements are as follows:

Observed Behavior Measures

- Quantity and quality of applicants by Service
- Quantity and quality of contracts by Service
- Conversion ratios of applicants into contracts

Reported Behavior Measures

- Reported recruiter contact
- Reported conversations with parents

Attitudinal measures

- Reported intentions to enlist in the military
- Reported strength of intentions

Each of these measures has been substantiated by existing literature and additional testing. All appear to be valid measures for purposes of evaluating the experiment according to the criteria established. These measures have also been found sufficiently sensitive to varied advertising mixes. This allows for policy recommendations based on statistical differences between the various treatment conditions.

To evaluate correctly the data provided by these measures the following adjustments and actions were required:

- Adjustments for the variations in sample composition within certain cells were implemented. In particular, Cell Green required adjustment for demographic differences (i.e., race).
- Adjustments to certain cells for some evaluation measures were made to allow for correct inferences. For example, to examine the effects of advertising using the interaction term between recruiter contact and parent conversations, Cells Yellow and Blue were adjusted.
- Type II error constraints must be stringently considered in evaluating test results.

CHAPTER 5

ANALYTICAL APPROACH

RESEARCH PERSPECTIVE

This chapter reviews our approach to analyzing the data from the DoD Advertising Mix Test. As these data arrived, they were checked, coded, collated and aggregated. Appendix D provides a description of the data collected during the test. Once assembled, validated and aggregated into a data base, these data constituted a comprehensive quantitative representation of the performance of the recruiting system during the period of the test (FY 1984).

Earlier chapters of this report have discussed the motivation and need for the test, its objective, criterion for evaluation and specific measures of recruiting system performance - as well as its actual field implementation. This chapter discusses the analytic approach and quantitative techniques used to evaluate the experiment. Specifically, this chapter reviews the data elements, the level of aggregation, and the mathematical representations or formulations used. The next two sections of this chapter discuss these issues for observed behavior measures (enlistment contracts and applicants), and reported behavior and attitude measures.

Two general observations are noted before discussing these specific measures, however. First, the overall assessment of the experiment requires investigation across measures. Second, all measures of recruiting performance declined during the period of the test.

The need to look across measures arises because the military manpower recruiting system is large and complex. A large number of factors affect it and, hence, affect any quantitative representation of it. Managerially useful advertising policy guidelines can be developed given these system complexities by (1) using multiple measures of recruiting system performance; (2) placing more emphasis on consistency among a variety of analyses; and (3) focusing on determining the direction and ranges of advertising expenditures, rather than on developing precise and static decision rules for advertising spending.

Second, the measures selected for evaluating the enlistment process, both applicants and contracts, substantially and consistently declined from FY 1983 to FY 1984. Every measure of the enlistment process observed during the period of the experiment decreased substantially in the matched subset of the control cell (Cell Yellow) and in the control cell as a whole. Hence, where no changes in advertising were made, the recruiting system was still less productive in the experimental year than in the prior year. For example, aggregate unemployment levels decreased during this period and entry level military pay did not keep pace with the increase in civilian income levels. Both of these factors made recruiting more difficult.

Table 5.1 provides the percent change in the evaluation measures observed in the subset of the control cell (Cell Yellow) between FY 1983 and FY 1984. It also indicates the change in the unemployment rate. The overall decline in these measures during the period of the test has several implications.

Table 5.1

Percent Change in Measures of the Enlistment Process Control Cell 1983 to 1984

Measure	Percent Change
Total Enlistment Contracts (DoD wide)	- 4.4
High School Graduate & Senior Enlistment Contracts (DoD)	- 4.5
AFQT I-IIIA Enlistment Contracts HSDG (DoD)*	- 9.2
Total First Applicants (DoD wide)**	- 19.8
High School Graduate & Senior First Applicants (DoD)	- 20.6
AFQT I-IIIA First Applicants HSDG (DoD)	- 24.5
Reported Recruiter Contact (DoD)	- 16.1
Reported Conversations with Parents about Enlisting in Military	- 18.8
Unaided Mention of Joining Military	- 21.7
Aided Likelihood of Joining Military	- 15.1
Aided Composite Likelihood of Serving in One or More Military Services	- 8.3
Overall Unemployment Rate	- 19.6

* *AFQT I-IIIA: individuals scoring at or above the 50th percentile on the Armed Forces Qualification Test.*

** *Individuals taking the non-institutional Armed Services Vocational Aptitude Battery test sequence for the first time.*

Assessments of the effects of the level and mix of advertising on the enlistment process were made by comparing the performance of these measures in each cell with its performance in the control cell. In addition, the pervasive decline in these measures clearly demonstrates a sharp movement in the overall system.

The DoD Advertising Mix Test was designed to evaluate recruiting advertising policy and was not designed to explain fully all changes in the recruiting system. The sharp change in system performance during the year of the test required more focus on identifying the advertising-related changes in each measure of performance and allowed less focus on systematically and statistically relating changes in one measure with changes in others. As a result, the measures were investigated in parallel rather than in sequence. That is, independent analyses were performed on the various measures at the same time rather than developing a sequential analyses plan to test results across measures in an a priori sequence.

OBSERVED BEHAVIOR

Because of the design of the experiment, cross-sectional regression models were used to test the following hypothesis: Various advertising treatments produce differing responses which can be measured by the number of contracts and applicants (observed behavior). Each ADI in the experiment was used as a single observation for these cross-sectional regressions. All observations in these regressions were annual. The various observed behaviors were modeled as a function of the advertising treatment and other explanatory factors. Dummy variables were used to indicate the advertising treatments instead of actual advertising expenditures on Joint and Service-specific advertising because categorical variables are better suited to the experiment's four cell design.

The cross-sectional models using all the ADIs were supplemented by models based on ADIs from pairs of test cells. These models test the hypothesis that the cells in the given pair exhibit different responses because of their respective advertising treatments. Of particular importance is the comparison of each test cell with the control cell. These "pair-wise" analyses were performed only with 1984 data and the changes from 1983 to 1984.

Formulation Issues

The models estimated for the DoD enlistment contracts can be compared with several other recent models that estimate enlistment supply for various Services. These other models generally have used contracts or accessions as dependent variables. The following comparisons highlight five key formulation issues.

Goals

Several recent models of enlistment supply, including work by WARC with the Navy Recruiting Command, have included goals. Goals were not explicitly used in this test's models for several reasons. First, data across Services were not consistent. Indeed, the Air Force apparently only established accession goals during the period of the test whereas other Services also established contract goals. Second, the effect of goals on contracts is considerably more difficult to evaluate when several Services are involved. For example, are the effects of the Army's goals confined to the Army's performance or do the Army's goals impact all Services? Similarly, how should changes in recruitment standards be incorporated into goal formulations? Thus, the effects of goals and standards quickly lead to the identification of alternative formulations. However, the complexity of the recruiting system does not permit discrimination among these different formulations.

Another reason for not using goals in the models concerns the broad and general decline of the recruiting system's performance during the test period -- the overall Delayed Entry Program (DEP) pool declined significantly during FY 1984. This factor most likely reduced the impact of goals on measures such as contracts. While goals would clearly bind against accessions in some cases, their effect on contracts and applicants is expected to have been reduced.

Another factor in eliminating the use of goals concerns the argument that they would be expected to have a progressively lower impact. Whereas goals might be argued to have an effect on contracts, their effect on intentions to join the military is dubious at best. Finally, alternate formulations concerning the impact of goals were tested in several models. These efforts did not materially alter the nature of the results.

Lags

Distributed lag formulations for variables such as unemployment and advertising have been widely used in military enlistment supply models. These models, which use monthly data, greatly increase the number of observations and the associated degrees of freedom. Unfortunately, the increase in observations is countered by their serial correlation. Because of leads and lags in the recruiting process, the number of contracts signed in a given month is frequently serially correlated with the number of signed contracts in previous months. In addition, monthly models must account for independent variables and seasonality. This frequently renders the interpretation of coefficients and findings difficult.

The models employed in this study are generally cross-sectional models using annual data. Distributed lag formulations are not appropriate for such models since a time sequence is not considered. However, most, if not all, lag effects are picked up within a few months in the distributed lag models reported in military recruiting studies. Consequently, the impact of various independent variables, including advertising, is reflected in the annual data. In addition, different rate changes in unemployment have been directly addressed in the annual change models.

Interaction Terms

Numerous interactions among variables are possible and likely in the recruiting system. For example, recruiting effort, unemployment and advertising may be highly interactive in the recruiting system. Not enough is known about the recruiting system to identify, formulate, specify and reliably estimate each possible interaction as a separate term in a model. Therefore, a model formulation that allows for interaction among the variables has been employed. The response variable is modeled as the product of functions of the independent variables. Such formulations have been extensively employed in marketing modeling work.

Demand Constraints

It is generally believed that the Services administratively control the input of less qualified applicants but accept all the available but limited supply of those better qualified applicants. For reasons of trainability, performance and retention, the Services prefer those applicants who are high school graduates (or seniors who will graduate prior to entry on active duty) and who also score in the top half of the aptitude range on the Armed Forces Qualification Test (AFQT).

Many models of enlistment supply have been formulated under the assumption that supply-generating initiatives, such as recruiting and advertising resources and bonuses, affect only the input of the supply-limited group of better qualified applicants. In practice, however, the demand for the less qualified applicants is also affected by changes in recruiting resources and by the Services' efforts to meet their active duty manning requirements.

The dynamics of the marketplace, coupled with the Services' own manpower policies and practices, can produce what appear to be counter-intuitive results. That is, the input of less qualified applicants can increase along with those better qualified as more resources are injected into the recruiting system. Short- and intermediate-term factors such as training seat availability and an end-strength shortfall, for instance, may encourage the Services to relax temporarily their administrative controls and allow a greater input of the less qualified along with those better qualified applicants.

If only the preferred group of better educated and above average aptitude enlistment applicants and contracts were included in the analysis, in our judgment the field experiment would have been incomplete, and possibly subject to invalid results. The Services cannot in reality achieve a global optimum that ensures at all times a perfect balance between resource allocation initiatives, force manning objectives and accession policies. Thus, it would be unwise to assume in this experiment that applicant and contract flows of the less preferred (and at least partially demand constrained) should be ignored as irrelevant to the criteria established for evaluating this field experiment.

Relative Military Pay

Recent models of enlistment supply have incorporated the effect of relative military pay on enlistments. These models were developed to account for large changes in military pay and benefits over time. Military pay does not, however, vary greatly across markets during a single year. Hence, most variation in relative military pay depends on differences in civilian incomes across markets. These differences are highly correlated with differences in unemployment rates, degrees of urbanization and racial composition across markets. The models used in this study incorporated these variables and did account for or absorb the relative income effects. Models in which measures of civilian income have been explicitly included did not yield significantly different results from those achieved in this study.

The Model

Multiplicative models were developed for total applicants, contracts and for the key segments of each of these measures of observed behavior. The multiplicative formulation, which has been widely used in marketing, captures some nonlinearity in response as well as possible interactions among the independent variables.

In these models, XUNEMP, XURBAN, XRACE and XRECR represent, in log form, per capita or rate variables for unemployment, urbanization, percent non-white and production recruiter person-months, respectively. The variables DB, DC and DD are dummy variables representing Cells Blue, Green and Red, respectively. The impact of the control cell (Cell Yellow) is absorbed into the constant. The coefficients of these models are interpreted as elasticities.

Specifically, the multiplicative model takes the form:

$$(\text{Applicant Rate}) = b_0 (\text{Unemployment Rate})^{b_1} (\text{Urbanization Index})^{b_2} (\text{Racial Composition Index})^{b_3} (\text{Recruiter person-months per capita})^{b_4}\ e^{b_5 DB}\ e^{b_6 DC}\ e^{b_7 DD}\ e^{E}$$

where b_0 to b_7 are coefficients to be estimated; "e" represents the base of natural logarithms (approximately 2.7183) and E is the error. Because this formulation is multiplicative, the effect of a change in any one term multiplies through all other terms.

The effects of membership in Cell Blue are captured by the coefficient b_5. Thus, when a test market belongs to Cell Blue, DB is set to 1, and the net multiplicative effect on the applicant rate is through the term e^{b_5}. Conversely, when a test market does not belong to Cell Blue, DB is zero; hence, $e^{b_5 DB}$ becomes e^0 which equals 1, and multiplying the expression by 1 does not change its value.

In the models, the applicant rate was measured by total applicants per 1,000 population. In order to preserve a common unit of analysis, the recruiter rate rather than the absolute number of total recruiters was used. The advantage of this approach is that the observations are appropriately scaled and the error term E is minimized. If absolute numbers were used instead of rates, the measurement error would have wide disparities because of small and large markets (i.e., heteroskedasticity).

In log form, the multiplicative model appears as:

$$\begin{aligned}\log(\text{Applicant Rate}) &= b_0 + b_1 (XUNEMP) \\ &+ b_2 (XURBAN) \\ &+ b_3 (XRACE) \\ &+ b_4 (XRECR) \\ &+ b_5\, DB + b_6\, DC + b_7\, DD + E\end{aligned}$$

Thus, the model becomes linear and additive when expressed in natural logarithms. Note that DB, DC and DD do not appear as logarithms since they are expressed in the power of "e" in the multiplicative specification. The coefficents of the logarithm terms, such as b_4, are interpreted as elasticities, reflecting the percentage change in, for example, an applicant rate in response to a one percent change in recruiters per capita. Thus, the multiplicative specification yields coefficients that have meaningful interpretations as elasticities for policymakers.

REPORTED BEHAVIOR AND ATTITUDINAL MEASURES

The YATS responses, which form the basis for both the reported behavior and attitudinal measures, were analyzed using rigorous statistical tests. These tests were designed to identify the specific instances where changes in advertising were associated with significant changes in reported behaviors and/or attitudes. Two parametric tests, the difference of differences and simultaneous tests of significance, and one nonparametric test, sample rank ordering, were used.

Difference of Differences (two-tailed "t" test)

The observations corresponding to Cell Yellow for 1983 and 1984 serve the necesssary purpose of "control." In Cell Yellow, the advertising level and mix in 1984 were deliberately maintained at their 1983 levels. The changes (or difference) from 1983 to 1984 in each of the non-control cells can be compared to the changes in the control cell. The difference of differences from Cell Yellow (Control) to Cells Blue, Green and Red measures the changes that occurred between 1983 and 1984 with respect to the control cell. This is termed the "difference of differences" estimator.

The variance of such an estimator is computed, and a two-tailed student "t" test is conducted to determine whether the "difference of differences" estimator is significantly different from zero. The level of significance was set at 0.10. The details of this procedure are described in Appendix F.

There exists an alternate approach to understanding this "difference of differences" estimator of advertising effects. The change in the measures between 1983 and 1984 for Cell Yellow is interpreted as a time trend that may be driven by any number of factors other than changes in advertising budgets. The change in other cells' measures between 1983 and 1984 is interpreted as a sum of this time trend (estimated by the change in Cell Yellow) and an advertising effect. Therefore, as an example, the difference between the change in Cell Blue and the change in Cell Yellow (referred to as the "difference of differences" estimator) measures the effect of advertising in Cell Blue. This same line of reasoning can be used with respect to all other cell pairs.

Simultaneous Tests of Significance

An alternate test of significance is conducted to determine whether the "difference of differences" estimators for Cells Blue, Green and Red are simultaneously equal to zero. This test examines the hypothesis that all the 1983 and 1984 observations came from a homogeneous population with identical advertising effects in all cells. The ability to reject this hypothesis might yield clues regarding which cells were significantly different and by how much. The critical 0.10 significance level is obtained from the studentized range.

Sample Rank Ordering

Three sample constructions are available and are described in the next section. Determining the extent to which the results are sensitive to the choice of sample is important. To examine the sensitivity of the changes in measures to the sample construction, a nonparametric rank ordering procedure was implemented. A sample rank ordering of the percentage changes in measures with respect to the 1983 levels was made for each of the three sample constructions.

Criteria for Significance

Each of the reported behavior and attitudinal measures was subjected to the parametric tests and the sample rank ordering. Therefore, statements in this report asserting that the effect of advertising is "significant" for a certain question are based on findings that met the criteria established in these parametric tests and that are consistent in the non-parametric ranking procedure.

ISSUES FOR CONSIDERATION

Surveys vs. Direct Observations

The measures based on YATS responses are not observed. They represent reported behavior or attitudes among a sample of the population of interest. Measures derived from the YATS responses are, therefore, estimates of underlying behavior and attitudes: Observed behavior is more valid.

Change in 1984 Protocol

Changes in the YATS protocol between 1983 and 1984 posed problems relating to the construction of comparable samples. To reduce sampling costs, the 1984 YATS sample included some respondents whose phone numbers were called in 1983. This resulted in possible duplicate interviews. A second change in the study's design involved the questions concerning the respondents' intentions to join the military Reserves. In 1983, under the original format, the sections on active duty and reserve duty were separated. Some questions administered to the "Reserve" sample were not administered to the "active" sample and vice versa. In 1984, the questions of interest were not only asked in the same sequence but also asked of the entire sample of respondents.

Sample Selection

Although YATS measures the responses of a wide range of individuals, including males and females, for the purposes of the test, the YATS sample was narrowed to males aged 16 to 21 because they constitute the primary target audience for military recruiting. In 1983, the total number of relevant cases was 4,415. To address the changes in the 1984 protocol, three subsamples of the YATS data were considered:

Sample 1: New interviews only, without reserve respondents and without respondents whose phone numbers were included in the 1983 sample (reinterviews) (2,547 cases).

Sample 2: New interviews and "reinterviews," without reserve respondents (4,401 cases).

Sample 3: New interviews and "reinterviews," with reserve respondents (5,057 cases).

Sample 3 was selected as a base for analysis for 1984. Sample 3 contains the largest sample. In addition, the questions on the reported behavior and attitudinal measures of interest were asked in the same order to both the "Reserve" and "active" respondents in 1984. Finally, the bias estimation and reduction techniques employed to accommodate the reinterview respondents were considered appropriate.

A caveat on surveys in general should be given. Inaccuracies in either the sampling scheme or in the answers given by respondents result in measurement error. These inaccuracies are amplified when the smaller sample is scaled up to the national population.

Quality of Respondents

The quality of the respondents whose observed behavior measures were analyzed can be determined with precision (through their AFQT group level). In the YATS study, the quality of individual respondents can only be approximated because no definitive standardized test results are available from the survey data. Although the aggregate samples could have been subdivided by educational level, the benefits that could be achieved by such subdivision might have been outweighed by the inaccuracies in respondents' self-classification. Therefore, analysis was based on the aggregate sample and not on any other proxy measure for quality.

Inclusion of Other Explanatory Factors

In addition to advertising, other factors would seem to influence attitudes and behavior with regard to military enlistment. Factors such as unemployment, size of the recruiter force or urbanization could significantly affect the reported behavior and attitudes of the respondents. The

DoD Advertising Mix Test was conducted with only four cells--too few to estimate jointly the effects of advertising and other influencing factors on behavior and attitudes. Statistically, there are insufficient degrees of freedom to include other explanatory variables. If the analysis were conducted at the ADI level, these explanatory variables could be included. This would require deleting those ADIs with unacceptably low numbers of observations. Such an approach would, however, raise the issue concerning the definition of an acceptable number of observations. To avoid these conflicts, the analysis was confined to the cell level in which the effect of other explanatory variables on the control cell could be incorporated into the "difference of differences" estimator.

Choice of Questions

Several questions in the YATS aim to measure attitudes about military service. The analysis is confined to those questions devoted to measuring the effect of advertising towards military service. More specifically, the analysis considers those proven by previous research to demonstrate a direct and positive relationship to future enlistment.

Weighting Procedure

A weighting procedure to adjust the YATS survey responses to reflect national proportions has been documented (R.E. Mason, "Estimation Procedures in YATS," RTI Technical Report, December 16,1983). The weights are constructed based on the sampling scheme. First, a procedure called Mitofsky-Waksberg clustering technique is used to identify telephone numbers. In this case, clusters were determined by area codes and the first three digits of the phone numbers. Then, households within clusters are sampled. Finally, eligible persons within a household are sampled. The actual number of respondents is multiplied by the established weight, which yields a figure representing the total number of youth (within the relevant age and gender categories) in the United States.

We desired to conduct our analysis of the YATS data based on numbers that reflect national population proportions in each cell. Using this weighting procedure to scale sample responses to the national level preserves the average response. (The average response is measured by the proportion of cases which responded favorably to a particular question.) Such scaling may, however, substantially affect the variance of the response measure. The national-level population projections (derived using the YATS weights) were scaled down so that the total number of responses in all cells equaled the original sample size in the cells (as defined in the DoD Advertising Mix Test). The adjusted cell-level sample reflecting national population proportions was computed by first calculating the ratio of the total original (i.e., unweighted) sample size to the total weighted sample size across all cells, and then the total weighted total for each cell was multiplied by this ratio to obtain the adjusted cell-level sample.

SUMMARY

This chapter described several analytical approaches and quantitative techniques used to evaluate the data collected from the field experiment. The methods chosen resulted from several factors, including the truncated design of the experiment (i.e., a partial instead of a full factorial design), the kinds of variables developed from the data collected (such as ratio and categorical), and the efforts to cross-validate the findings using one approach with that of another.

To evaluate advertising's effect (if any) on those measures representing observed enlistment behavior, a multiplicative log formulation of a model was constructed. The coefficients fitted to the model were derived from cross-sectional regression techniques using ADIs as the geographic unit of analysis.

To evaluate advertising's effect on measures representing reported behavior and attitudes toward military service, a series of parametric and non-parametric statistical tests were undertaken.

CHAPTER 6

RESULTS

Previous chapters have described the study design, the analytical approach and the measures used to evaluate advertising effectiveness. The first section of this chapter summarizes the results of the DoD Advertising Mix Test and its implications. The subsequent sections provide the findings with respect to the three measures of observed behavior, reported behavior and attitudinal responses, respectively, (described in Chapter 4). Additional interpretations of these results are discussed in Chapter 7.

SUMMARY OF RESULTS AND IMPLICATIONS

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

- Cell Blue performed better than or at least as well as the other cells. This result is consistent for all three measures.

- Recruitment performance during the test year in Cell Blue (which had the lowest total advertising expenditure) was not adversely affected. In fact, the evidence suggests that recruiting system performance actually increased at Cell Blue's level and mix of advertising expenditures.

One direct implication from these results is the implementation of Cell Blue's budget levels on a national basis. The budget would need to be adjusted for inflation in media costs and could be tested for one year. Tracking and evaluating market responses to this advertising mix and spending level would be recommended. In addition, alternative spending levels should be maintained in some markets. Longer-term (beyond one year) effects of Cell Blue's budget levels are not known.

Alternate implications, based on further analysis and interpretation of the observed behavior results, are reviewed in Chapter 7.

RESULTS

Three measures were used to evaluate advertising effectiveness: observed behavior; reported behavior; and attitudes. Having validated these measures and identified their sources (Chapter 4), we shall now review how various levels of advertising expenditures affected these three measures.

Impact of Advertising Treatment on Observed Measures of Behavior

Three measures of observed behavior were used in the analysis:

- Number of applicants taking the enlistment test
- Number of contracts signed
- Applicant-to-contract conversion ratio, i.e., the number of applications required per contract. Advertising may increase applicants without a corresponding increase in contracts, leading to inefficiency. Conversely, advertising may increase the yield of a given applicant pool, thus enhancing system efficiency.

Each of these measures was analyzed at two levels:

- Total DoD level: Does the number of enlistment contracts for all Services change from one cell to another?

- Individual Service share level: For example, does the Army's share of total applicants change from one cell to another?

The following key segments of male, non-prior service (NPS) applicants or enlistees were also analyzed:

- High school graduates and seniors
- Non-high school graduates or seniors
- High school graduates or seniors who were also AFQT Category I-IIIA
- High school graduates or seniors who are also AFQT Category I-III

Overview of Results from Observed Behavior Measures

The analysis supports the hypothesis that the advertising treatments produced significant differences in the observed behavior measures (applicants and contracts). In particular:

- Cell Blue generally did better, never worse, than the control (Cell Yellow) at a high level of statistical significance.

- Cell Green never did better than the control and often performed worse at a high level of significance.

- For the high school graduate and senior segment, Cell Blue did better than the control. In contrast, Cell Green provided worse results than the control for both applicants and contracts.

The hypothesis that advertising treatment can create significant differences in Service share of observed behavior measures has little support. More specifically, the total level of DoD advertising treatment budget or its mix between Service-specific and Joint does not, generally, affect individual Service shares of contracts or applicants (given that individual Service shares of the Service-specific budget components are maintained). An exception to this observation is found for the Marine Corps share of high school applicants (see Table 6.4).

DOD Level Analysis

Data Pooled Across Cells (Table 6.1)

Applicants. The model for total applicants is specified in Chapter 5.

With the exception of the non-high school group, the models for applicants have generally good explanatory power. The non-advertising

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.1

Regression Coefficients (Elasticities) Reflecting the Relative Contribution of the Regression Variables to the Observed Measures of Behavior

DoD Seniors and High School Diploma Graduates

Independent Variable	Applicant Rate	Contract Rate	Conversion Rate
CONSTANT	.30	-.03	.33
XRECR	.61**	.68**	-.07*
XUNEMP	.32**	.27**	.05
XRACE	.06**	.02	.04**
XURBAN	.01**	.01*	.00
DB (Blue)	.11**	.09	.02
DC (Green)	-.10*	-.09	-.01
DD (Red)	-.02	-.003	-.017
$\bar{R}^2$	.55***	.57***	.23

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 72 observations

XRECR *denotes the natural logarithm of the recruiter person-months per 1,000 population in the ADI*

XUNEMP *denotes the natural logarithm of the unemployment rate in the ADI*

XRACE *denotes the natural logarithm of the racial composition index for the ADI*

XURBAN *denotes the natural logarithm of the urbanization index for the ADI*

DB, DC and DD are dummy variables that are set to 1 if the ADI belongs to Cell Blue, Green or Red, respectively, and zero otherwise.

Reading the Table: If unemployment increases by 100%, then applicants will increase by 32%, contracts will grow by 27% and the conversion of applicants to contracts (number of applicants per contract) will go up by 5%.

variables have the expected signs, and recruiters display highly significant elasticities for total applicants and high schoolers of both aptitude group segments.

The dummy variable for Cell Blue is significantly higher than control for total applicants (at the 0.05 level) and also for high schoolers. It is higher than control for the other segments but at lower levels of statistical significance. Cell Green is lower than control (at the 0.10 level) for high schoolers, and AFQT category IIIB and higher.

Contracts. The model is defined as:

$$\log(\text{Contract Rate}) = b_0 + b_1\,(XRECR) + b_2\,(XUNEMP) + b_3\,(XRACE) + b_4\,DB + b_5\,DC + b_6\,DD + E$$

Again, Cell Blue does significantly better than control for total contracts (at the 0.10 level). Cell Green does significantly worse in three out of five models (see Table 6.13). The models for contracts, as for applicants, are generally satisfactory, except for non-high school graduates. The poorer fit for this group is probably because of constraints imposed by the Services concerning this category of potential enlistees.

Conversion Rates. The models provide no evidence of increased efficiency of the recruiting system caused by advertising treatments. Overall, the same or greater numbers of applicants were required to generate an enlistment contract.

The models estimated are of the form:

$$\log(\text{Conversion Rate}) = b_0 + b_1\,(XRECR) + b_2\,(XUNEMP) + b_3\,(XRACE) + b_4\,(XURBAN) + b_5\,DB + b_6\,DC + b_7\,DD + E$$

The models have low $\bar{R}^2$ values, indicating that there is not much variation in these ratio data that is explainable by the independent variables. The only cell effect worth noting is the strongly positive impact of Cell Green for non-high school graduates. In other words, the advertising treatment for Cell Green brings in a significantly higher number of applicants per contract among the non-high school group.

Conclusions. Overall, an examination of the annual cross-sectional regression models for applicants, contracts and conversion ratios, reveals that Cell Blue has done better than or as well as control in all cases. In contrast, Cell Green performed worse than or as well as control. This is particularly noteworthy for the high school segment. Additional tables for each candidate category are presented at the end of this chapter (Tables 6.12 to 6.14).

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.2

Regression Coefficients (Elasticities) Reflecting Changes in Observed Behavior Measures

DoD Seniors and High School Diploma Graduates Paired Cell Yellow to Cell Blue

Independent Variable	Applicant Rate	Contract Rate	Conversion Rate
CONSTANT	.54	.38	.14
XRECR	.69	.80**	-.11
XUNEMP	.28**	.23**	.06
XRACE	.04	.00	.04**
XURBAN	.09	.01	.08
DB (Blue)	.12**	.09	.03
$\bar{R}^2$	.46***	.60***	.20

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 43 observations

Cross-Sectional Analyses with Cell Pair Data. The cross-sectional models using all the ADIs have been supplemented by models based on ADIs from pairs of test cells. These models test the hypothesis that the cells in the pair exhibit different responses because of their respective advertising treatments. Of particular importance is the comparison of each test cell with the control cell. These "pair-wise" analyses have been performed using 1984 data alone and using changes from 1983 to 1984.

For each data set, multiplicative models were developed for the various applicants and contracts segments and their respective conversion ratios. In these models, only one dummy variable was used to capture the difference in the response of the cell pairs being examined. The cell pair of greatest interest is Cell Yellow-Cell Blue. The elasticities estimated for seniors and high school diploma graduates (HSDG) are displayed in Table 6.2 for applicants, contracts and conversion ratios, respectively. Additional tables for other candidate categories are in Tables 6.15 to 6.17 at the end of this chapter. Models were, of course, developed for the other cell pairs as well.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Applicants. For applicants, the models are good except for non-high school graduates. The form of the models estimated is:

$$\log(\text{Applicant Rate}) = b_0 + b_1(\text{XRECR}) + b_2(\text{XUNEMP}) + b_3(\text{XRACE}) + b_4(\text{XURBAN}) + b_5\,\text{DB} + \text{E}$$

The dummy variable DB (Cell Blue) is significantly different from zero, with strong effects for total applicants, high school graduates and seniors, and high quality (AFQT I-IIIA) high school graduate rates.

Contracts and Conversion Rates. The results for contracts are similar, with strong treatment effects displayed for the key segments of high school graduates and seniors, and high quality HSDGs. Models for conversion ratios are again poor, with no significant treatment effect. The models estimated are:

$$\log(\text{Contract Rate}) = b_0 + b_1(\text{XRECR}) + b_2(\text{XUNEMP}) + b_3(\text{XRACE}) + b_4(\text{XURBAN}) + b_5\,\text{DB} + \text{E}$$

$$\log(\text{Conversion Rate}) = b_0 + b_1(\text{XRECR}) + b_2(\text{XUNEMP}) + b_3(\text{XRACE}) + b_4(\text{XURBAN}) + b_5\,\text{DB} + \text{E}$$

If instead of a dummy variable, the actual per capita expenditure for Service-specific advertising in each of the ADIs in Cell Yellow and Cell Blue were used (with Joint being relatively constant), we would expect, and did find, a negative elasticity for these variables. Statistically significant negative elasticities were recorded specifically for the high school segment with regard to both applicants and contracts.

Changes in Applicant Rates. A final set of models was developed, again on cell pairs, where the variables were defined to be changes between 1983 and 1984. Since racial composition and urbanization are not expected to change significantly in the period of a year, these variables were dropped, and a multiplicative model was developed relating changes in the observed behavior measure to changes in recruiter effort, unemployment and to a dummy variable (representing the difference in treatment effects between the cell pairs). The models for the pair Cell Yellow-Cell Blue are shown in Table 6.3 for applicants.

The models are all very poor with low $\bar{R}^2$ values. This is to be expected in cross-sectional change models. However, the dummy variable DB (Cell Blue) is positive and significant for total applicants, for high school graduates and for high quality I-IIIA high school graduates. The findings are similar for contracts and conversion ratios.

Conclusions. As indicated in the analysis for data pooled across cells, the models indicate that Cell Blue has done better than or as well as control.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.3

Regression Coefficients (Elasticities) Reflecting Changes in DoD Applicant Rates by Category

Independent Variable	Total Applicants	HSDG+ Seniors	I-IIIA HSDG	NHS	III B+
CONSTANT	-.01**	-.01**	.00	.00	-.002**
XRECR	.19	.01	.26	.18	.01
XUNEMP	-.03	-.05	-.07	.03	.00
DB (Blue)	.03*	.002*	.002*	.00	.00
$\bar{R}^2$	.01	.02	.00	.00	-.06

Note: Coefficients (Elasticities) were derived from changes in applicant rates between FY 1983 and 1984 for pairs of markets (ADI's) within Cells Yellow (Control) and Blue.

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Summary of DoD Level Results. The analysis supports the hypothesis in that advertising treatment created significant differences in the observed behavior measures (applicants and contracts). Of particular importance are the following findings:

- Cell Blue performed at least as well as the control cell (Cell Yellow). It usually did better at a high level of statistical significance.
- The performance of Cell Green was often worse at a high level of significance than the control. It never did better than Cell Yellow.
- For the high school and senior segment, Cell Blue out performed the control for both applicants and contracts. In contrast, Cell Green did worse than the control for those same measures.

Service Share Analysis

The results discussed so far have examined the effect of advertising on applicants, contracts and conversion ratios at the aggregate DoD level. Next to be investigated is the degree to which advertising treatments affected each Service individually. The aim is to determine the degree to which advertising treatments can shift the

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.4

Regression Coefficients (Elasticities) Reflecting Changes in Service Share of Applicants

Seniors and High School Diploma Graduates

Independent Variable	Army	Navy	Air Force	Marine Corps
CONSTANT	-.64**	-1.67**	-.66	-3.38**
SREC	.007	-.009	.11	-.11
XUNEMP	.08*	-.09	.06	-.06
XRACE	-.007	.02	-.003	.003
XURBAN	-.003	.01**	.0006	.009
DB (Blue)	.01	-.02	.05	.21*
DC (Green)	-.06	-.06	.09	.05
DD (Red)	-.02	-.008	.06	-.03
$\bar{R}^2$	.05	.06	-.01	-.01

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F statistic significant at 0.01 level.

N = 72 observations

outcome from Service to Service. The Army has the bulk of the Service-specific advertising budget and the highest share of applicants and contracts. As a result, the impact of advertising changes on this group bears special attention.

Cross-Sectional Pooled Data: Model 1. A series of cross-sectional models was developed for the observed behavior response measures (applicants, contracts) and their key segments. The share of an individual Service of the total DoD response was the dependent variable. Independent variables were the natural logarithm of Services' share of recruiter person-months in each market over the period (this new variable is denoted by SREC), exogenous market variables (unemployment, percent non-whites, percent urbanization) and treatment dummy variables. Again multiplicative models were developed to accommodate non-linearities and possible interactions. The explicit model specification is:

$$\log(\text{Service applicants/Total applicants}) = b_0 + b_1(\text{XUNEMP}) + b_2(\text{XURBAN}) + b_3(\text{XRACE}) + b_4(\text{SREC}) + b_5\,\text{DB} + b_6\,\text{DC} + b_7\,\text{DD} + E$$

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.5

**Regression Coefficients (Elasticities)
Reflecting Service Changes in Share of Applicants**

**Seniors and High School Diploma Graduates
Paired Cell Yellow to Blue**

Independent Variable	Army	Navy	Air Force	Marine Corps
CONSTANT	-.36*	-1.66**	-.89	-.3.41*
XUNEMP	.07	-.05	-.07	-.23
XURBAN	-.008	.02**	-.003	.02
XRACE	.02	-.03	-.01	.03
SREC	.35**	.02	.15	-.13
DB (Blue)	.30	.01	.05	-.24*
$\bar{R}^2$	.05	.06	-.01	-.01

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Similar to the total DoD level analysis, these share models were estimated for all observations pooled together and for data sets restricted to pairs of test cells. Table 6.4 presents the results, for HSDGs and seniors, of these models for each Service using the pooled data (see Tables 6.18 to 6.21 for details on other applicant categories). On the whole, the models fit quite poorly. This indicates that the shares of applicants among the Services may depend on other factors. Only in the Marine Corps did an advertising treatment variable (DB, DC or DD) show any impact on Service shares of applicants. The most noteworthy effects are observed in Cell Green where the Army achieved a higher share of AFQT I-IIIA HSDGs, whereas the Navy and Air Force experienced changing shares of lower quality applicants.

Advertising had no significant effect on Cell Red's share of applicants. The only significant effect noticed was with Cell Blue's reduced share of high school applicants to the Marines. Recall that increased high school applications were achieved across all Services combined in Cell Blue. As a consequence, the Marine Corps was receiving a smaller slice of a larger pie. Cell Blue had a favorable impact on the Army share of applicants and a positive impact on total DoD applicants.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Model 2 - Cell Pair Data. Table 6.5 presents the results of the models for seniors and HSDGs (see Tables 6.22 to 6.25 for other applicant categories) developed on the restructured data set of Cell Yellow and Cell Blue.

The explicit form of the model for the Army is:

$$
\begin{aligned}
&\log(\text{Army applicants/Total applicants}) \\
&\quad = b_0 + b_1\,(\text{XUNEMP}) \\
&\quad + b_2\,(\text{XURBAN}) \\
&\quad + b_3\,(\text{XRACE}) \\
&\quad + b_4\,(\text{SREC}) \\
&\quad + b_5\,\text{DB} + \text{E}
\end{aligned}
$$

Under this formulation, model fit improves somewhat for the Army, but not for the other Services. Again, however, the advertising treatment effects are quite limited. No influences of advertising treatment is observed for Army, Navy or Air Force shares of applicants of any type (between Cell Yellow and Cell Blue). Marine Corps shares of several subcategories of applicants (high school graduates and seniors, high school AFQT Category IIIB and above) decline at the 0.10 level of significance.

Summary of Service Share Analysis. On the whole, the analyses demonstrate that the advertising treatments had little or no effect on Service shares of applicants. None of the models developed provided good fits to the data. Since Cell Blue generally had a positive impact on total DoD applicants, and no negative influence on Army shares, this implies that Cell Blue had a favorable or neutral impact on Army applicants.

Individual Service proportions of the overall budget for Service-specific treatment advertising were kept constant across treatment conditions. This allowed an investigation of the effect of the level of DoD advertising expenditures and of the mix between Service-specific and Joint advertising on individual Service "market shares." This was done in a manner analogous to the analysis of these effects on the DoD level of response.

Since Service shares must sum to 100, the models estimated for each Service are clearly not independent. However, models, similar to the one used for the Army, have been estimated for each of the Services. The model coefficients (e.g., the elasticity of recruiter effort) are not independent estimates across Services and, strictly speaking, are not comparable.

Many of these problems inherent to a share formulation are removed if applicant rates or contract rates are used as dependent variables (in a way similar to that used in the total DoD level models). However, these rate models are much harder to formulate and interpret than are the share models. Indeed, the competitive, cooperative and interactive factors of one Service impacting the performance of another Service must be included. Therefore, share models are presented here. Results obtained with the rate models are qualitatively similar.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.6

Percent Change in Reported Behavior Measures
Active and Reserve Respondents 1983-1984

	Cell Yellow (Control)	Cell Blue	Cell Green	Cell Red
Reported Conversations with Parents	-32.0 $\boxed{**}$	-31.1 $\boxed{**}$	-33.5 $\boxed{**}$	-25.3 $\boxed{**}$
Reported Recruiter Contact (DoD)	-16.1 $\boxed{**}$	-7.4 *	-15.4 $\boxed{**}$	-13.9

○ Significantly different from control (yellow). * Significant at 0.10 level.

□ Significantly different over time. ** Significant at 0.05 level.

The Impact of Advertising Treatment on Reported Measures of Behavior

The previous section detailed the results of the DoD Advertising Mix Test on observed enlistment behavior (applicants, contracts). This section analyzes the effects of the test upon the proportion of respondents reporting contact with a military recruiter and the proportion of respondents who report having discussions with their parents about the possibility of serving in the military.

Overview of Results for the Reported Behavior Measures

Both reported recruiter contact and reported conversations with parents about enlistment decreased in all cells in the Fall 1984 (post experiment) wave of YATS compared to the Fall 1983 (pre-experiment) wave. For reported conversations with parents, the decreases in Cells Green, Red and Blue were not significantly different than the decrease in control Cell Yellow (Table 6.6). Hence, advertising treatment did not affect the reported level of conversations with parents about enlistment.

In regard to reported recruiter contact, for all Services combined, the decrease in Cell Blue was significantly less than the decreases in control Cell Yellow at the 0.10 level. The decreases in Cells Green and Red were not significantly different than the control decrease. Cell Blue performed better than both the control and the other cells for reported levels of recruiter contact, for all Services combined.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

At the individual Service level of analysis, the effects of advertising treatment on reported recruiter contact was also observed. Service shares of reported recruiter contact were defined as the proportion of individuals reporting recruiter contact with any Service. Since an individual can report contact with recruiters from more than one Service, these shares are not constrained to add to 100. In the control cell, these shares did not change significantly between 1983 and 1984.

A look at the results depicted in Table 6.8 indicates that the advertising treatment did not change the Army's share of recruiter contact. However, the other Services experienced significant changes with regard to their share of recruiter contacts:

- A decrease for the Air Force in Cells Red, Green and Blue compared with control

- An increase for the Marine Corps in Cells Green and Red compared with control

- A decrease for the Navy in Cell Red compared with control

Detailed Findings: Conversations with Parents

Referring to Table 6.6, though the differences in reported conversations with parents are significant over time, no cell shows a statistically significant difference from the control difference. As the results indicate, advertising treatment had no effect on the reported level of conversations with parents about enlistment.

Detailed Findings: Conversations with Recruiters

With respect to reported conversations with recruiters, the effect of advertising, when measured by the difference of differences estimator (a pairwise parametric comparison discussed in Chapter 5), was significant for Cell Blue as shown in Table 6.6. The studentized range test (a simultaneous test of differences, discussed in Chapter 5) also suggests that Cell Blue generated significantly more conversations with recruiters.

Table 6.7 shows that Cell Blue also consistently had the highest rank ordering of changes relative to control Cell Yellow. Cell Blue produced more reported conversations with military recruiters, even though it had fewer recruiters per capita than the other three cells.

Service-Specific Findings:Conversations with Recruiters (Reported Recruiter Contact)

The results are as follows (see Table 6.8):

- Conversation with a Recruiter of Any Service. As shown in the first row on Table 6.8, Cell Blue experienced a decline in conversations with recruiters much less severe than the control cell. Unlike the other test cells, this difference is also statistically significant. This finding does serve to corroborate the findings depicted in Table 6.7.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.7

Rank Order of Percent Changes in Recruiter Contact

	Cell Yellow	Cell Blue	Cell Green	Cell Red
New Interviews	4	1	3	2
Active Interviews	2/3	1	4	2/3
Active and Reserves Interviews	4	1	3	2

Note: 4 is equal to the largest decrease.
1 is equal to the smallest decrease.

- Army share of conversations with recruiters: As examined through the difference of differences "t" test, no cell had an advertising effect significantly different from zero. The effect of advertising on the Army's share of conversations with recruiters was statistically insignificant.

- Navy share of conversations with recruiters: Cell Red had an advertising effect, measured by the difference of differences estimator, that was significantly different from zero. This is also corroborated by the studentized range test. Cell Red experienced a significant drop

Table 6.8

Percent Change in Reported Recruiter Contact Between 1983 and 1984

YATS Measure	Cell Yellow	Cell Blue	Cell Green	Cell Red
Reported Recruiter Contact (DoD)	-16.1 $\boxed{**}$	-7.4 *	-15.4 $\boxed{**}$	-13.9
Air Force Share	+18.8	-7.1 $\boxed{*}$	-8.5 $\boxed{*}$	-15.4 $\boxed{*}$
Army Share	-5.6	-3.9	-14.7	+1.7
Marine Share	-7.4	-4.8	+12.1 $\boxed{*}$	+23.8 $\boxed{*}$
Navy Share	+23.8	+12.3	+19.6	-14.8 $\boxed{*}$

O Significantly different from control (yellow).

$\square$ Significantly different over time.

* Significant at 0.10 level.

** Significant at 0.05 level.

in the Navy's share of conversations with recruiters when compared to all cells (including Control Cell Yellow). Other cells were not significantly affected by the advertising.

- Air Force share of conversations with recruiters: The effect of advertising on the Air Force's share of conversations with recruiters was statistically significant in all treatment (not control) cells through the studentized range test. All advertising treatments led to a decreased share of reported conversations with Air Force recruiters.

- Marine Corps share of conversations with recruiters: Cells Green and Red had an advertising effect that was significantly different from zero as suggested by the difference of differences and the studentized range tests. They both reported an increased share of reported conversations with recruiters.

The Impact of Advertising Treatment on Reported Attitudinal Measures

This section details the results of the DoD Advertising Mix Test on reported attitudinal measures, as derived from the Youth Attitude Tracking Study (YATS). Attitudinal measures reflect the stated aided mention and degree of certainty that respondents have about possible military enlistment. These measures are: unaided mention of joining the military, likelihood of joining the military, and composite likelihood of joining the military. A detailed analysis of these measures was provided in Chapter 4.

Overview of Results for the Reported Attitudinal Measures

The analysis does not support the hypothesis that advertising treatments produced a significant difference in attitude toward the military or individual Services. When results are compared across the three attitudinal measures, inconsistent and internally contradictory findings emerge. This implies that the effect of advertising on attitudes is indeterminate.

As with the other measures investigated, all three attitudinal measures declined in all cells in the Fall 1984 (post experiment) wave of YATS compared to the Fall 1983 (pre-experiment) wave.

There were significant differences between the decrease in a treatment cell and the decrease in control Cell Yellow for two of the three attitudinal measures. However, no treatment cell exhibited a consistent decrease across the three attitudinal measures compared to control Cell Yellow. For example, a cell which decreased significantly on one measure (e.g., unaided mention of joining the military) did not decrease significantly and often increased for the other two measures when compared to control. Moreover, the nonparametric rank orderings of percent change in these attitudinal measures were not consistent with respect to either measures or samples. For one attitudinal measure, Cell Red may have experienced the largest decline of all cells while

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

for another measure it may have suffered the least when compared to the other cells (including control). In summary, the attitudinal measures did differ significantly with respect to advertising treatment. The differences observed, however, were not consistent across measures or samples.

Defining a relationship between advertising treatment and attitudes toward the military depends upon identifying which, if any, of the measures used are reliable, independent measures of enlistment intentions and subsequent enlistment behavior. Since such identification is not currently available, the conclusion is that the effect of advertising treatment on attitudes toward the military is indeterminate.

Detailed Findings: Unaided Mention of Joining the Military

Table 6.9 presents the percent change in this and the other two attitudinal measures. The change is defined as the difference in proportions of positive responses between 1983 and 1984 divided by the proportion of positive responses in 1983. Table 6.10 presents the rank ordering of percent changes across the three samples investigated. The difference of differences estimator reveals that Cell Blue has an advertising effect that is significantly different from zero, and is negative when compared with control. The studentized range test also points to the same conclusion. Cell Blue consistently had the lowest rank ordering of changes relative to the control cell across all three samples. This indicates that the conclusions are consistent across different definitions of samples.

Detailed Findings: Unaided and Aided Mention of Joining the Military

The difference of differences over time in Cells Blue, Green and Red are significantly different from zero. The studentized range test also shows that the advertising effects in the test cells are simultaneously different from zero. The sample rank ordering shows consistency for Cells Blue and Green, with identical ranks for samples 2 and 3. The rank ordering for all cells is identical for samples 2 and 3. Although the effect of advertising on the likelihood of joining the military was not statistically significant, it is notable that Cell Blue consistently had the highest rank ordering of changes relative to Cell Yellow across all three samples. This means that Cell Blue did the best among other cells across different sampling schemes on this measure.

Detailed Findings: Composite Likelihood of Joining the Military

This measure was derived from the question: "How likely is it that you will be serving on active duty in the (Service)?" The difference of differences estimator of composite likelihood of joining the military was statistically significant in Cell Red by the criterion of the two-tailed "t" test. Cell Red performed worse than the control cell and consistently had the lowest rank ordering across all cells. Such differences in other cells were not significant. However, the studentized

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.9

Percent Change in Attitudinal Measures
Active and Reserve Respondents

Measures	Cell Yellow	Cell Blue	Cell Green	Cell Red
Unaided Mention of Joining Military	-21.6	-43.7 **	-26.7	-9.3
Aided Mention of Joining Military	-15.1	-5.2 $\boxed{**}$	-21.4	-7.6
Composite Likelihood of Joining Military	-8.3	-1.4	-8.0	-17.5 *

O Significantly different from control (yellow).

☐ Significantly different over time.

* Significant at 0.10 level.

** Significant at 0.05 level.

Table 6.10

Rank Order of Change in Attitudinal Measures

Sample	Cell Yellow	Cell Blue	Cell Green	Cell Red
<u>Unaided Military</u>				
Sample #1 New Interviews	1	4	3	2
#2 Active Interviews	2	4	3	1
#3 Active & Reserve Interviews	2	4	3	1
<u>Aided Military</u>				
Sample #1 New Interviews	2	1	4	3
#2 Active Interviews	3	1	4	2
#3 Active & Reserve Interviews	3	1	4	2
<u>Composite Likelihood</u>				
Sample #1 New Interviews	1	2	3	4
#2 Active Interviews	3	1	2	4
#3 Active & Reserve Interviews	3	1	2	4

Note: 4 is equal to the largest decrease.
1 is equal to the smallest decrease.

Table 6.11

Percent Change in Service Shares of Composite Likelihood to Join Military

	Cell Yellow	Cell Blue	Cell Green	Cell Red
Air Force	-6.1	-15.3	-6.5	+2.0
Army	+8.0	-14.9 **	+17.4	-5.6 *
Marine Corps	-1.5	-28.3 ** $\boxed{*}$	-10.1	-0.6
Navy	+8.1	+26.6	-27.9 ** $\boxed{*}$	-5.0

○ Significantly different from control (yellow).   * Significant at 0.10 level.

□ Significantly different over time.   ** Significant at 0.05 level.

range test suggests that this advertising effect is indistinguishable from zero when compared simultaneously with other differences. Hence, results for the composite likelihood measure are not significant.

Detailed Findings: Service Share - Composite Likelihood of Joining the Military

Individual Service shares of the Composite Likelihood of Joining the Military measure were computed. Those shares can sum to more than 100 percent since individual respondents can indicate a definite or probable intention to join more than one Service. The results of this analysis are presented in Table 6.11 and are summarized as follows:

- Results of Army Share of Composite Likelihood of Joining the Military: The difference of differences estimator reveals that Cell Blue had advertising effects that were significantly different from zero. The effect of advertising on the Army share of the composite likelihood of joining the military was statistically significant in Cells Blue and Red as implied by both the "t" test and the

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

studentized range test. The Army's share decreased in these cells and increased in Cells Yellow and Green.

- Results for Navy Share of Composite Likelihood of Joining the Military: The effect of advertising on the Navy's share of the composite likelihood of joining the military is statistically significant in Cell Green. This inference results from both the "t" test and the studentized range test. The difference of differences estimator also confirms this. The Navy's share of the composite likelihood of joining the military was lower in Cell Green than in all other cells including control Cell Yellow.

- Results of Air Force Share of Composite Likelihood of Joining the Military: The difference of differences estimator reveals that none of the cells had an advertising effect significantly different from zero. Advertising had a statistically insignificant effect on all cells. This is implied by both the "t" test and the studentized range test. Thus, there is no statistically significant effect of advertising on Air Force share of composite likelihood of joining the military.

- Results for Marine Corps Share of Composite Likelihood of Joining the Military: The effect of advertising on the Marine Corps share of the composite likelihood of joining the military is statistically significant in Cell Blue. The change in the Marine Corps share of this measure is significantly lower in Cell Blue than the other cells.

The interpretation of these share measure differences also depends upon the validity and reliability of the composite likelihood measure compared to the other measures. This measure is based on repeated questions about a respondent's likelihood of joining specific Services. Thus, Service-specific preferences of respondents might influence this measure.

DIRECT IMPLICATIONS OF FINDINGS

Clearly, the results of the DoD Advertising Mix Test have implications for DoD advertising budget policy. After summarizing the results across measures, budget implications based only on cell performance during the test are discussed and calculated. These are the direct implications. Alternate budget implications, based on additional analyses of applicant rates, are reviewed in Chapter 7.

Assessments of the effects of the level and mix of advertising on the enlistment process were made by comparing the performance of the measures of the enlistment process in each cell with their performance in the control cell. The context of the experiment was one in which all measures of recruiting system performance declined in the

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

test year compared to the previous year.

Within this context, the results of the comparisons of the treatment cells (Cells Blue, Green and Red) with the control cell (Cell Yellow) were consistent across measures, units of analysis and methods of analysis. Cell Blue performed significantly better than the control cell (Cell Yellow) and better than or no worse than Cells Red and Green when measured by the enlistment contract rate per unit of population and by the rate of applicants per unit of population. These differences were strongly evident for high school graduates and seniors, as well as for totals. It is also noteworthy that Cell Green performed significantly worse than control for the key high school graduate and senior category.

No differences were observed across cells in the conversion rate from applicants to contracts for any category of recruits. Finally, few significant differences in the market shares of enlistments or applicants were observed for any Service for any category of recruits in Cell Blue compared with the control cell. The only exception to this may be the Marine Corps share of high school graduate and senior applicants. (Even here, little if any negative impact on the Marine Corps level of such applicants is to be anticipated because its reduced share occurs from a larger pool of applicants.) Hence, Cell Blue performed better on these observed behavior measures with additional applicants evidently leading to additional enlistment contracts of various categories.

On the reported behavior measures, Cell Blue also performed better than the control cell for reported recruiter contact and the same as the control cell for reported conversations with parents about enlistment (for which no cell differed significantly from the control cell) at the DoD level. The Air Force share of reported recruiter contact decreased significantly relative to the control cell. Again, this decrease in share was offset, at least partially, by the higher level of overall military recruiter contact reported. Hence, Cell Blue performed better on the reported behavior measures with additional recruiter contact evidently leading to additional applicants and producing additional enlistment contracts of various categories.

Finally, the effect of advertising treatment on attitudinal measures of intention to join the military is indeterminate. For example, in non-parametric rank order comparisons, Cell Blue performed the best on two such measures and the worst on one. Significant additional analysis of both historical response and enlistment data and the experimental response data is required in order to ascertain the effect of advertising treatment on enlistment intentions and subsequent enlistment behavior.

The finding that Cell Blue performed better than the control cell and better than the other treatment cells is notable because Cell Blue had the lowest total test advertising budget level of all the cells.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Nevertheless, it is clear that during the one-year period of the test, the lower advertising budget and spending level in Cell Blue did not lead to lower response levels for the military as a whole. Hence, during the one-year period of the test, substantially reducing advertising expenditures did not lead to a decrease in the performance of the overall recruiting system given that Service shares of the reduced levels of Service-specific budgets were kept constant. The results of the experiment hold for the military recruiting system as a whole, for the Army and for the other Services. These results hold across the various measures of response investigated in analyses conducted and reviewed by us. In fact, the recruiting system's performance significantly improved in Cell Blue during the one-year period when other differences in the cells were considered.

Hence, a direct implication of these results is to implement the Cell Blue budget levels on a national level. This implication is warranted on the grounds of both efficiency and effectiveness. It can be accompanied by the suggestion that the market response to the new budget levels be tracked and tested further and that some markets be maintained at alternaive spending levels in order to determine the longer term effects of the Cell Blue budget level.

A number of steps are involved in determining the direct budgetary implications of the results of the DoD Advertising Mix Test. First, budgeting guidelines for working media expenditures per 17–21-year-old male per year were derived directly from the average Cell Blue expenditure level during the year of the test ($3.96 per 1,000 17-21-year-old males). Guidelines for the Joint proportion of the budget (41 percent) were derived from the average Cell Blue proportion during the test ($1.63 Joint expenditure/$3.96 total expenditure equals 41 percent). Second, these media costs per 17-21-year-old male were multiplied by the number of 17-21-year-old males in the United States in 1984. Non-media production and labor costs incurred by each advertiser and identified and included in their planning for the experiment were added back to the media costs. This yielded budget levels for FY 1984 that the experiment's results indicate would have been more effective for NPS, enlisted, active force advertising budgets. At this point, other advertising budget elements such as reserve and officer advertising, which were excluded from the test, were re-added to arrive at the total DoD advertising budgets for FY 1984 indicated by the test results. Finally, recommended DoD enlisted, active force budget levels for FY 1987 were calculated by inflating the 1984 adjusted budget levels by 10 percent per year to allow for price increases in advertising costs. Total recommended FY 1987 DoD advertising budget levels were then computed by adding back excluded elements programmed for FY 1987.

TEST CELL DESIGN

Media Budget (Millions of $)	Yellow (Control)	Green	Blue	Red
Service-specific	68	68	15	15
Joint	16	4	16	40

Table 6.12

Relative Contribution (Elasticities) of the Regression Variables to Applicant Levels

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.21	.30	-.19**	-3.23**	-.30
XRECR	.54**	.61**	.79**	.18	.49**
XUNEMP	.33**	.32**	.17**	.35**	.49**
XRACE	.05**	.06**	-.05*	.02	.18**
XURBAN	.01**	.01**	.02**	.01	.004
DB (Blue)	.12**	.11**	.10	.18	.12
DC (Green)	-.09	-.10*	-.06	-.04	-.16*
DD (Red)	-.03	-.02	-.10	-.06	.38
$\bar{R}^2$	.52***	.55***	.50***	.08	.47***

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 72 observations

Table 6.13

Relative Contribution (Elasticities) of the Regression Variables to Contract Levels

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.05	-.03	-.46	-4.78**	.67
XRECR	.65**	.68**	.78**	.16	.59**
XUNEMP	.26**	.27**	.14*	.13	.46**
XRACE	.02	.02	-.04	.04	.11**
XURBAN	.01**	.01*	.01**	.03**	.07
DB (Blue)	.09	.09	.08	.10	.10
DC (Green)	-.10*	-.09	-.07	-.25**	-.14*
DD (Red)	-.01	-.003	-.07	-.09	.07
$\bar{R}^2$	.55***	.57***	.49***	.09	.46***

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 72 observations

Table 6.14

Relative Contribution (Elasticities) of the Regression Variables to Conversion Rates of Applicants to Contracts

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.27	.27	.26	1.54**	.36
XRECR	-1.0**	-.07*	-.02	-.01	-.10
XUNEMP	.07*	.05	.03	.22*	.03
XRACE	.03**	.04**	.01	.02	.07**
XURBAN	.00	.00	.06**	.02	.00
DB (Blue)	..03	.03	.02	.09	.02
DC (Green)	-.75	-.00	-.02	.21**	.02
DD (Red)	-.21	-.02	-.04	-.03	.04
$\bar{R}^2$	.15	.23	.06	.06	.34***

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 72 observations

Table 6.15

DoD Applicant Rate Paired Cell Yellow to Cell Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.43	.54	-.15	-3.11**	-.02
XRECR	.63**	.69**	.75**	.23	.66**
XUNEMP	.28**	.28**	.27**	.33*	.31**
XRACE	.03	.04	.08**	.03	.17**
XURBAN	.09	.09	.02**	.02	.01
DB (Blue)	.13**	.12**	.13**	.21	.09
$\bar{R}^2$	.46	.49***	.63***	.08	.32

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 43 observations

Table 6.16

DoD Contract Rate
Paired Cell Yellow to Cell Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.24	.38	-.45	-4.57**	.03
XRECR	.75**	.80**	.77**	.30	.85**
XUNEMP	.21**	.23**	.20**	.09	.30**
XRACE	-.00	.00	-.07	.04	.11**
XURBAN	.09	.01	.01	.02**	.01
DB (Blue)	.10*	.09*	.10**	.14*	.08
$\bar{R}^2$	.60***	.60***	.62***	.15	.39

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.
*** - F Statistic significant at 0.01 level.

N = 43 observations

Table 6.17

DoD Conversion Rate of Applicants
to Contracts Paired Cell Yellow to Cell Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	.19	.14	-.29	-1.46	.05
XRECR	.12	.11	.02	.05	.19***
XUNEMP	-.07	.06	-.07	-.24	.02
XRACE	-.03	-.04**	.01	-.01	-.07**
XURBAN	.00	-.01	-.01	.00	.03
DB (Blue)	-.03	-.03	-.02	-.07	-.02
$\bar{R}^2$	.10	.20	.04	-.06	.32

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Table 6.18

Army Share of Applicants
Pooled Data from All Cells

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	-.51	-.64**	.95*	-1.04	-.46
SREC	.01	.007	.22**	-.01	.03
XUNEMP	.91**	.08*	.14*	.06	.05
XRACE	-.01	-.007	-.03	-.07**	.01
XURBAN	-.0009	-.003	.01	-.003	-.0005
DB (Blue)	.02	.01	.06	.009	.02
DC (Green)	.03	-.06	.11*	-.02	-.07
DD (Red)	-.03	-.02	.02	-.04	-.01
$\bar{R}^2$	.02	.05	.14	.28	-.05

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 72 observations

Table 6.19

Navy Share of Applicants
Pooled Data from All Cells

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	-1.50**	-1.67**	-.77	-.88	-2.99**
SREC	-.02	-.009	.04	.14	-.11
XUNEMP	-.13*	-.09	-.07	-.36**	-.11
XRACE	.04	.02	.13**	-.07	-.05
XURBAN	.01*	.01**	.003	.009	.02**
DB (Blue)	-.02	-.02	-.03	-.10	-.004
DC (Green)	-.03	-.06	-.04	-.26*	.01
DD (Red)	.003	-.008	-.02	-.03	-.03
$\bar{R}^2$	.08	.06	.26	.11	.03

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 72 observations

Table 6.20

Air Force Share of Applicants
Pooled Data from All Cells

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	-.52	-.66	-.37	-3.93	-1.37
SREC	.13*	.11	.10	.06	.07
XUNEMP	-.08	.06	-.01	-.55**	-.12
XRACE	.004	-.003	-.04	.005	-.01
XURBAN	-.004	.0006	-.001	-.007	-.001
DB (Blue)	.04	.05	.03	-.16	.02
DC (Green)	.09	.09	-.005	.22	.20*
DD (Red)	.08	.06	.23	.17	.13
R^2	.03	-.01	-.04	.25	.002

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 72 observations

Table 6.21

Marine Corps Share of Applicants
Pooled Data from All Cells

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	-3.21**	-3.38**	-3.79**	-4.01**	-3.01**
SREC	-.09	-.11	-.09	-.11	-.13
XUNEMP	-.04	-.06	-.23	-.05	.12
XRACE	.0008	.003	-.06	.07	.05
XURBAN	.006	.009	.02	-.03	.004
DB (Blue)	-.17	-.21*	-.18	.03	-.21
DC (Green)	.02	.05	.07	.55**	.05
DD (Red)	-.03	-.03	-.01	-.19	-.13
$\bar{R}^2$	-.04	-.01	.02	.001	.0007

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 72 observations

Table 6.22

Army Share of Applicants
Cells Yellow and Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-III A HSDG	NHS	III B-V
CONSTANT	-.30	-.36*	-.55**	.13	-.34
SREC	.33**	.35**	.42**	.44*	.28*
XUNEMP	.08	.07	.06	.11	.06
XRACE	.009	.02	-.03	-.02	.02
XURBAN	-.004	-.008	-.004	.01	-.007
DB (Blue)	.03	.03	.02	.05	.03
$\bar{R}^2$	.11	.14	.29	.10	-.007

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Table 6.23

Navy Share of Applicants
Cells Yellow and Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-IIIA HSDG	NHS	III B-V
CONSTANT	-3.12**	-3.41*	-3.71**	-2.36**	-3.21**
SREC	-.12	-.13	-.10	-.02	-.15
XUNEMP	-.16	-.23	-.36	.08	-.13
XRACE	.03	.03	-.007	.18	.03
XURBAN	.01	.02	.02	-.03	.01
DB (Blue)	-.19*	-.24*	-.20	.03	-.25*
$\bar{R}^2$	·05	.09	.09	-.07	.05

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Table 6.24

Air Force Share of Applicants
Cells Yellow and Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-III A HSDG	III B-V
CONSTANT	-1.13**	-.89	-.63	-1.43
SREC	.14	.15	.14*	.14
XUNEMP	-.09	-.07	-.01	-.19
XRACE	-.009	-.01	.02	-.02
XURBAN	.008	-.003	-.005	-.00009
DB (Blue)	.04	.05	.03	.01
$\bar{R}^2$	-.01	-.01	-.03	.06

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

Table 6.25

Marine Corps Share of Applicants
Cells Yellow and Blue

Independent Variable	TOTAL	HSDG+ Seniors	I-III A HSDG	NHS	III B-V
CONSTANT	-1.77**	-1.66**	-.96*	-2.25**	-2.14**
SREC	-.03	-.02	.06	-.04	-.08
XUNEMP	-.07	-.05	-.01	-.23	-.04
XRACE	-.02	-.03	-.04	-.002	-.06
XURBAN	.02**	.02**	.01	.01	.04**
DB (Blue)	.01	.01	-.01	-.01	.01
$\bar{R}^2$	.015	.03	.005	-.05	.08

* - t Statistic significant at 0.10 level.
** - t Statistic significant at 0.05 level.

N = 43 observations

CHAPTER 7

ADDITIONAL ANALYSES

The results of the test, as indicated in Chapter 6, clearly show that Cell Blue performed better than, or at least as well as, the other cells during the one-year period of the test. This occurred even though the other three cells had substantially higher rates of advertising expenditures. Indeed, Cell Red had a much higher rate of Joint spending while Cells Yellow and Green had higher rates of expenditure for Service-specific advertising.

This chapter provides additional analyses of the experimental data. It is aimed at answering two questions:

1. Why did Cell Blue perform better than, or at least as well as, the other cells during the one-year period of the test?

2. Do insights into the reasons for Cell Blue's performance provide guidance for recommendations about DoD advertising budgets and policies?

After describing the findings, this chapter introduces and tests three hypotheses that may explain Cell Blue's performance. The steps taken to validate a model supporting one of the three hypotheses is then described. Additional tests are also provided to confirm one of the hypotheses.

SUMMARY OF RESULTS

The findings in this chapter can be summarized as follows:

- The percentage of advertising allocated to Joint was not the only factor affecting Cell Blue's performance. In addition, there was no evidence that the recruiting performance in Cell Blue was a result of only the total DoD advertising budget level. The enlistment responses to the advertising treatment observed during the experiment were a function of both the level of advertising budgets and the mix between Service-specific and Joint advertising.

- The total level of advertising expenditures and the mix between Service-specific and Joint expenditures do not operate independently in affecting enlistment behavior.

- Higher proportions of Joint advertising were effective in obtaining good response at lower overall expenditure levels. As the budget is increased, the percentage allocated to Joint to maximize response declines.

- Cell Blue's performance during the test is not caused by an underlying relationship between enlistment response and advertising that is perversely negative. Rather, cells with higher budgets and less efficient mixes of advertising expenditures performed worse than Cell Blue which had a lower budget and better mix of advertising expenditures.

- Insight into how the relationship between the level of advertising expenditures and the mix between Service-specific and Joint advertising affects the experimental results permits budget computations and recommendations that go beyond a recommendation to implement the Cell Blue treatment condition nationally.

ANALYSIS OF ADVERTISING RESPONSE

Three hypotheses were investigated regarding the impact of total advertising expenditure and of the proportion of that expenditure on Joint advertising on recruitment response. The aim is to test for the independence or interdependence between Joint and Service-specific advertising. The hypotheses are:

1. Response depends only on total advertising expenditure

2. Response depends only on the percentage allocated to Joint advertising

3. Response is based on the interaction between the total advertising expenditure and the percentage allocated to Joint advertising

These hypotheses were investigated using applicant data that are available on an ADI basis, thereby increasing the number of observations. Applicant data are less affected by goals and missions than are data on contracts. Ideally, these hypotheses should also be tested using reported and attitudinal measures. This could not be done because reliable measures (with sufficient sample size) of these data were available only at the cell level. However, the general consistency of the previously reported results using attitudinal and reported data and applicant data makes such an analysis less necessary.

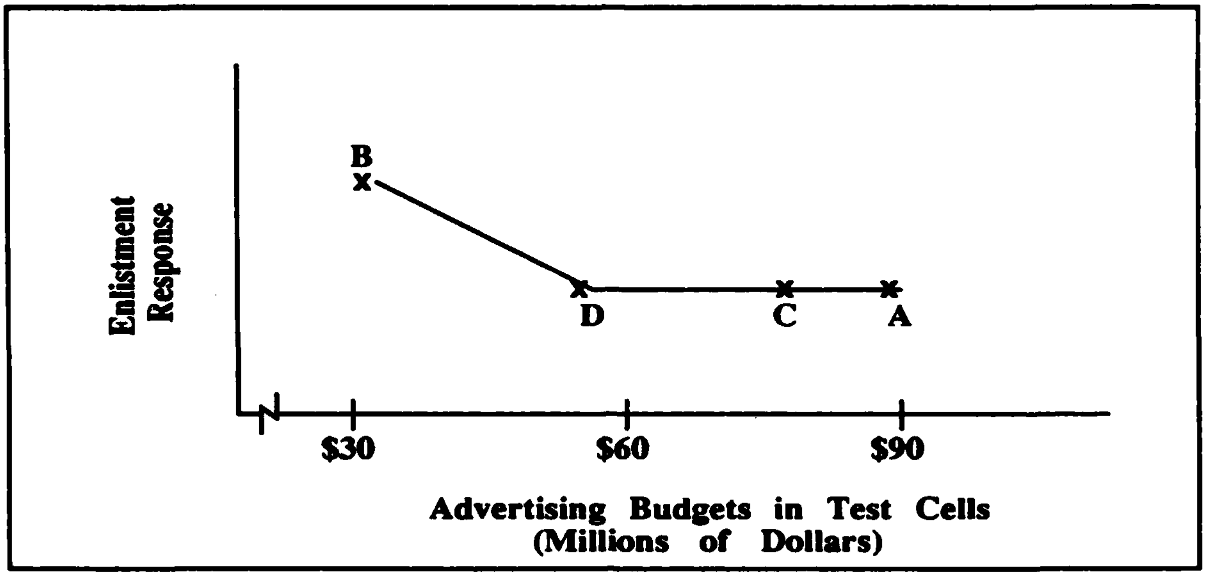
Total-Expenditure Hypothesis

The first hypothesis for explaining the experimental results states that enlistment behavior responded only to the total level of advertising expenditures regardless of whether the expenditures are Joint or Service-specific. This implies *that the target audiences do not differentiate Joint* from Service-specific advertising. Counter to this hypothesis, the cell-based experimental results imply that an inverse relationship exists between advertising expenditures and recruiting performance across the range of budgets tested. This is schematically represented in Figure 7.1. Higher levels of advertising lead to or cause lower levels of enlistment behavior.

This hypothesis suggests that not only are increased advertising expenditures not contributing to increased sales (having reached some saturation point) but also high levels of advertising expenditures actually decrease sales (having reached a supersaturation point). The implications of this hypothesis in the current experiment are that the market is indifferent to the mix between Service-specific and Joint advertising and that no budget level above the total Cell Blue level should be implemented. Before this hypothesis can be accepted, a significant negative relationship between total advertising expenditures and enlistment behavior should be established. A number of different models, described in Appendix G, were formulated and tested on the ADI data to assess this hypothesis. A significant negative relationship between per capita advertising expenditures and per capita applicant rates was not established and hence the hypothesis was rejected. The conclusion is that the enlistment response during the experiment is not solely a function of total advertising expenditure levels.

Figure 7.1

Enlistment Response to Total Advertising Budget Levels in the Test Cells (Total Expenditure Hypothesis)



A = Cell Yellow B = Cell Blue C = Cell Green D = Cell Red

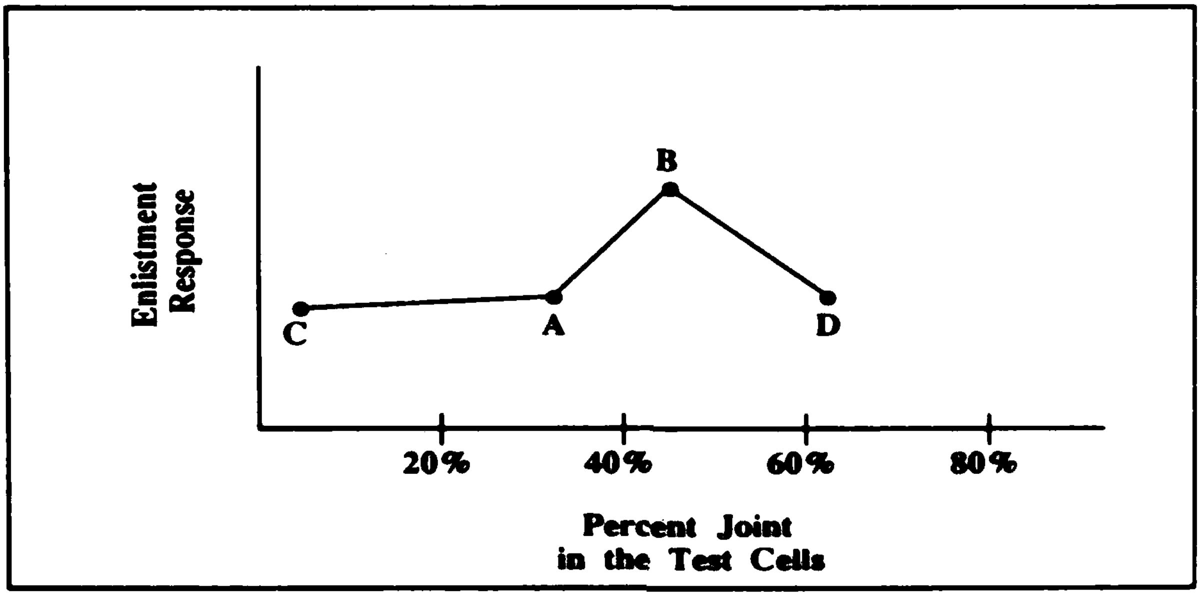
Percent-Allocated-to-Joint Hypothesis

The second hypothesis states that enlistment behavior responds only to the mix of advertising budgets or expenditures between Service-specific and Joint, irrespective of total expenditure or budget level. This implies that Service-specific and Joint advertising are differentiated by the target audiences and that different response functions exist for each that either are constant at all levels of spending or vary with expenditure levels at precisely proportional rates. Given this hypothesis, the cell-based experimental results imply that a non-monotonic relationship exists between the mix of advertising budget levels and recruiting performance across the range of budgets tested. This is represented schematically in Figure 7.2. The enlistment response to advertising rises with the percent Joint up to some optimal point, beyond which response is unchanged or declines.

The implication of this hypothesis in the current experiment is that the market is sensitive only to the mix between Service-specific and Joint advertising. In addition, the mix should be set at or near the Cell Blue rate of approximately 41 percent Joint (based on per capita delivered advertising expenditures). Accepting this hypothesis would require that the optimal mix between the two response functions be independent of the level of advertising expenditures or budget. Again, a number of different models, described in Appendix G, were formulated and tested on the ADI data to assess this hypothesis. A significant relationship between the mix of advertising expenditures observed and per capita applicant rates was not established. Hence, the hypothesis was rejected. The conclusion is that the enlistment response during the experiment is not solely a function of the mix between Service-specific and Joint expenditures or budget levels.

Figure 7.2

Enlistment Response to Percent Joint of Total Budget Levels in the Test Cells (Percent Allocated to Joint Hypothesis)



A = Cell Yellow B = Cell Blue C = Cell Green D = Cell Red

Interaction Hypothesis

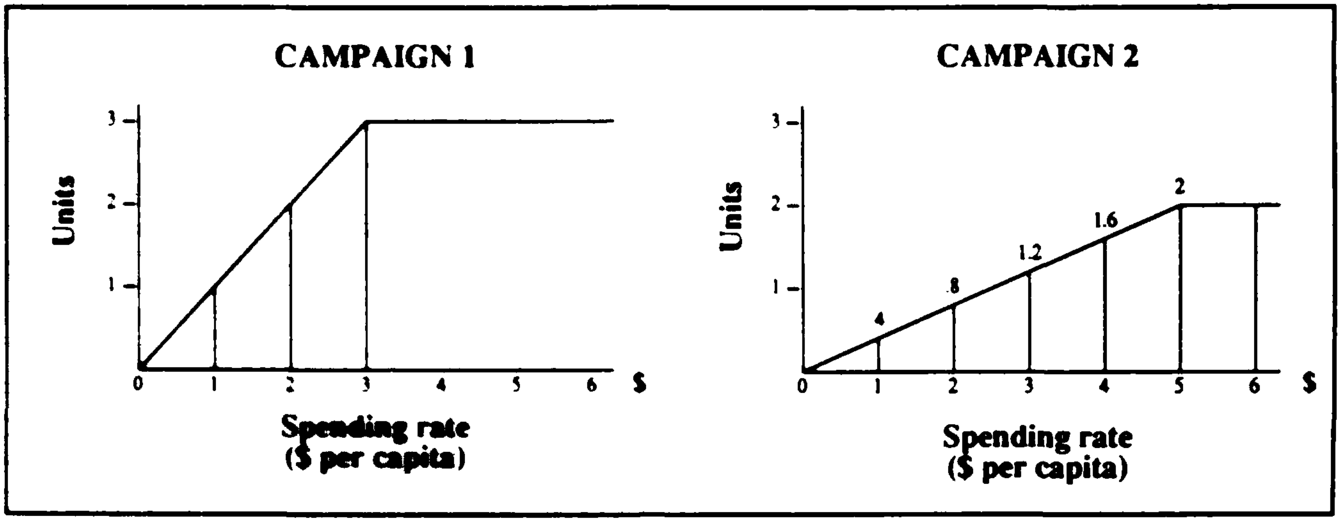
The third hypothesis states that the total level of advertising expenditures and the mix between Service-specific and Joint expenditures do not operate independently in affecting enlistment behavior. This hypothesis implies that Service-specific and Joint advertising are differentiated by the target audiences. It also indicates that the appropriate mix between the two areas of advertising will depend, at least in part, on the overall expenditure. (Or, alternatively, that the appropriate expenditure level would partially depend on the desired mix between the two categories.) Hence, one mix between Service-specific and Joint advertising may be appropriate and effective at one level of total expenditures whereas a quite different mix is appropriate at a lower or higher level of total expenditures.

To understand this hypothesis, it is helpful to consider the following numerical example. Let total response depend on the allocation of a total budget B between two campaigns, Campaign 1 and Campaign 2; total response is the sum of the responses obtained from each campaign. The response from each campaign is shown in Figure 7.3. Campaign 1 has a linear response to per capita spending up to a spending rate of \$3. The "saturation" response is 3 units. Similarly, Campaign 2 has a saturation response of 2 units at a spending rate of \$5 per capita. These response functions are simplified to ease the exposition of response functions typically found in marketing studies.

Based on our assumptions, if B were set at \$8 per capita and \$3 were allocated to Campaign 1 and \$5 went to Campaign 2, the total response would be 5 units. Let "p" be the proportion of the

Figure 7.3

Two Enlistment Response Functions for Campaigns 1 and 2



budget B allocated to Campaign 1. Thus when "p" = 3/8, total response is 5. The total response can be easily calculated for different allocations with corresponding values of "p" and for different values of B. Table 7.1 shows the calculations for B = 8.

The relationship between "p" and total response is graphed in Figure 7.4. This figure also shows similar graphs developed for values of B equal to $4 and $6 per capita. These graphs portray an <u>interaction</u> between the total budget B and the proportion allocated to Campaign 1. As B increases, the allocation "p" required for Campaign 1 to achieve maximum total response decreases. For B = 4, "p" is 0.75, while for B = 8, it is 0.375. This result ("p" changing with the budget level) illustrates the interaction hypothesis. Under Hypothesis 1, the graphs at each level of B would be parallel to the horizontal axis producing the same response for a given B, regardless of "p" (Figure 7.5). For Hypothesis 2, there would be only a single graph, regardless of the value of B (Figure 7.6).

As indicated in Figure 7.4, total response depends on both the level of total advertising expenditures and on the proportion allocated to each campaign. Observe the two points labelled X and Y in Figure 7.4. Note that point Y represents a higher response despite the facts that it represents a lower total level of expenditures and that neither Campaign 1 nor Campaign 2 exhibits a negative relationship between response and advertising (see Figure 7.3). Point X achieves better response because it represents a better mix between Campaign 1 and Campaign 2 for <u>its budget level.</u>

To test the interaction hypothesis, the most direct approach is to estimate the two response functions (one for Service-Specific advertising and one for Joint advertising) separately. Alternatively, it can be tested indirectly by estimating curves such as those in Figure 7.4 for different budget levels. Because of the highly constrained nature of the test design, neither approach is easy. For example, only two levels

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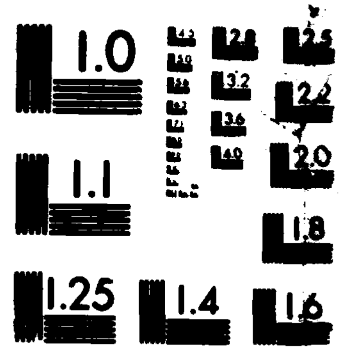

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Table 7.1

Total Enlistment Response as a Function of p
(p = percent of total budget expenditure to Campaign 1)

Allocation to Campaign 1	0	1	2	3	4	5	6	7	8
Allocation to Campaign 2	8	7	6	5	4	3	2	1	0
Total Budget (B)	8	8	8	8	8	8	8	8	8
p *(percent of Campaign 1 expenditure to Total Budget)*	0	.125	.25	.375	.5	.625	.75	.875	1
Response 1	0	1	2	3	3	3	3	3	3
Response 2	2	2	2	2	1.6	1.2	.8	.4	0
Total Response	2	3	4	5	4.6	4.2	3.8	3.4	3

Figure 7.4

Interaction Hypothesis: Enlistment Response Functions

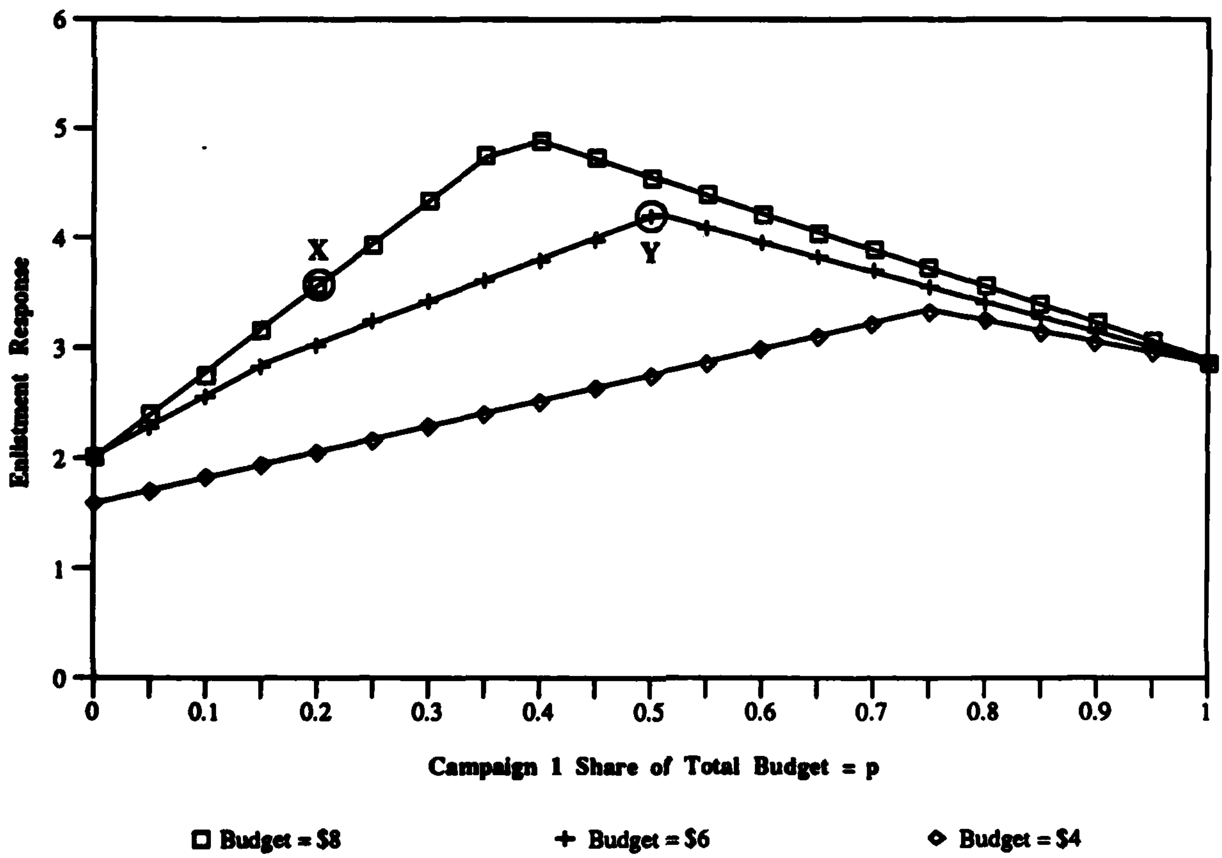


Figure 7.5

Hypothesis I: Enlistment Response Depends Only on Total Advertising Expenditure (B)

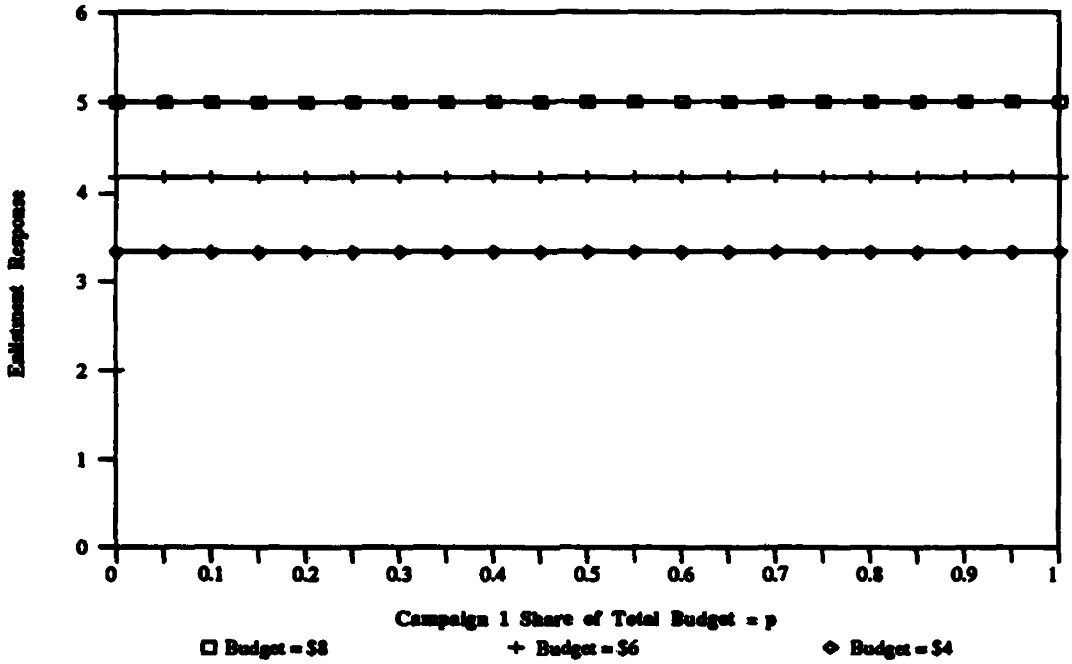
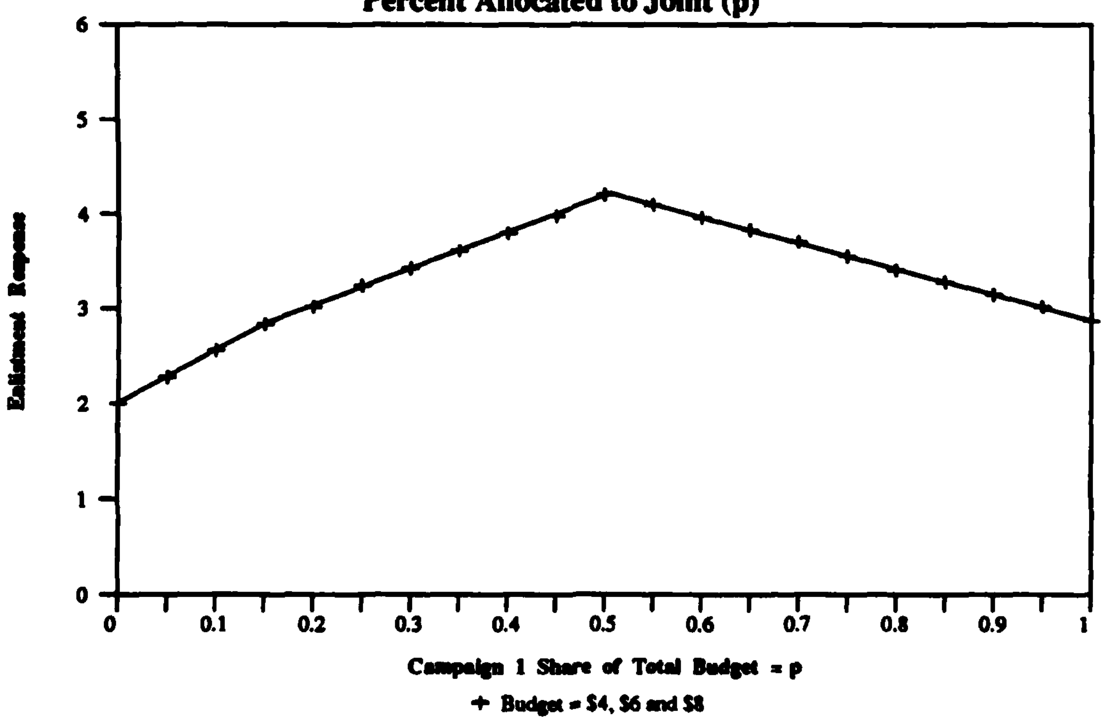


Figure 7.6

Hypothesis II: Enlistment Response Depends Only on Percent Allocated to Joint (p)



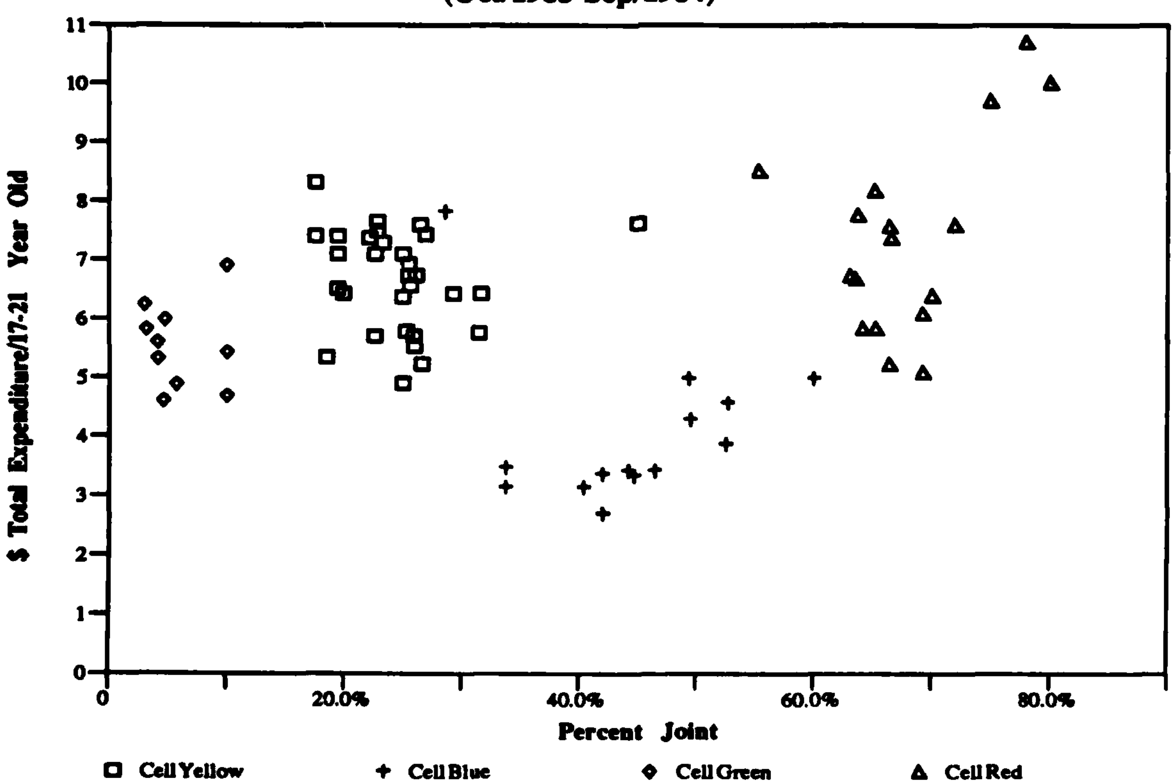
of spendir.; for Service-specific advertising were tested ($68 million and $15 million), making the estimation of a response function difficult. Also, as Figure 7.7 shows, the proportion of Joint advertising to the total budget that is observed is not as dense and uniform as would be ideal. For example, there are few points with expenditure rates of $5 or more and a percentage of Joint advertising in the 40-60 percent range. Similarly, there are very few observations with the percentage of Joint advertising greater than 80 percent or less than 20 percent. Thus, estimation of the complete contour of the response curves, as in Figure 7.4, is impossible.

Based on preliminary data analysis, the interaction hypothesis was tested indirectly by estimating portions of the response curves. This testing is constrained by the data as noted above.

The data were first divided according to the level of advertising expenditure: low (less than $5.50 per 17-21-year-old male for year of the test), medium (between $5.50 and $7.00), and high (greater than $7.00). Each ADI in the experiment was classified into one of these total expenditure categories. This resulted in the creation of three separate data sets of roughly equal size corresponding to three separate levels of total advertising expenditures.

Figure 7.7

ADI Advertising Expenditure Level by the Proportion Allocated to Joint (Oct/1983-Sep/1984)



These three data sets provided the structure for assessing the interaction hypothesis. With the level of total advertising expenditures now fixed, attention could be turned to the effect of the mix between Joint and Service-specific expenditures on enlistment response for each total expenditure category. The essence of the interaction hypothesis is that the enlistment response to the mix between Joint and Service-specific advertising varies at different total advertising expenditure levels. This premise could now be assessed. Models relating DoD applicants and Army applicants (total as well as high school diploma graduates or seniors) to the percent Joint were developed for each of the three expenditure categories. The effect of the percentage of Joint advertising to total advertising on applicants was then compared.

Table 7.2 presents the results of the models of applicants. The dependent variable (Y) was applicants per 1,000 17-21-year-old males in an ADI. The independent variables were P (the proportion of Joint advertising expenditures to the total advertising expenditures in a market) and R (the number of recruiter person-months of effort in a market). All observations were on an annual basis.

Figure 7.4 shows that the proportion of a given level of total advertising expenditure allocated to a given component, such as Joint advertising, can result in an increasing response up to a certain "turning" point. After that point, diminishing responses are obtained. The formulation of models designed to reflect this characteristic explicitly was deterred by two considerations. First, the data were limited by a lack of observations (especially where Joint advertising was greater than 80 percent of a low total budget and where Joint advertising was less than 20 percent of a high total budget). In addition, relatively few total observations, and hence degrees of freedom, were available at any of the total expenditure levels. It is possible, therefore, that the "turning point" lies within or close to the range of unobserved data and would not be properly estimated. Second, while desirable, it is not necessary to estimate precisely the response curves of applicants to the various advertising mixes for each level of total advertising expenditure. The interaction hypothesis can be <u>sufficiently</u> assessed by estimating the major segments of the response functions for which data are available.

Before the interaction hypothesis can be accepted (or rejected), it is necessary to establish (or reject) that enlistment response to the mix between Joint and Service-specific advertising is significantly different at the various levels of total advertising expenditure. Hence, monotonic models of enlistment response were estimated. In such models, the relationship between enlistment response and the percentage of Joint advertising is strictly increasing or strictly decreasing for the segment of the response curve being estimated.

In these models, a significantly positive coefficient estimate for the P (percentage Joint) term indicates that a positive relationship exists between the percentage of Joint advertising and the applicant response rate across the observations of the total level of advertising expenditures. Enlistment response increases as the percentage of Joint advertising increases for the observations modeled. Conversely, a significantly negative coefficient estimate for the P term indicates a negative relationship between the percentage of Joint advertising and the applicant response rate for the segment modeled. Because only major segments of (not the entire) response functions are modeled, enlistment response to the percentage of Joint advertising may change direction

Table 7.2

Annual Cross Sectional Models of DoD Applicant Rates At Different Total Budget Levels

Functional Form	Coefficient Estimates				Measure of Fit
$Y = a + b \log (P) + cR$	a		b	c	$\bar{R}^2$
Low Spending $T \leq 5.50$	1.63		.37*	2.30**	.40
High Spending $T \geq 7.01$	.87		-.51**	1.81**	.58
$Y = a + bP^2 + cP + dR$	a	b	c	d	$\bar{R}^2$
Medium Spending $5.50 < T < 7.01$	2.26	-3.03	2.67	.57**	.28

T = Total working media expenditures

Y = Total DoD applicants per 1000 17-21-year-old males

P = Proportion Joint advertising of total budget

R = Recruiter person-months

* - Statistic significant at 0.10 level.
** - Statistic significant at 0.05 level.

toward the end of or beyond the range of data observed (even given a statistically significant coefficient for the P term).

The results of the models of applicant response estimated for the high and low total advertising expenditure levels support the interaction hypothesis. As displayed in Table 7.2, a positive coefficient, significantly different from zero at the 0.10 level, is estimated for the percentage of Joint advertising at the low total advertising expenditure level for the segment of observations available. Similarly, a negative coefficient, significantly different from zero at the 0.05 level, is estimated for the percentage of Joint advertising at the high total advertising expenditure level. Clearly, these coefficient estimates differ from one another.

The significant positive relationship of applicant response to the percentage of Joint advertising at the low total advertising budget implies that the greatest response is obtained near the end of the observed range (about 80 percent Joint advertising). Similarly, the significant negative relationship of applicant response to the percentage of Joint advertising at the high total budget implies that the greatest response is obtained near the beginning of the observed range at this level of advertising (about 20 percent Joint advertising). Extrapolating these models beyond the range of the observed data is highly inappropriate. In particular, one should not conclude, based on these models, that the maximizing percentage of Joint advertising is zero at the high total expenditure level nor one hundred at the low level.

For the middle level of total advertising expenditures, an additional modeling step was undertaken. Few observations of the middle range of Joint advertising were available for this level of total advertising expenditures. Hence, a non-monotonic model was formulated to allow for a turning point to occur in the largely unobserved area. Coefficients estimated for the percentage of Joint advertising were not significantly different from zero for either the monotonic or non-monotonic model. The non-monotonic model did, however, provide an estimate of the turning point.

Key advantages of the basic modeling approach described here are that it permits the predictive validation steps reported in the following section. It also provides guidance for budget computations reviewed later in this chapter.

In summary, the hypothesis that the total level of advertising expenditures and the mix between Service-specific and Joint expenditures do not operate independently in affecting enlistment behavior has been tested. The effect, on the rate of applicants, of the percentage of total advertising expenditures allocated to Joint advertising was found to be:

- Positive and significantly different from zero at the low level of total expenditures
- Not significantly different from zero at the medium level of total expenditures
- Negative and significantly different from zero at the high level of total expenditures

The conclusion is that the total level of advertising expenditures and the mix between Joint and Service-specific expenditures do interact and do not operate independently in affecting enlistment behavior. Higher proportions of Joint advertising are effective at lower levels of total expenditures. Lower proportions of Joint advertising are appropriate at higher levels of total expenditures.

PREDICTIVE VALIDATION

The fitted models provide support for the hypothesis of interaction between the size of the advertising budget and its allocation between Joint and Service-specific programs. Much stronger support can be provided by a predictive test. Although any number of model formulations might fit a given set of data, for policy-making purposes, assurance is needed that any such model would also perform well on an independent data set. Such an independent data set could be gathered simultaneously with the given set and "held out" from the fitting procedure, or it might be obtained from a different time period. In this case, a holdout sample was not feasible because of limited numbers of ADIs available. Therefore, the second approach was adopted.

Ideally, 1983 data could be used to fit the models. Then using actual 1984 spending and recruiting resources in each ADI, the response could be forecast (e.g., total applicants, Army applicants) by ADI. In addition, the mean response by cell could be computed. Finally, it would be possible to determine whether differences between the means of one cell versus the control cell matched similar differences obtained using actual response (all other factors remaining comparable). Using models developed on 1984 data, responses in 1983 could be predicted, given actual 1983 spending and recruiting resources.

A departure from this idealized procedure in the predictive validation test was necessary. Indeed, very substantial differences existed between 1983 and 1984 actual responses that were unrelated to the advertising budget or its allocation. It was assumed that these differences in response were a result of economic and related factors as indicated in Chapter 2.

To compensate for these changes, the idealized procedure was modified as follows:

- First, 1983 advertising expenditures were inflated by 7 percent in order to make a 1983 advertising dollar equivalent to a 1984 advertising dollar. All further computations were conducted with these equivalent dollars.

- The ADIs were classified into three groups: low, medium, and high advertising expenditure rates.

- "Forecasts" of applicant response were made for each ADI for 1983 using the equivalent dollar expenditures on advertising and actual recruiter resource allocations. Let these be designated by F_{ij} where i is the ADI number, and j the type of response. For example, the predicted response for total applicants for the Philadelphia, PA ADI in 1983 might be 6 per 1,000 17 - 21-year-old males.

- Let G_{ij} denote the fitted value of the jth response in ADI i, using the 1984 data. For example, this might be 4 total applicants per 1,000 17-21-year-old males for the Philadelphia, PA ADI in 1984, basedon the fitted model.

- Similarly, let A_{ij} denote the actual value of the jth response in ADI i in 1983, and let B_{ij} denote the corresponding quantity in 1984. For example, these values for the Philadelphia, PA ADI might be 5 and 3.5 in 1983 and 1984, respectively.

- We calculated the average F_{ij}, G_{ij}, A_{ij}, and B_{ij} for each response j across the ADIs in each experimental cell. Let the means of these cells be denoted by F_{kj}, G_{kj}, A_{kj}, and B_{kj}, where k = Cell Yellow, Blue, Green and Red. The means of these cells are displayed in Table 7.3 for DoD total, DoD high school and senior applicants, Army total and Army high school and senior applicants. There is a generally close agreement between the fitted and actual cell means and a wide difference between forecast and actual 1983 cell means. These differences are not attributable to the experimental treatments.

To validate the model, two sets of changes from 1983 to 1984 were calculated, by cell and type of response based on:

- the model
- only the data

The changes based on the model do not reflect the impact of the economic variables whereas those based on the actual data do. Thus, the two sets of changes are not yet comparable. The difference in response between each cell and control for each set was computed. The assumption (based on the market-matching which used geographic and

Table 7.3

Actual Compared to Fitted and Forecast Applicant Rates for Selected Enlistment Group by Test Cell

	1984		1983		S_{kj}	R_{kj}
	Actual B_{kj}	Fitted G_{kj}	Actual A_{kj}	Forecast F_{kj}	$= \frac{B_{kj}}{A_{kj}}$	$= \frac{G_{kj}}{F_{kj}}$
DoD Total						
k						
Yellow	3.95	3.97	4.93	3.96	.801	1.000
Blue	4.06	4.11	4.81	3.91	.844	1.051
Green	3.81	3.77	4.76	4.05	.800	0.931
Red	3.96	3.94	4.97	3.96	.797	0.999
DoD HS/SR						
k						
Yellow	3.32	3.34	4.19	3.32	.792	1.006
Blue	3.38	3.43	4.06	3.29	.833	1.043
Green	3.22	3.17	4.01	3.40	.803	0.932
Red	3.39	3.36	4.16	3.32	.815	1.012
Army Total						
k						
Yellow	1.85	1.85	2.22	1.82	.833	1.016
Blue	1.88	1.92	2.11	1.74	.891	1.103
Green	1.72	1.68	2.16	1.82	.796	0.923
Red	1.78	1.78	2.21	1.78	.805	1.000
Army HS/SR						
k						
Yellow	1.44	1.43	1.74	1.40	.828	1.021
Blue	1.46	1.50	1.64	1.34	.890	1.119
Green	1.30	1.27	1.64	1.40	.793	0.907
Red	1.42	1.42	1.73	1.38	.821	1.029

HS/SR - high school and senior applicants

economic data) that the economic effect is equal in each cell was then made. These economic effects were removed from the changes based on actual data by calculating these differences. Thus, the cell differences obtained using changes based on the model and those based on actual data became comparable. As will be shown below, the two sets of numbers are extremely close both for total DoD responses and for Army responses, thus providing support for the model.

The ratios $R_{kj} = G_{kj} / F_{kj}$ were then computed. These are the proportional changes between 1983 and 1984 in the cells k = Yellow, Blue, Red and Green, for the various types of response j. These ratios can be expressed as percentages by multiplying them by 100.

An example of this ratio is

$R_{Yellow, Total Applicants} =$

$$\frac{\text{Model fit for 1984 Cell Yellow, Total Applicants}}{\text{Model forecast for 1983 Cell Yellow, Total Applicants}}$$

We then subtracted $R_{Yellow, j}$ from $R_{Blue, j}$, $R_{Red, j}$ and $R_{Green, j}$ in order to obtain the model based cell effects for response j. For convenience, let

$C_{kj} = R_{kj} - R_{Yellow\ j}$.

Thus

$C_{Yellow, Total Applicants} = 0$, and
$C_{Blue, Total Applicants} = R_{Blue, Total Applicants} - R_{Yellow, Total Applicants}$.

These quantities, for various types of responses, are displayed in Table 7.4.

A similar set of numbers was computed, using $S_{kj} = B_{kj} / A_{kj}$. The formula represents the proportional changes between 1983 and 1984 in the cells k = Yellow, Blue, Green and Red for the various types of response j. For example,

$S_{Yellow, Total Applicants}$

represents the ratio of actual response in 1984 Cell Yellow by total applicants to actual response in 1983 Cell Yellow by total applicants.

The quantities $D_{kj} = S_{kj} - S_{yellow, j}$ are defined to obtain the actual values of the cell effects. These quantities are also displayed in Table 7.4.

Table 7.4

Percentage Difference from the Control Cell in Applicant Rates across the Test Cells

	Total Applicants		HS/SR Applicants	
DoD				
	Predicted C_{kj}	Actual D_{kj}	Predicted C_{kj}	Actual D_{kj}
k				
Yellow	0%	0%	0%	0%
Blue	5.1%	4.3%	3.7%*	4.0%
Green	-7.0%	-.1%	-7.4%	1.1%
Red	-.1%	.4%	.6%	2.3%
ARMY				
	Predicted C_{kj}	Actual D_{kj}	Predicted C_{kj}	Actual D_{kj}
k				
Yellow	0%	0%	0%	0%
Blue	8.7%**	6.8%	9.8%**	6.2%
Green	-9.3%	-3.7%	-11.4%	-3.5%
Red	-1.6%	-2.8%	.8%	-.7%

HS/SR - high school and senior applicants
* Significantly different from control at the 0.10 level.
** Significantly different from control at the 0.05 level.

ADDITIONAL TESTING OF THE INTERACTION HYPOTHESIS

In order to provide additional support for the interaction hypothesis, and to obtain results that are as independent as possible of the specific formulation used, several other analyses of the experimental data were conducted. In a manner analogous to the analysis of the observed behavior measure, experimental markets were regrouped into cells defined by the two dimensions of interest (the recommended levels of Joint versus Service advertising). In addition, dummy variable regression models were fit to this data. Detailed results of several of these models are presented in Appendix H. These results also support the interaction hypothesis.

IMPLICATIONS OF ADDITIONAL ANALYSIS

Alternative implications to implementing the Cell Blue advertising expenditure level and mix on a national basis are warranted to the extent that the data and analytical tools available to derive them are sufficient. As discussed above, there are indeed limits to the density and uniformity of data available for the analyses discussed in this chapter. Consideration of policy and budget implications based on these analyses is appropriate because incremental system effectiveness is indicated by the results. In other words, policy actions based on the analyses discussed in this chapter indicate a level of system performance (measured by applicant rates) that is superior to either the current or direct implication policy. Given the limitations, however, the budget implications are expressed as ranges. The analyses indicate that several different mixes and levels of advertising expenditure can contribute relatively equally to fulfilling recruiting system requirements over a one-year period. Importantly, these different levels and mixes would entail different levels of advertising costs. Again, an adaptive approach to implementation is appropriate.

Specifically, the policy implications based on these analyses are:

- Reduce advertising working media spending to between \$4.35 and \$5.50 per 17-21-year-old male in 1984 dollars from the FY 1984 control level of \$7.00.

- Change the mix of advertising expenditures (working media) between Joint and Service-specific advertising to between 45% and 70% Joint from the FY 1984 control level mix of 17%.

- Reduce the FY 1987 DoD enlisted, active force advertising budget from the proposed \$154 million to between \$92 million and \$112 million. Reduce the FY 1987 total DoD advertising budget from the proposed \$242 million to between \$182 million and \$201 million.

- Increase the FY 1987 Joint advertising enlisted, active force (working media) budget from the proposed \$23.1 million to between \$35 million and \$42 million.

- Provide some markets (ADIs) at advertising levels that are both significantly higher and significantly lower than the levels implied by the above budgets.

- Continue research and analyses to understand better the relationship between specific measures of enlistment intentions and subsequent actual enlistment behavior.

These budgeting guidelines were obtained from the models fitted and described in this chapter. Because the models fit to the low-spending group and high spending group are monotonically increasing and decreasing with "p" (percentage Joint advertising), respectively, these models would suggest that "p" should be close to the observed highest and lowest values in the respective groups of markets. From the middle spending group (overall spending rate of between \$5.50 and \$7.00 per 17-21-year-old male with an average of \$6.25), to maximize total DoD applicants, "p" should be set at 41 percent. To maximize DoD high school diploma graduate and senior (HSDG + HS), total Army and Army HSDG plus HS, "p" should be set at 42 percent, 41 percent, and 44 percent, respectively. Selecting 42 percent as the value of "p" and applying it to the average spending rate for this group of markets yields a suggested spending rate for Joint advertising of about \$2.60 per capita. For the low-spending ADIs with a mean spending rate of \$4.34, this level of Joint spending translates to a value of "p" of about 60 percent. Response in these markets increases with "p," but the highest observed value of "p" is about 70 percent. Any possible decline in response toward the end of the observed range of "p" is unlikely to be detected by our model. Thus, a value of 60 percent for "p" seems plausible.

For the high-spending ADIs with a mean spending rate of \$7.98 per capita, the middle-spending group translates to a value of 30 percent for "p." Response in these markets decreases with "p," but the smallest value of "p" observed is about 20 percent. Thus, a 30-percent value seems plausible.

To summarize, point estimates of suggested "p" values were estimated for each of the three working media spending levels as follows:

High-Expenditure Level	30 Percent Joint
Medium-Expenditure Level	42 Percent Joint
Low-Expenditure Level	60 Percent Joint

Since no significant positive advertising effects were supported in any analysis for working media expenditures over \$5.50 per 17-21-year-old male, the low-expenditure level is recommended. In other words, the low-expenditure level of advertising is indicated because, over the period of the experiment, no additional response to advertising in excess of this expenditure level was evidenced. The level of working media per 17-21-year-old male was established at between \$4.34 (the mean of all low-expenditure level observations) and \$5.50 (the maximum of the low-expenditure category). The mix of working media was established at between 45 percent (near the suggested point estimate for the medium expenditure category) and 70 percent (the maximum of the low-expenditure observations).

Moving from per capita FY 1984 working media implications to actual FY 1987 dollar budget guidelines required several steps. Non-media costs, price inflation in advertising costs between 1984 and 1987, and non-test advertising elements had to be computed and added to a working media aggregate budget determined by multiplying the per capita spending amounts by 9,677,000 (the number of 17-21-year-old males in 1984). Non-media costs were interpolated from data provided in the advertising plans prepared by each advertiser in preparation for the experiment. These costs ranged from less than 8 percent of working media expenditures for Joint percent of working media expenditures for Joint advertising at its highest budget level to more than 39 percent of working media expenditures for Service-specific advertising at its lowest level of the recommended range. These costs were 11.2 percent of working media for Joint advertising at the control budget level in FY 1984 compared with 25.3 percent for the Services at the control budget level. These additional advertising program costs incurred by the Services were then included in the budget computations. Advertising price inflation was estimated at 10 percent per year, and non-test advertising costs were added directly back into budget totals where indicated (i.e., reserve and officer program advertising were added back into the recommended total DoD advertising budget levels). Table 8.1 in the next chapter presents the results of these calculations for selected budget combinations within the range of combinations implied by the analyses discussed in this chapter.

CHAPTER 8

SUMMARY AND RECOMMENDATIONS

Key aspects of the DoD Advertising Mix Test, its results and budget implications are described to consolidate the material of earlier chapters and to support the recommendations presented here.

The DoD Advertising Mix Test was an in-market test designed to generate quantitative data to help answer the following question: "What is the optimum mix of Joint/Service-specific recruitment advertising for achieving active, enlisted, non-prior Service (NPS) goals at different levels of total DoD recruitment advertising?"[5] This question was addressed with a field experiment to assure meaningful variance in the levels and mixes of advertising observed, statistical independence between advertising and enlistments in past periods (and other recruiting variables), and consistent measurement of recruiting system performance. These assurances are necessary to allow causal inferences to be drawn. The test was collaboratively designed and fielded to measure the effect of:

- Different levels of total DoD advertising budgets

- Different mixes of Service-specific and Joint advertising budgets

Hence, the test focused on aggregate budget levels. All allocation, media, and placement decisions were made and implemented by the military advertisers through the same decision and control processes now prevalent in military advertising practice.

The test involved four systematically different budgets. Each was implemented on a pro-rated basis in a test cell made up of television markets (ADIs) and identified by a color. The four test cells were matched as closely as possible to one another for past enlistment performance, levels of unemployment, youth propensity to enlist, and for racial, urban and geographic composition. The test budgets were implemented in the test cells for a period of one year. The experimental budget conditions were generally well implemented by the military advertisers and a comprehensive data set covering the experimental period was assembled and analyzed.

The analysis focused on providing managerially useful guidelines for DoD advertising budget policy based on assessments of efficiency and effectiveness criteria. Multiple measures of recruiting system performance were reviewed, collected and employed in the analysis. Consistency of results across measures and analysis methods was emphasized. The direction and order of magnitude of effective changes in budget policies were sought rather than precise and static decision rules.

RESULTS

As noted in Chapter 6, Cell Blue performed better than or at least as well as the other cells. Cell Blue, with the lowest overall advertising expenditure, did not adversely affect recruitment performance during the test year. In fact, Cell Blue performed significantly better than the other cells when measured by enlistment contract and applicant rates per unit of population.

[5]Korb, op. cit.

The fact that Cell Blue, with the smallest advertising budget, did better than the other cells, does not imply that advertising is ineffective for military recruiting. Indeed, changing shares of recruiting advertising allocated to the various Services could yield different responses. Recall that the shares of Service-specific advertising budgets were intentionally kept stable during the test period. Furthermore, only the level and mix of expenditures were varied. Advertising was not eliminated. Consequently, the overall effectiveness of advertising for military recruiting, beyond the levels and mixes tested, cannot be assessed.

The results of the experiment are sound for the military recruiting system as a whole and are also valid for the Army as well as for the other Services.

BUDGET IMPLICATIONS

The results of the experiment have budget implications in two ways. Based only on the experimental results, a national implementation of the Cell Blue budget levels is warranted on grounds of both efficiency and effectiveness. Any such implementation should be accompanied by a commitment to the notion that market response to the new budget levels should be tracked and tested further. Some markets should be maintained at alternative spending levels to determine the longer-term effects of the Cell Blue budget level. This alternative is referred to as the direct implications of the experiment. Its implementation would lead to a reduction in the FY 1987 DoD enlisted, active-force advertising budget from $154.3 million to $86.7 million. The total DoD advertising budget would decline from $242.9 million to $175.3 million. The Joint advertising component of these budgets would be maintained at $23.6 million, and $31.8 million respectively. Hence, the Joint advertising share of these budgets would increase.

Alternatively, budget implications based on the analyses presented in Chapter 7 indicate a superior level of system performance (measured by applicant rates) than either the direct implication policy or current budget policy. Based on these analyses, several different mixes and levels of advertising expenditures can contribute relatively equally to fulfilling recruiting system requirements. Depending on the particular combination of budget level and mix chosen, total advertising spending would fall while Joint advertising would increase. As Table 8.1 reflects, the FY 1987 DoD enlisted, active-force advertising budget would fall from $154.3 million to between $92.2 and $112.5 million. The total DoD advertising budget would fall from $242.9 million to between $181.3 and $201 million. Here, Joint advertising components of these budgets would rise substantially from $23.1 million to between $35 million and $41 million and from $31.3 million to between $43 and $50 million, respectively.

RECOMMENDATIONS

Two comments should be made regarding the spirit of the recommendations. First, no single experiment or research initiative over a fixed period of time provides adequate basis for asserting definitive, deterministic policy mandates in marketing. Rather, effective application of experimental results are achieved when testing is viewed as a vehicle that facilitates organized learning about the limits of existing marketing policies and about the feasibility of establishing better policies. The recommendations can best be viewed as suggestions for adaptive initiatives

Table 8.1

EXAMPLE FY 1987 BUDGET CURRENT AND PROPOSED LEVELS

Millions of Dollars

	Current	Proposed Levels		
		$4.35 Per Capita 70% Joint	$5.00 Per Capita 60% Joint	$5.50 Per Capita 45% Joint
Total DoD Advertising Budget	242.9	181.3	191.9	200.8
Joint	31.2	48.9	50.2	43.2
DoD Enlisted Active Force Advertising Budget	154.3	92.2	103.3	112.2
Joint	23.1	40.7	42.0	35.0
DoD NPS Enlisted Active Force Advertising Elements Tested	126.8	65.7	75.7	84.6
Joint	22.7	40.3	41.6	34.6

based on the results of the experiment. This implies an ongoing review and evaluation of these recommended initiatives.*

The second consideration concerns the fact that several DoD advertising budgets have been proposed and/or approved since the experiment

*The models and estimation methodology used in this study are consistent with those of previous research on factors affecting enlistment supply. However, more recent efforts suggest that recruiter behavior variables might be important in manpower supply models (Dertouzos, 1985; Carroll, Lee and Rao, 1986). Systematic changes in recruiter behavior can alter the quantity and quality of enlistments and can make estimating the impact of recruiting resources, including advertising, difficult. To the extent that changes in recruiter behavior are correlated with changes in advertising expenditures, the magnitude of the advertising effect may be underestimated.

For example, a sluggish economy or other external factors could produce a climate in which recruiters would have little trouble meeting monthly goals. In such a situation, increases in enlistment supply resulting from advertising may not result in observable increases in actual contracts. The advertising effect, in the absence of suitable recruiter motivation, may merely make it easier for recruiters to achieve their objectives. Thus, models which do not account for the level of recruiter effort may not capture the true advertising effect.

Accounting for such factors simultaneously for all four Services is a demanding task well beyond the scope of this study. Accordingly, any effects that recruiter behavior variables might have had on the findings of this experiment are unknown.

was initiated. The decisions made in this budgeting process contrast slightly with our recommendations.* More specifically, the DoD enlisted, active-force advertising budget has grown in real terms from the $108.7 million FY 1984 budget level to the proposed FY 1987 level of $154.3 million. At the same time, the proportion of the budget allocated to Joint advertising has decreased over this period from 16.9 percent to 15.2 percent. Although the results of the experiment firmly argue for budget levels moving toward those in Cell Blue (lower overall expenditure with a greater proportion allocated to Joint), exactly the opposite has occurred during the recent budget cycles.

With these considerations in mind, three recommendations based on the DoD Advertising Mix Test are provided:

1. Budget Policy - Reduce DoD recruitment advertising budgets while increasing the proportion of those budgets allocated to Joint advertising. Both the direct and alternate budget implications of the test

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*Application of Research Findings

In July 1986, the Deputy Secretary of Defense reviewed the findings of the DoD Advertising Mix Test. After full consideration of the findings and the recruiting environment, he decided to phase in reductions to total DoD advertising and to effect cost savings by reducing Service and slightly increasing the Joint advertising budgets. Specifically, the Deputy Secretary established a goal to achieve a 25-percent reduction in the total DoD advertising budget by FY 1991. Table 8.2 displays the target advertising budget levels for the Services and the Joint program for FYs 1988 through 1992.

Continuous monitoring of Service recruiting performance will be conducted to ensure that adequate resources are provided to support DoD recruiting efforts and that justifiable annual advertising budgets can be formulated and defended.

Table 8.2
DoD Recruitment Advertising Budgets
FY 1988 - FY 1992
(Current Year Dollars in Millions)

	FY 88	FY 89	FY 90	FY 91	FY 92
Army	124.8	120.2	114.6	108.1	110.6
Navy	36.2	25.7	24.3	22.6	23.1
Marine Corps	18.8	17.7	16.5	15.0	15.3
Air Force	23.3	22.8	22.1	21.2	21.9
Joint	33.5	35.0	36.4	37.7	38.6
TOTAL	236.6	221.5	213.9	204.6	209.5

lead to this conclusion. While the level and mix of advertising spending represented in Cell Blue produced the best recruiting system performance of the spending plans tested in the experiment, Cell Blue does not represent the best or optimum mix at that level of total spending to maximize recruiting system performance. The analyses in Chapter 7 indicate that a higher level of recruiting system performance can be achieved by taking into account the effect on recruiting of the observed interaction between the total advertising budget level and its associated mix of Joint and Service-specific advertising.

Table 8.1, for example, depicts budgets which take into account this interaction effect in establishing the appropriate mix of Joint and Service-specific advertising at alternative total spending levels. The analysis in Chapter 7 that served to quantify this interaction effect also reinforces the conclusion derived from analyses of the test cell's spending plans that overall advertising budgets are too large and that, as the total budget is reduced, a corresponding increase in the proportion allocated to Joint advertising is clearly warranted.

2. Market Testing - Provide some markets with advertising budget levels both significantly higher and lower than the levels recommended here. This allows systematic learning about the adaptation of the system to the new budget levels and about any longer-term impacts of the recommended budget levels.

3. Research - Considerable resources will continue to be invested in recruitment advertising. The effectiveness of these investments should continue to be assessed. More specifically, continued research to understand better the relationship between advertising expenditures and enlistment intentions as well as between measures of enlistment intentions and actual enlistment behavior is recommended.

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APPENDICES

Appendix A	Korb Memo FY84 Advertising Mix Test Concept Design
Appendix B	Rand Letter Methodology for Assigning Markets to Test Cells
Appendix C	*The FY 1984 Advertising Mix Test: Review of Planned Advertising Expenditures* (September 1984)
Appendix D	Chavarrie Memo Data Collection for Advertising Mix Test
Appendix E	*The FY 1984 Advertising Mix Test: A Criterion for Evaluating Advertising Policies* (September 1984)
Appendix F	Testing for Significance: A "Difference of Differences" Estimator
Appendix G	Statistical Models Used to Test the Relationship Between Enlistment behavior and Advertising
Appendix H	Regression Analysis Graphs of Dummy Variables
Appendix I	DoD Advertising Mix Expenditures by ADI (FY 1984) Original Design
Appendix J	FY83 and FY84 Cell Means Original and Modified
Appendix K	P.E.P. Systems, Inc. Documentation of Media Allocation Methodology

APPENDIX A

KORB MEMO
FY84 ADVERTISING MIX TEST CONCEPT DESIGN

APPENDIX A

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

MANPOWER,
RESERVE AFFAIRS
AND LOGISTICS

8 JUL 1983

MEMORANDUM FOR THE ASSISTANT SECRETARY OF THE ARMY (M&RA)
ASSISTANT SECRETARY OF THE NAVY (M&RA)
ASSISTANT SECRETARY OF THE AIR FORCE (MRA&I)

SUBJECT: FY84 Advertising Mix Test Concept Design

Attached (Tab A) is the approved concept design for the Advertising Mix Test which begins October 1, 1983. As the discussion of the issues at Tab B shows, we generally agreed with your comments and recommendations on the draft test design which we staffed in May of this year.

I want to thank you and your staffs for the continued effort, cooperation and comments on this important project.

Larry Korb

Lawrence J. Korb
Assistant Secretary of Defense
(Manpower, Reserve Affairs & Logistics)

Attachment

ADVERTISING TEST CONCEPT DESIGN

I. BACKGROUND

For the past few years, Congress has been concerned with the level of DoD recruitment advertising expenditures. The Secretary of Defense has posed legitimate management questions as to the cost effectiveness of the mix of Joint Service and Service-specific advertising. Since the Department of Defense does not have a methodology which relates and quantifies the effect of varying levels of advertising to actual enlistments, responding to these policy questions has been difficult.

In FY 1981, the Congressional Budget Office (CBO) recommended significant increases in the Joint Recruiting Advertising Program (JRAP) with concurrent reductions in Service-specific advertising and a net overall savings. The Secretary of Defense approved the CBO concept of increasing the Joint Service advertising program but not at the amounts suggested by the CBO. His guidance was to double the size of the Joint Service program in FY 1982 while reducing the Service-specific and net DoD advertising costs.

Quite properly, the individual Services are concerned that cutbacks in Service-specific advertising will adversely affect their ability to meet recruitment goals and to sustain the gains made in quality in the last two years. They believe that Joint advertising's role is one of "corporate" or umbrella advertising which complements the main thrust of the "product" advertising of the individual Services.

During the summer of FY 1981, the Secretary of Defense continued the dialogue about the proper Service-specific/Joint Service advertising mix and the most appropriate total advertising program levels. After much discussion, the Secretary decided to hold the advertising mix and total funding at current levels, and to conduct a major field test to determine the most appropriate levels and mix of advertising funding.

An outside contractor was retained in September 1982 to design an in-market test which would generate quantitative data to help answer the question: "What is the optimum mix of Joint/Service-specific recruitment advertising for achieving Active Enlisted NPS goals at different levels of total DoD recruitment advertising?" The test would, therefore, entail testing two variables simultaneously:

a. The level of the total DoD Active Enlisted NPS Recruitment Advertising budget -- which includes both Joint and Service-specific advertising; and

b. The mix of Joint and Service-specific advertising within each total advertising expenditure level.

In particular, the test would assess the hypothesis that the same recruitment effectiveness can be achieved by increasing the Joint budget significantly while decreasing the overall DoD Active Enlisted NPS Recruitment advertising budget.

It is also expected that such a test would develop information which would provide a better understanding of the relationships among recruitment advertising and awareness of the individual Services and the benefits they offer; attitudes toward the Services; and various measures of recruitment success, including applicants, contracts, and accessions.

An initial experimental design was developed in the Fall of 1982 which consisted of nine cells. While conceptually sound, this design was judged to be too complex, costly and disruptive to the recruitment programs. Based on this conclusion, a four-cell test design was suggested which was scientifically sound and operationally acceptable to the Services. Specific information about the four-cell test design is presented in this paper.

II. METHODOLOGY CONSIDERATIONS AND ASSUMPTIONS

Six considerations and assumptions were taken into account in designing the test.

A. Definition of Variables to be Tested

As designed this test is concerned only with the Active Enlisted Non-Prior Service recruitment advertising. Further, it is concerned solely with the media advertising funds as reported to Congress. A substantial amount of the total advertising budget is for recruiting Reserves, medical scholarship programs, officers and ROTC scholarship programs. Moreover, there are a number of support advertising programs included in the advertising budget such as: lead fulfillment, sales promotion, market research, and print material and literature. When these programs are excluded from the total budget, the Active Enlisted Non-Prior Service Recruitment Advertising expenditures for FY 1982 constituted only $83.5 million of the total $155 million. The Service expenditures for Active Enlisted Non-Prior Service advertising is shown in Table 1.

Table 1

FY 1982(Actual) Advertising Allocations
($ in Thousands)

Army	-	$45,412
Navy	-	9,953
Marines	-	8,000
Air Force	-	4,305
Subtotal Service-Specific	-	$67,670
Joint	-	15,831
Total	-	$83,501

Accordingly, these FY 1982 figures will be the base expenditures and the base mix around which total expenditures and the Joint/Service-specific mix can be varied. Fund allocation for each Service is based on the percentage spent by that service of the total actual FY 1982 advertising funds without adjustment for inflation.

B. Representativeness and Control of Test from Effects of Extraneous Variables

In order for the test to be valid, DoD specified that each cell in the test must be representative of the total U.S. Further, the design and control of the test has to insure that extraneous variables will not confound the results.

In addition to advertising, there are many variables which affect recruitment success. Included in this list of variables are: the size of the population, Service enlistment rates, minority population, unemployment rates, propensity to enlist, geographic regions and the size of the market.

The test must be balanced so that the influence of these variables is controlled; that is, they affect each group of test markets equally. Under these conditions, the only independent variable which will be different from one group of test markets to another will be the total Active Enlisted NPS advertising level and the Joint/Service-specific mix. Therefore, any differences observed in the recruitment process would be attributable to the advertising expenditure level or Joint/Service-specific mix and not to other variables.

A basic requirement is that each group of test markets be representative of the recruitment conditions found throughout the country. In effect, each group of test markets will be a microcosm of the U.S. At the same time, each group of markets must be independent from a media point of view, so that advertising placed in one group of markets does not spill over into any other group of test markets to any significant degree.

Perhaps more importantly, a country the size of the U.S. is not homogeneous. Thus, to pick a group that represents the heterogeneity, i.e., the tremendous variation from place to place, of the country, a sufficient number of markets must be chosen to offset the nonhomogeneity characteristics.

C. Time Span of the Test to Cover Cyclical Recruitment Environments

It is generally agreed that it takes time for advertising to work. Although it may begin to work immediately, its effects are not apparent or measureable for at least several months. Its full effects are not felt for perhaps as long as one to two years.

Therefore, the test must be operative for a long enough period of time to permit the full effects of advertising to have impact.

Another factor which affects both the duration of the test and the criteria of evaluation is the economic environment. In periods of high unemployment, recruitment is easier, particularly among the 17-22 age group. During such times, economic motivations become the dominant factor and could easily obscure the effects of advertising. If the economic environment remained at a constant level (i.e., high unemployment) throughout the test period, it may not be possible to measure any effects of variations in expenditures levels and/or advertising mix, at least not in behavioral terms (i.e., applicants, contracts or accessions).

This has implications for the test design that must be taken into consideration:

The test must be staged long enough to anticipate changes in the economic environment from a high unemployment to a low unemployment situation to permit the varying effects of advertising to be observed. Accordingly, OSD will decide in Spring 84 whether to extend the test for an additional year.

Both the attitudinal and behavioral criteria should be included in the test in order to measure the full effects of advertising.

D. Relevance of Test Measurements

A number of measurements are available:

Applicants. (individuals who have taken the production ASVAB)

Contracts.

Accessions. (special emphasis on CAT 1-111A High School Graduates)

Awareness and propensity. (of military-aged youth population)

The ability of these measurements to vary with respect to changes in advertising level and Joint/Service-specific mix may depend upon the specific recruitment environment.

Needless to say, for the test to be relevant and meaningful, the yardsticks by which the results are assessed should be related to the recruitment process. Every attempt must be made to continue to identify/develop new, cost-effective measures.

E. Potential Impairment of Service Recruitment Results

It is important that the test not unduly interfere with the individual Services achieving their overall recruiting goals.

The test entails decreasing the amount of Service-specific advertising expenditures in some of the test markets. There is obviously some risk involved in this procedure since advertising may be the key element in maintaining Service awareness and propensity to enlist. Awareness and propensity to enlist could decay over time with continued low levels of advertising. This is particularly critical based on the extent to which awareness and propensity to enlist are related to applications and contracts.

Again this has two implications for the test design:

The allocation of Service-specific funds, on the downside, in the test markets must be made in such a way as to entail as little risk as possible to the Services' long term awareness and propensity to enlist.

The duration of the test must allow for obtaining measurable results, as well as minimizing the risk of decay in Service awareness over the long term.

In essence, what DoD is seeking is a test design whereby the results of the in-market test would not only be valid but also projectable to the total United States in all types of recruiting environments, while not impairing the Services' ability to meet recruitment goals.

F. Service participation cooperation and sharing of information/data

For the advertising test to succeed, it is very important that the Services cooperate and remain actively involved in its planning and execution. In addition, increased data/information will be required according to a pre-agreed schedule on programs, expenditures, recruiting results and plans. It is essential that the test data requirements and data delivery schedule be coordinated very early in the planning process. (See Section IIIC). These data requirements will be specified by DoD prior to the start of the test.

It is assumed that the operation of the test will be overseen by a cross-service steering committee (with OSD at the chair) and a technical working group. There will also be a cross-service policy liaison working group to help monitor/assess the test program and findings.

III. DESCRIPTION OF THE IN-MARKET TEST DESIGN

A. Test Design

The test will consist of four cells (a control cell, with a special subset, and three test cells) which collectively cover the entire United States. The basic geographical unit in the test will be the 210 Areas of Dominant Influence (ADIs). ADIs are groups of counties that are mutually exclusive and that jointly make up all the continential United States. ADIs are designated by the Arbition Company according to predominant local televison viewing patterns. As such there is a wealth of demographic and socio-economic data collected at the ADI level of detail.

The control cell (Cell White) consists of 76% of the military-aged youth population of the country. In this cell, which includes the two largest ADIs--New York and Los Angeles--the advertising levels will mirror those in effect in FY 1982. Thus, for the control cell the national rate of $83.5 million in total military advertising will be simulated. This breaks down to a national rate of $15.8 million for Joint and $67.7 million for Service-specific advertising. The total annual advertising funds for the control cell will, of course, be lower than the $83.5 million rate expanded nationwide. In fact, the actual funding will be 76% of the national level of $83.5 million or $63.5 million for Cell White.

The by-service allocation for this cell is shown in Table 2.

Table 2

Annual Advertising Funding for the Control Cell Based on Actual FY 82 dollars
($ in Thousands)

	National Rate	Actual Cell Funding
Army	$45,412	$34,513
Navy	9,953	7,564
Marine Corps	8,000	6,080
Air Force	4,305	3,272
Joint	15,831	12,032
Total	$83,501	$63,461

The second test cell (Cell Blue) consists of 8% of the country or 14 ADIs. This cell will include the current national rate of Joint advertising ($15.8 million) and a greatly reduced Service-specific level (a $14.7 million national rate). The actual funds for this cell are $1.27 million for Joint and $1.17 million for Service or a total cost of $2.4 million for the cell. The Service-specific amount is based on the FY 1982 national rate of local advertising which was viewed as the minimum level for having a service program. The by-Service amounts for this cell are shown below in Table 3.

Table 3

Annual Advertising Funding for Test Cell Blue (FY 82 dollars)
($ in Thousands)

	National Rate	Actual Funding
Army	$ 7,139	$ 571
Navy	2,535	203
Marine Corps	2,721	218
Air Force	2,317	185
Joint	15,831	1,266
Total	$30,543	$ 2,443

The third test cell (Cell Green) which is composed of 8% of the nation and 10 ADIs consists of a much-decreased Joint advertising level ($4M national rate) and a Service-specific nation rate equal to FY 1982 levels ($67.7M). The actual costs for this cell are $.3 million for Joint and $5.4 million for Service or a total cost of $5.7 million for the cell. The allocation for this cell follows:

Table 4

Annual Advertising Funding for Test Cell Green (FY 82 dollars)
($ in Thousands)

	National Rate	Actual Funding
Army	$45,412	$ 3,633
Navy	9,953	796
Marine Corps	8,000	640
Air Force	4,305	344
Joint	4,000	320
Total	$71,670	$ 5,733

The fourth test cell (Cell Red) consists of a much larger Joint advertising program and a reduced Service-specific total. This test cell, which again represents 8% of the nation and 18 ADI's, provides for a national rate of $40M for Joint advertising and combined Service specific advertising levels of $14.7 million. The actual total funding for this cell is $3.2 million for Joint and $1.2 million for the combined Service-specific. The rationale for the Service-specific levels in this cell are the same as those in test Cell Blue. The $40 million Joint level is based on a previously used, although not uniformly accepted, formula which compares the increases needed in Joint components for the prescripted decreases in the Service-specific program. The allocation among the Services follows:

Table 5

Annual Advertising Funding for Test Cell Red (FY 82 dollars)
($ in Thousands)

	National Rate	Actual Funding
Army	$ 7,139	$ 571
Navy	2,535	203
Marine Corps	2,721	218
Air Force	2,317	185
Joint	40,000	3,200
Total	$54,712	4,377

A summary of the test funding by Service is shown in the following table:

Table 6

Summary Test Cost by Services and Cell*
($ in Millions)

National Rate	Control Cell	Test Cell Blue	Test Cell Green	Test Cell Red	
Army	$45.4	$ 7.1	$45.4	$ 7.1	
Navy	10.0	2.5	10.0	2.5	
Marine Corps	8.0	2.7	8.0	2.7	
Air Force	4.3	2.3	4.3	2.3	
Joint	15.8	15.8	4.0	40.0	
Total	$83.5	$30.5	$71.7	$54.7	
Actual Funding					**Total Prog**
Army	$34.5	$ .6	$ 3.6	$ .6	$39.3
Navy	7.6	.2	.8	.2	8.8
Marine Corps	6.1	.2	.6	.2	7.2
Air Force	3.3	.2	.3	.2	4.0
Joint	12.0	1.3	.3	3.2	16.8
Total	$63.5	$ 2.4	$ 5.7	$ 4.4	$76.0

* Numbers may not total due to rounding

A summary of the test design is provided in the following two charts. Chart A shows the national rates for Joint and Service-specific (in lower left corner of each cell), the percent of the country in the cell and the number of ADIs in the cell. Additionally, Chart B displays simulated as well as actual allocations per cell for Joint vs Service-specific advertising.

The proposed allocation of ADIs among the cells is shown in Chart C. The design was created by randomized assignment of ADIs to the test programs, subject to constraints stipulating that the means of the variables be closely matched across the four test cells. This is the best balance of ADIs on the variable of propensity.

ADVERTISING TEST

Note: In each of the four cells, the Joint and Service-specific amounts are simulated advertising expenditures and not actual expenditures.

CONTROL CELL CELL White (76% of the nation) 168 ADIs JOINT — SAME SERVICE SPECIFIC — SAME (CURRENT) Joint $15.8M/Service Specific $67.7M	CELL Blue (8% of nation) 14 ADIs SAME JOINT LOWER SERVICE SPECIFIC Joint $15.8M/Service Specific $14.7M
CELL Green (8% of the nation) 10 ADIs LOWER JOINT CURRENT SERVICE SPECIFIC Joint $4m/Service Specific $67.7M	CELL Red (8% of the nation) 18 ADIs HIGHER JOINT LOWER SERVICE SPECIFIC Joint $40m/Service Specific $14.7M

CHART A

ADVERTISING TEST

CONTROL CELL

CELL White (76% of the nation)

JOINT -- AS DESIRED (CURRENT)

SERVICE SPECIFIC -- SAME (CURRENT)
($ in Millions)

	Joint	Service	Total
Simulated	$15.8	$67.7	$83.5
Actual	$12.0	$51.4	$63.4

CELL Blue (8% of nation)

SAME JOINT

LOWER SERVICE SPECIFIC
($ in Millions)

	Joint	Service	Total
Simulated	$15.8	$14.7	$30.5
Actual	$ 1.3	$ 1.2	$ 2.4

CELL Green (8% of the nation)

LOWER JOINT

CURRENT SERVICE SPECIFIC
($ in Millions)

	Joint	Service	Total
Simulated	$ 4.0	$67.7	$71.7
Actual	$ .3	$ 5.4	$ 5.7

CELL Red (8% of the nation)

HIGHER JOINT

LOWER SERVICE SPECIFIC
($ in Millions)

	Joint	Service	Total
Simulated	$40.0	$14.7	$54.7
Actual	$ 3.2	$ 1.2	$ 4.4

CHART B

ADVERTISING MIX TEST DESIGN

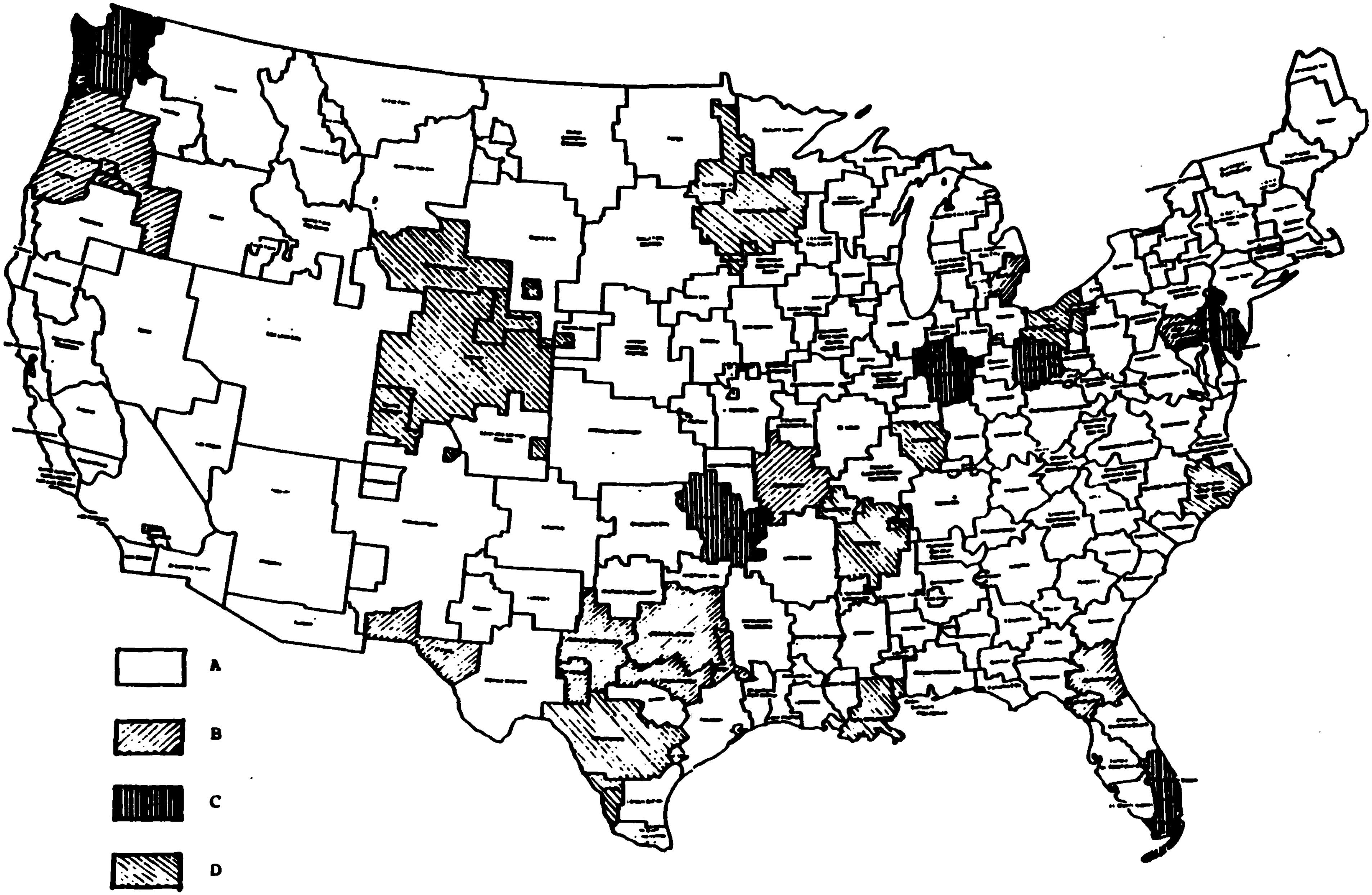

Chart C

B. <u>Test Measurements</u>

The three pre-identified measures of effectiveness by which this test will be evaluated are:

Change in propensity levels, awareness and attitudes.

The change in the number of applicants.

The change in the number of contracts.

Information on applicants and contracts is available from records maintained by the Services. Propensity, awareness and attitudes are available from YATS, although somewhat limited due to current sample sizes.

It is generally agreed that additional attitudinal measures would greatly enhance the test measurement. However, the cost of gathering this information at required levels of statistical precision is very high. Thus, further trade-off analysis and thought are necessary. If feasible, this additional attitudinal information will have to be collected in FY 1984 in a special survey of applicants.

All measurements will be studied in aggregated and disaggregated form so as to make sure that quality goals are properly assessed.

C. <u>Data and Planning Requirements</u>

The test requires the preparation of an advertising plan for each cell by each of the Services. In other words, each Service must prepare four advertising plans. The only constraint on these plans is that no major creative strategy changes should be made for the duration of the test, although specific executions can be changed. Similarly, an advertising plan must be prepared for using Joint advertising funds in each cell in as optimum a manner as possible.

A large number of phenomena other than advertising will be observed in treatment markets during the course of the experimental intervention. Some will have significant effects on recruitment performance and must be explicitly considered in the analysis of the experiment. These must be specified, collected, validated and disagregated.

A detailed data plan including the data definition, formats, frequencies and other specifications will be staffed prior to the beginning of the test. It is envisioned that data to be reported will include, but not be limited to:

1. <u>By Market</u> (by ADI)

    Youth population

    Segmentation (male, female, minority, quality, etc.)

    Household income

    Incidences of military installations

    Economic and employment conditions

    Recruitment goals

    Historical recruitment performance

    Projected recruitment performance (test period)

    DEP posture

2. <u>Resources</u> (by Cell)

    Production recruiter strength (manning)

    Advertising expenditures by mode, by month (national, local, etc.)

    Advertising expenditures by medium, by month

    Impressions by mode

    Impressions by medium

3. Performance (by Cell)

   Measured awareness

   Attitude shifts

   Prospect leads

4. Activity (by Cell)

   Applicants

   Contracts

Finally, certain monitoring mechanisms will be required for the duration of the test with regard to advertising and recruitment activity related to the experimental intervention to ensure validity and unambiguity. Monitoring mechanisms and tolerances such as total advertising expenditures and delivery, (including such items as reserve and officer programs expenditures), recruitment goaling and production activity, production recruiter strength and manning, recruiter production incentive plans, broad recruitment policy and other policy constraints must be specified prior to the beginning of test. Without monitoring mechanisms it would be difficult to analyze the specific effects of advertising.

DoD is committed to ensuring adherence to agreed controls. All participants in the experimental intervention will monitor their units, activities and commercial advertising agencies for compliance and will report excursions and magnitudes to the designated DoD point-of-contact as they occur. DoD will access the impact of these items and arbitrate as required.

D. Timetable

The test will begin in October 1983 and last for 12 months with an additional 12 month period if necessary. To accomplish this start date the following milestones are required and must be met.

Approval of test concept design	July 1983
Detailed plan of data/information/Controls (draft)	July 1983
Development of Service & Joint test plans (by test cell)	August 1983
Base line data collection/ attitudinal information	September 1983
Test begins	October 1983

Appendix A

Balancing the ADIs

Table

1. Advertising Mix Test Cells
2. Balancing Variables
3. Summary of Design
4. List of ADIs
   - Cell White
   - Cell Blue
   - Cell Green
   - Cell Red

Table 1

ADVERTISING MIX TEST CELLS

		Advertising ($Million per Year)[a]		
Cell	Program	Joint Advertising	Service-Specific Advertising	Percent of Nation in Cell
White	Control (FY82 Advertising Level)	15.8	67.7	76
Blue	Reduced Service Advertising	15.8	14.7	8
Green	Reduced Joint Advertising	4	67.7	8
Red	Increased Joint Advertising	40	14.7	8

[a]Expenditure rate necessary for a nation-wide program. During the test, this rate will be pro-rated to the size of population in the test cell.

Table 2

BALANCING VARIABLES
Advertising Mix Test Design

Variable Name	Abbreviation	Definition	Source
Size of Population	SIZE*	Number of males age 17-21 in the area, 1982	DMDC estimate from Census data
Enlistment Rates			
Army	ARMY	Number of male high-quality enlistments (high school diploma graduates and seniors with AFQT scores of 50 or above), calendar year 1982, as a percent of 1982 male population age 17-21	DMDC data from MEPCOM ARS system
Navy	NAVY		
Air Force	AF		
Marine Corps	MC		
DoD	DOD		
Nonwhite Population	NONW	Black and Hispanic males age 17-21, as a percent of total male population age 17-21, 1982	Census
Unemployment Rate	UNEM	Unemployment rate in manufacturing, all ages, calendar 1982	Bureau of Labor Statistics, county file
Propensity to Enlist	PROP	Percent of area survey respondents who reported positive propensity to enlist ("definite" or "probable" intention)	1982 Youth Attitude Tracking Study, MEPS level data
Geographic Region		Percent of 1982 area population (males 17-21) living in each major geographic region	Census
Northeast	NE		
West	W		
South	S		
Market Size	TOP 12	Percent of area 1982 population (males 17-21) living in one of the 12 most populous ADIs (which make up one-third of the U.S. population)	Census

*Cells are not actually balanced on this variable. It is used to define the size of the test cell and as an element in computation of the other variables.

Table 3

SUMMARY OF DESIGN

		ENLISTMENT RATES[b]								REGIONS[f]			
CELL	SIZE[a]	ARMY	NAVY	AF	MC	DOD	NONW[c]	UNEM[d]	PROP[e]	NE	W	S	TOP 12[g]
Option 3													
B	7.52	0.629	0.505	0.337	0.207	1.679	19.1	10.1	36.9	7	16	44	53
C	8.02	0.597	0.548	0.332	0.229	1.706	17.4	9.7	33.9	35	17	25	35
D	7.90	0.608	0.512	0.364	0.232	1.716	17.1	9.7	38.3	0	17	35	39
A	76.55	0.604	0.481	0.351	0.214	1.650	19.7	9.8	35.3	22	21	33	32

[a] SIZE = Percent of U.S. population in the cell.

[b] ENLISTMENT RATES = Number of high-quality enlistments per 100 males 17-21 years old in the population.

[c] NONW = Percent nonwhite.

[d] UNEM = Unemployment rate.

[e] PROP = Percent with positive propensity to enlist (1982 YATS Survey).

[f] REGIONS = Percent of test cell population residing in the region (Northeast, West, South).

[g] TOP 12 = Percent of test cell population residing in one of the 12 largest markets.

SUMMARY OF ADVERTISING MIX TEST DESIGN

CELL	SIZE[a]	ENLISTMENT RATES[b] ARMY	NAVY	AF	MC	DOD	NONW[c]	UNEM[d]	PROP[e]	REGIONS[f] NE	W	S	TOP 12[g]
B	7.52	0.629	0.505	0.337	0.207	1.679	19.1	10.1	36.9	7	16	44	53
C	8.02	0.597	0.548	0.332	0.229	1.706	17.4	9.7	33.9	35	17	25	35
D	7.90	0.608	0.512	0.364	0.232	1.716	17.1	9.7	38.3	0	17	35	39
A1	15.87	0.607	0.481	0.343	0.209	1.641	19.4	9.6	37.9	7	29	36	26
A2	60.68	0.603	0.481	0.353	0.215	1.652	19.8	9.9	34.6	26	19	32	33

[a] SIZE = Percent of U.S. population in the cell.

[b] ENLISTMENT RATES = Number of high-quality enlistments per 100 males 17-21 years old in the population.

[c] NONW = Percent nonwhite.

[d] UNEM = Unemployment rate.

[e] PROP = Percent with positive propensity to enlist (1982 YATS Survey).

[f] REGIONS = Percent of test cell population residing in the region (Northeast, West, South).

[g] TOP 12 = Percent of test cell population residing in one of the 12 largest markets.

VERSIO 03 CELL SIZES = 6. 8. 8. 16. 76. SP. .-IN = 158 <<<<< WEIGHTED Z-STAR) BALANCE CRITERIA >>>>>
DESIGN ; CELL NUMBER 4

			ADI	WGT	NE	W	S	AMHOR	AVHCR	ARHCR	MPPOP	DOMCR	BLACK	UNEMP	SPAN	BONUS	PRCPA	L	M
4	92.	AL	ATLANTA	1.36	0.0	0.0	47.0	-21.6	-25.4	-50.9	-82.5	24.7	1314.0	93.1	75.4	0.0	171.1	0.0	47.0
4	128.	NY	BUFFALO	0.87	40.6	0.0	0.0	-7.1	-15.4	-16.1	-42.0	38.1	340.2	101.8	61.3	41.8	153.1	0.0	40.6
4	184.	NC	CHARLOTTE	0.72	0.0	0.0	32.7	-23.0	-19.5	-41.9	-52.7	12.9	764.4	73.5	37.8	0.0	124.1	0.0	32.2
4	200.	CA	CHICO-REDDING	0.15	0.0	19.1	0.0	-2.7	-6.7	-12.2	-21.3	16.9	20.0	52.9	136.1	1905.3	67.7	0.0	0.0
4	204.	IN	CINCINNATI	0.89	0.0	0.0	0.0	-5.0	-25.1	-31.6	-53.6	33.4	429.7	103.1	31.5	4168.9	161.1	0.0	47.4
4	240.	TX	CORPUS CHRISTI	0.23	0.0	0.0	15.5	-13.0	-18.5	-24.5	-31.7	1.1	69.1	30.2	941.1	1949.2	45.5	0.0	0.0
4	248.	IL	DAVENPORT-ROCK I	0.38	0.0	0.0	0.0	-2.8	-15.4	-24.6	-31.4	27.2	87.8	74.1	108.6	850.9	103.0	0.0	0.0
4	292.	CA	EUREKA	0.07	0.0	9.4	0.0	-6.1	-12.1	-9.5	-20.2	2.3	12.2	26.9	36.2	850.9	33.6	0.0	0.0
4	404.	TX	HOUSTON	1.72	0.0	0.0	47.4	-42.0	-44.3	-66.8	-80.7	2.3	828.5	81.2	912.7	21.0	166.7	42.4	0.0
4	408.	AL	HUNTSVILLE-DECAT	0.10	0.0	0.0	27.7	-8.5	-13.9	-25.5	-31.6	13.4	350.7	61.1	20.8	0.0	77.5	0.0	0.0
4	412.	ID	IDAHO FALLS-POCA	0.14	0.0	13.4	0.0	-11.1	-16.2	-10.7	-28.8	3.5	7.3	28.1	71.3	1337.9	48.1	0.0	0.0
4	440.	AR	JOPLIN-PITTSBURG	0.18	0.0	0.0	0.0	-2.0	-17.7	-22.1	-25.8	9.0	26.8	35.5	20.7	1265.5	55.5	0.0	0.0
4	444.	KS	KANSAS CITY	0.81	0.0	0.0	0.0	-14.0	-21.4	-40.5	-55.2	22.9	430.7	78.3	104.5	3781.5	132.1	0.0	37.8
4	456.	MN	LA CROSSE-EAU CL	0.20	0.0	0.0	0.0	-1.4	-14.6	-18.8	-27.0	14.8	4.9	45.5	7.9	0.0	69.1	0.0	0.0
4	472.	MS	LÁUREL-HATTIESBU	0.11	0.0	0.0	11.6	-7.7	-8.9	-17.9	-25.9	3.0	375.5	27.3	15.4	1157.6	42.5	0.0	0.0
4	480.	KY	LEXINGTON	0.37	0.0	0.0	22.3	-11.6	-26.5	-26.9	-36.1	7.4	123.4	50.5	27.4	2731.6	82.5	0.0	0.0
4	528.	GA	MACON	0.17	0.0	0.0	18.5	-6.5	-9.9	-10.7	-30.1	13.3	777.1	36.5	27.2	0.0	67.4	0.0	0.0
4	572.	WI	MILWAUKEE	0.86	0.0	0.0	0.0	-14.4	-31.3	-37.9	-47.2	21.8	405.0	89.5	127.2	0.0	159.0	0.0	37.9
4	662.	IL	PADUCAH-CAPE GIR	0.36	0.0	0.0	0.0	-8.9	-14.6	-22.3	-35.0	17.2	155.8	66.1	33.0	931.9	96.2	0.0	0.0
4	716.	NC	RALEIGH-DURHAM	0.74	0.0	0.0	34.4	-10.6	-29.5	-43.6	-54.1	17.2	1283.0	71.2	114.4	56.3	135.7	0.0	34.4
4	752.	CA	SACRAMENTO-STOCK	1.05	0.0	42.7	0.0	-22.0	-24.0	-32.2	-78.8	25.0	305.9	111.3	641.3	4258.7	153.2	0.0	42.7
4	756.	MO	ST. JOSEPH	0.05	0.0	0.0	0.0	-4.9	-3.7	-8.9	-18.3	5.5	24.9	20.4	16.1	938.1	32.8	0.0	0.0
4	764.	CA	SALINAS-MONTEREY	0.24	0.0	15.8	0.0	-14.1	-14.4	-22.7	-55.3	1.2	210.7	39.2	646.3	1581.1	56.2	0.0	0.0
4	788.	CA	SAN FRANCISCO	2.46	0.0	50.4	0.0	-50.7	-53.1	-83.2	-92.1	3.3	582.5	105.8	734.6	5041.8	179.3	50.4	0.0
4	816.	IA	SIOUX FALLS-PITC	0.24	0.0	0.0	0.0	-1.9	-19.2	-13.8	-28.8	17.2	7.7	36.6	6.1	0.0	79.3	0.0	0.0
4	856.	KS	TOPEKA	0.21	0.0	0.0	0.0	-15.4	-18.1	-19.9	-37.9	-0.7	207.7	24.8	90.5	1400.0	48.5	0.0	0.0
4	860.	AZ	TUCSON	0.34	0.0	23.6	0.0	-13.1	-17.2	-19.6	-36.5	12.7	125.6	54.4	658.0	0.0	82.5	0.0	0.0
4	886.	TX	VICTORIA	0.03	0.0	0.0	7.1	-9.9	-7.6	-6.5	-3.7	3.3	45.6	14.6	297.4	714.1	21.1	0.0	0.0
4	900.	WI	WAUSAU-RHINELAND	0.18	0.0	0.0	0.0	0.8	-13.6	-11.4	-19.4	19.6	3.4	50.2	15.6	0.0	62.5	0.0	0.0
4	924.	PA	WILKES BARRE-SCR	0.49	34.7	0.0	0.0	-6.1	-6.8	-21.4	-37.9	32.3	31.6	86.2	15.3	3474.2	124.6	0.0	0.0
4	936.	OR	YAKIMA	0.78	0.0	19.9	0.0	-4.2	-13.2	-14.4	-26.8	14.5	38.7	52.6	258.5	0.0	66.4	0.0	0.0
			Z* IN CELL ADI	15.87	2.4	6.3	8.2	-11.7	-18.6	-26.3	-46.4	14.8	301.4	58.8	703.0	1211.6	92.1	3.0	10.2
			NOT IN CELL ADI	84.13	3.9	3.8	9.0	-10.4	-15.6	-23.3	-36.4	13.5	291.7	53.8	152.6	630.9	84.4	3.5	6.7
			DIFFERENCE (ABS)		1.5	2.4	0.8	1.2	3.0	3.0	4.0	0.5	9.7	5.1	50.3	580.7	7.7	0.5	3.5
			Z-STAR GRAND MEAN		2.7	4.2	8.9	-10.6	-16.1	-23.8	-36.9	13.6	293.1	54.5	160.0	716.2	85.5	3.4	7.2
			PERCENT DIFFERENCE (ABS)		34.19	49.37	7.83	10.02	15.79	10.82	5.32	3.04	2.83	7.92	26.87	65.17	1.72	12.57	41.52

ADVERTISING MIX TEST

DESIGN
CELL A ($16M/$60M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NC	W	S	TOP 12
ALBANY, GA.	0.14	0.752	0.649	0.457	0.140	1.999	41.8	9.3	40.1	0	0	1	0
ALBANY-SCHENECTA	0.49	0.905	0.721	0.642	0.286	2.555	7.1	7.8	39.9	1	0	0	0
ALBUQUERQUE	0.48	0.515	0.567	0.429	0.164	1.675	29.0	11.1	32.1	0	1	0	0
ALEXANDRIA, LA.	0.14	0.217	0.164	0.209	0.045	0.635	31.2	13.2	43.3	0	0	1	0
ALPENA	0.02	1.933	1.482	1.031	0.193	4.639	1.0	20.2	34.2	0	0	0	0
AMARILLO	0.20	0.396	0.488	0.274	0.147	1.305	12.0	5.0	30.8	0	0	1	0
ANNISTON	0.06	0.860	0.842	0.215	0.108	2.025	18.4	14.8	38.5	0	0	1	0
ARDMORE-ADA	0.07	0.189	0.349	0.233	0.160	0.931	13.6	7.0	31.0	0	0	1	0
ATLANTA	1.36	0.632	0.582	0.288	0.173	1.675	29.3	7.3	38.1	0	0	1	0
AUGUSTA	0.24	0.617	0.582	0.285	0.134	1.618	49.6	10.0	57.1	0	0	1	0
AUSTIN, TEX.	0.38	0.311	0.267	0.246	0.081	0.905	19.5	4.3	19.3	0	0	1	0
BAKERSFIELD	0.18	0.497	0.370	0.312	0.191	1.370	24.7	12.5	31.7	0	1	0	0
BALTIMORE	1.05	0.644	0.470	0.341	0.240	1.695	31.9	10.0	44.0	0	0	1	0
BANGOR	0.14	1.019	1.106	0.740	0.249	3.114	1.3	9.3	39.8	1	0	0	0
BATON ROUGE	0.38	0.195	0.308	0.154	0.146	0.804	35.6	10.1	44.6	0	0	1	0
BEAUMONT-PORT AR	0.20	0.391	0.423	0.275	0.248	1.337	23.7	10.3	50.9	0	0	1	0
BILLING-HARDIN	0.10	0.510	0.717	0.369	0.261	1.857	7.2	6.7	35.8	0	1	0	0
BINGHAMTON	0.16	0.866	0.872	0.665	0.351	2.755	3.9	9.0	30.3	1	0	0	0
BIRMINGHAM	0.57	0.564	0.464	0.265	0.121	1.413	25.7	15.4	38.5	0	0	1	0
BLUEFIELD-BECKLE	0.17	0.977	0.356	0.473	0.276	2.083	6.4	15.8	41.7	0	0	1	0
BOISE	0.19	0.777	0.654	0.442	0.196	2.068	6.2	9.3	36.6	0	1	0	0
BOSTON	2.25	0.582	0.528	0.375	0.203	1.689	7.6	7.6	24.1	1	0	0	1
BOWLING GREEN	0.06	0.563	0.334	0.317	0.106	1.319	7.9	10.6	32.6	0	0	1	0
BRISTOL-KINGSTON	0.16	0.688	0.446	0.438	0.187	1.760	2.3	12.5	47.0	0	0	1	0
BUFFALO	0.67	0.840	0.685	0.673	0.356	2.553	10.8	12.3	43.9	1	0	0	0
BURLINGTON-PLATT	0.25	0.815	0.673	0.727	0.238	2.452	3.8	8.4	40.1	1	0	0	0
CEDAR RAPIDS-WAT	0.41	0.994	0.529	0.445	0.374	2.342	3.2	10.2	38.4	0	0	0	0
CHARLESTON, S.C.	0.24	0.558	0.689	0.292	0.131	1.670	45.1	10.1	58.5	0	0	1	0
CHARLESTON-HUNTI	0.62	0.729	0.333	0.392	0.212	1.666	3.3	14.0	40.9	0	0	1	0
CHARLOTTE	0.72	0.490	0.539	0.275	0.189	1.492	24.9	9.8	47.3	0	0	1	0

DESIGN
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
CHATTANOOGA	0.33	0.784	0.490	0.437	0.245	1.956	10.2	12.6	46.1	0	0	1	0
CHICAGO	3.74	0.482	0.291	0.274	0.239	1.286	27.2	11.0	31.4	0	0	0	1
CHICO-REDDING	0.15	0.869	0.702	0.528	0.328	2.427	6.9	16.0	35.0	0	1	0	0
CINCINNATI	0.85	0.890	0.550	0.475	0.283	2.198	10.8	11.3	44.5	0	0	0	0
CLARKSBURG-WESTO	0.08	0.485	0.396	0.524	0.332	1.738	1.3	13.4	41.0	0	0	1	0
COLORADO SPRINGS	0.28	0.792	0.624	0.609	0.202	2.227	20.0	9.3	33.1	0	1	0	0
COLUMBIA, S.C.	0.34	0.671	0.607	0.365	0.126	1.768	49.3	9.2	58.5	0	0	1	0
COLUMBIA-JEFFERS	0.17	0.510	0.407	0.339	0.129	1.393	5.9	7.6	40.5	0	0	0	0
COLUMBUS, GA.	0.29	0.299	0.303	0.116	0.091	0.809	40.4	10.3	38.3	0	0	1	0
COLUMBUS-TUPELO	0.18	0.249	0.365	0.139	0.116	0.869	30.5	11.7	38.9	0	0	1	0
CORPUS CHRISTI	0.23	0.433	0.304	0.205	0.129	1.071	17.5	7.0	19.3	0	0	1	0
DAVENPORT-ROCK I	0.38	0.906	0.583	0.424	0.334	2.248	5.3	13.4	36.4	0	0	0	0
DAYTON	0.58	1.194	0.662	0.655	0.344	2.854	12.8	12.2	43.6	0	0	0	0
DES MOINES	0.42	0.848	0.419	0.364	0.310	1.941	3.8	7.8	38.3	0	0	0	0
DOTHAN	0.11	0.845	0.427	0.275	0.142	1.690	24.9	11.5	38.5	0	0	1	0
DULUTH-SUPERIOR	0.20	0.932	0.852	0.699	0.514	2.997	3.3	15.6	31.1	0	0	0	0
EL CENTRO-YUMA	0.08	0.376	0.050	0.251	0.238	0.915	33.9	23.4	26.5	0	1	0	0
ELMIRA	0.09	1.507	1.359	0.742	0.537	4.145	3.1	11.5	36.3	1	0	0	0
ERIE	0.17	0.638	0.790	0.778	0.249	2.456	5.2	12.6	43.4	1	0	0	0
EUREKA	0.07	0.524	0.277	0.364	0.117	1.282	9.3	17.7	35.9	0	1	0	0
FARGO	0.27	0.780	0.303	0.435	0.252	1.770	2.9	6.4	32.6	0	0	0	0
FARMINGTON	0.04	0.515	0.400	0.515	0.314	1.744	39.5	11.1	30.8	0	1	0	0
FLINT-SAGINAW-BA	0.59	0.973	0.713	0.463	0.326	2.475	14.3	17.5	34.2	0	0	0	0
FLORENCE, S.C.	0.13	0.621	0.491	0.353	0.146	1.610	49.8	13.1	57.7	0	0	1	0
FT. MYERS-NAPLES	0.13	0.900	0.900	0.581	0.326	2.707	12.9	9.5	47.0	0	0	1	0
FT. WAYNE	0.28	0.830	0.636	0.374	0.374	2.213	7.0	12.9	52.1	0	0	0	0
FRESNO	0.50	0.481	0.330	0.344	0.129	1.284	26.6	13.5	38.6	0	1	0	0
GRAND RAPIDS-KAL	0.73	0.833	0.570	0.391	0.218	2.013	9.6	13.4	34.2	0	0	0	0
GREAT FALLS	0.08	0.894	0.868	0.544	0.272	2.579	10.4	8.2	36.4	0	1	0	0
GREEN BAY	0.44	1.024	0.653	0.553	0.349	2.579	2.6	11.2	17.7	0	0	0	0
GREENSBORO-WINST	0.52	0.630	0.485	0.317	0.189	1.621	25.7	9.3	47.7	0	0	1	0
GREENVILLE-SPART	0.64	0.696	0.518	0.246	0.181	1.640	19.7	11.1	54.1	0	0	1	0
GREENWOOD-GREENV	0.09	0.340	0.303	0.109	0.146	0.897	65.6	13.2	40.8	0	0	1	0

DESIGN
CELL A ($16M/$60M) (CONT.)

		ENLISTMENT RATES								REGIONS			
ADI	SIZE	ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	NE	W	S	TOP 12
HARRISONBURG	0.06	0.797	0.416	0.290	0.036	1.539	3.2	8.9	45.5	0	0	1	0
HARTFORD-NEW HAV	0.92	0.524	0.506	0.420	0.249	1.699	12.4	7.4	28.6	1	0	0	0
HELENA	0.02	0.907	0.907	0.623	0.397	2.833	3.2	7.5	36.4	0	1	0	0
HOUSTON	1.72	0.372	0.352	0.207	0.149	1.081	29.0	6.8	50.7	0	0	1	1
HUNTSVILLE-DECAT	0.30	0.686	0.543	0.326	0.249	1.804	16.3	14.8	30.5	0	0	1	0
IDAHO FALLS-POCA	0.14	0.436	0.298	0.451	0.116	1.302	5.6	8.2	36.4	0	1	0	0
JACKSON, MISS.	0.32	0.405	0.440	0.228	0.119	1.193	51.1	10.5	40.8	0	0	1	0
JOHNSTOWN-ALTOON	0.34	0.849	0.648	0.545	0.222	2.264	2.8	14.1	32.8	1	0	0	0
JOPLIN-PITTSBURG	0.18	0.889	0.354	0.273	0.174	1.690	4.0	8.0	33.6	0	0	0	0
KANSAS CITY	0.81	0.691	0.568	0.342	0.232	1.833	13.8	7.9	32.9	0	0	0	0
KNOXVILLE	0.47	0.632	0.397	0.412	0.171	1.613	5.6	12.3	47.6	0	0	1	0
LA CROSSE-EAU CL	0.20	0.934	0.487	0.396	0.264	2.081	1.4	9.5	31.2	0	0	0	0
LAFAYETTE, LA.	0.25	0.255	0.138	0.096	0.096	0.585	26.0	10.2	45.3	0	0	1	0
LAKE CHARLES	0.10	0.367	0.336	0.189	0.073	0.966	23.1	14.4	50.9	0	0	1	0
LANSING	0.32	0.691	0.362	0.349	0.287	1.689	12.2	13.4	34.2	0	0	0	0
LAS VEGAS	0.24	0.726	0.595	0.359	0.156	1.837	17.6	10.6	33.3	0	1	0	0
LAUREL-HATTIESBU	0.11	0.514	0.465	0.213	0.107	1.299	28.6	10.6	40.8	0	0	1	0
LEXINGTON	0.37	0.595	0.299	0.299	0.198	1.392	6.3	9.6	40.4	0	0	1	0
LIMA	0.05	0.978	0.848	0.783	0.217	2.826	12.8	14.2	38.8	0	0	0	0
LINCOLN-HASTINGS	0.30	0.660	0.384	0.328	0.242	1.614	3.0	4.8	28.2	0	0	0	0
LITTLE ROCK	0.49	0.572	0.547	0.295	0.136	1.550	21.5	10.3	37.3	0	0	1	0
LOS ANGELES	5.11	0.347	0.284	0.211	0.142	0.984	28.6	9.2	31.7	0	1	0	1
LOUISVILLE	0.65	0.842	0.531	0.351	0.248	1.972	12.2	12.1	41.1	0	0	1	0
LUBBOCK	0.21	0.314	0.300	0.203	0.164	0.981	17.9	5.2	30.8	0	0	1	0
MACON	0.17	0.704	0.585	0.561	0.197	2.046	43.5	7.2	38.1	0	0	1	0
MADISON	0.29	0.561	0.345	0.284	0.160	1.350	4.0	7.9	17.7	0	0	0	0
MARQUETTE	0.07	1.014	0.907	0.984	0.338	3.243	6.3	20.6	17.7	0	0	0	0
MCALLEN-BROWNSVI	0.25	0.396	0.164	0.211	0.173	0.945	18.8	16.0	19.3	0	0	1	0
MEDFORD	0.13	1.138	1.105	0.561	0.214	3.018	4.9	14.7	43.5	0	1	0	0
MERIDIAN	0.07	0.435	0.528	0.280	0.078	1.320	38.7	12.0	40.3	0	0	1	0
MILES CITY-GLEND	0.01	0.562	1.526	0.161	0.321	2.570	1.7	6.3	36.4	0	1	0	0
MILWAUKEE	0.84	0.683	0.438	0.368	0.288	1.777	12.7	10.6	17.7	0	0	0	0
MINOT-BISMARCK-D	0.17	0.550	0.284	0.248	0.139	1.221	7.8	6.4	33.0	0	0	0	0

DESIGN
CELL A (S16M/S60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
MISSOULA-BUTTE	0.16	0.597	0.703	0.650	0.219	2.168	3.6	10.7	36.4	0	1	0	0
MOBILE-PENSACOLA	0.53	0.772	0.606	0.381	0.232	1.991	25.7	11.1	39.2	0	0	1	0
MONROE-EL DORADO	0.22	0.339	0.278	0.165	0.122	0.904	31.5	12.7	42.3	0	0	1	0
MONTGOMERY	0.20	0.808	0.399	0.220	0.247	1.674	45.0	13.4	38.5	0	0	1	0
NASHVILLE	0.77	0.653	0.460	0.280	0.242	1.634	17.2	12.0	30.4	0	0	1	0
NEW YORK	7.04	0.354	0.441	0.245	0.199	1.239	27.6	8.4	23.2	1	0	0	1
NORFOLK-PORTSMOU	0.64	0.821	0.431	0.351	0.195	1.799	40.4	7.3	47.4	0	0	1	0
NORTH PLATTE	0.02	1.030	0.485	0.364	0.606	2.485	3.3	11.2	28.0	0	0	0	0
ODESSA-MIDLAND	0.15	0.456	0.512	0.210	0.133	1.311	17.9	6.0	40.7	0	0	1	0
OKLAHOMA CITY	0.64	0.343	0.282	0.248	0.119	0.992	13.1	4.8	31.0	0	0	1	0
OMAHA	0.40	0.756	0.460	0.560	0.426	2.202	8.0	6.7	27.9	0	0	0	0
ORLANDO-DAYTONA	0.61	0.899	0.884	0.664	0.291	2.738	16.7	7.9	38.5	0	0	1	0
OTTUMWA-KIRKSVIL	0.04	0.643	0.503	0.168	0.168	1.482	4.4	8.2	34.9	0	0	0	0
PADUCAH-CAPE GIR	0.36	0.712	0.570	0.426	0.224	1.933	7.2	12.6	39.9	0	0	0	0
PALM SPRINGS	0.30	0.388	0.343	0.374	0.168	1.273	20.3	12.8	31.7	0	1	0	0
PANAMA CITY	0.10	1.030	0.673	0.620	0.189	2.513	16.2	10.6	39.0	0	0	1	0
PARKERSBURG	0.04	1.024	0.683	1.024	0.735	3.467	1.4	12.0	38.8	0	0	1	0
PEORIA	0.27	0.602	0.606	0.269	0.375	1.852	7.6	12.7	32.2	0	0	0	0
PHOENIX	0.94	0.764	0.580	0.368	0.174	1.886	16.5	9.1	33.3	0	1	0	0
PITTSBURGH	1.36	0.625	0.597	0.424	0.287	1.933	7.0	13.0	41.4	1	0	0	0
PORTLAND-POLAND	0.36	1.124	0.781	0.766	0.303	2.974	1.8	7.6	39.8	1	0	0	0
PRESQUE ISLE	0.04	1.426	0.549	0.713	0.055	2.743	5.3	12.0	39.8	1	0	0	0
PROVIDENCE-NEW B	0.64	0.639	0.511	0.468	0.259	1.877	6.2	10.1	21.8	1	0	0	0
QUINCY-HANNIBAL	0.14	1.123	0.527	0.344	0.367	2.361	4.0	11.3	41.1	0	0	0	0
RALEIGH-DURHAM	0.74	0.736	0.424	0.281	0.208	1.648	40.4	7.9	50.9	0	0	1	0
RAPID CITY	0.13	0.566	0.395	0.380	0.240	1.581	10.8	5.5	34.1	0	0	0	0
RENO	0.16	0.490	0.549	0.430	0.152	1.621	9.3	8.9	34.8	0	1	0	0
RICHMOND	0.53	0.714	0.520	0.295	0.196	1.725	33.0	7.4	47.3	0	0	1	0
ROANOKE-LYNCHBUR	0.44	0.734	0.501	0.439	0.196	1.870	18.3	9.9	46.6	0	0	1	0
ROCHESTER, N.Y.	0.39	0.681	0.507	0.507	0.241	1.935	13.5	7.3	41.1	1	0	0	0
ROCHESTER-MASON	0.15	1.206	0.522	0.557	0.338	2.623	1.3	7.3	34.2	0	0	0	0
ROCKFORD	0.24	0.847	0.566	0.494	0.294	2.201	8.8	15.8	27.8	0	0	0	0
ROSWELL	0.07	0.471	0.581	0.220	0.094	1.365	16.1	5.8	42.5	0	1	0	0

DESIGN
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
SACRAMENTO-STOCK	1.05	0.597	0.570	0.471	0.158	1.797	19.7	13.5	36.0	0	1	0	0
ST. JOSEPH	0.05	0.591	0.673	0.388	0.143	1.795	3.8	8.8	32.9	0	0	0	0
ST. LOUIS	1.18	0.764	0.559	0.378	0.293	1.995	17.2	10.0	41.9	0	0	0	0
SALINAS-MONTEREY	0.24	0.411	0.402	0.238	0.030	1.082	30.9	11.9	35.0	0	1	0	0
SALISBURY	0.08	1.157	1.473	0.426	0.365	3.422	27.7	10.5	44.5	0	0	1	0
SALT LAKE CITY	0.85	0.392	0.189	0.256	0.141	0.977	5.9	8.0	30.7	0	1	0	0
SAN DIEGO	0.96	0.400	0.337	0.269	0.157	1.164	24.7	9.8	19.1	0	1	0	0
SAN FRANCISCO	2.46	0.366	0.349	0.192	0.161	1.068	27.1	8.2	35.0	0	1	0	1
SANTA BARBARA-SA	0.25	0.368	0.322	0.306	0.092	1.089	16.9	8.0	31.7	0	1	0	0
SARASOTA	0.06	0.894	0.715	0.590	0.340	2.539	9.5	7.5	31.3	0	0	1	0
SAVANNAH	0.26	0.451	0.416	0.255	0.098	1.221	40.3	7.8	55.1	0	0	1	0
SELMA	0.03	0.327	0.426	0.327	0.557	1.637	58.8	17.4	38.5	0	0	1	0
SHREVEPORT-TEXAR	0.51	0.331	0.399	0.309	0.129	1.168	29.8	9.7	42.7	0	0	1	0
SIOUX CITY	0.17	0.942	0.567	0.468	0.351	2.328	2.5	6.6	32.6	0	0	0	0
SIOUX FALLS-MITC	0.24	0.919	0.423	0.539	0.276	2.158	4.5	5.1	34.7	0	0	0	0
SOUTH BEND-ELKHA	0.33	0.803	0.547	0.299	0.283	1.932	9.7	11.8	34.7	0	0	0	0
SPOKANE	0.30	1.009	0.868	0.517	0.218	2.611	5.8	13.3	25.6	0	1	0	0
SPRINGFIELD, MAS	0.28	0.736	0.725	0.515	0.191	2.167	10.5	7.8	29.3	1	0	0	0
SPRINGFIELD-DECA	0.39	0.630	0.523	0.429	0.410	2.001	10.0	10.5	39.4	0	0	0	0
SYRACUSE	0.39	0.869	0.701	0.488	0.257	2.315	9.3	8.4	27.4	1	0	0	0
TALLAHASSEE	0.23	0.654	0.461	0.390	0.188	1.694	34.3	6.2	47.4	0	0	1	0
TAMPA-ST. PETERS	0.82	0.852	0.849	0.622	0.283	2.606	14.1	9.0	31.3	0	0	1	0
TERRE HAUTE	0.17	0.682	0.573	0.411	0.411	2.077	4.0	12.4	48.7	0	0	0	0
TOLEDO	0.49	0.698	0.702	0.422	0.364	2.186	9.7	13.1	47.9	0	0	0	0
TOPEKA	0.21	0.332	0.317	0.242	0.096	0.987	20.5	5.9	37.9	0	0	0	0
TRAVERSE CITY-CA	0.15	1.473	0.780	0.760	0.330	3.344	3.7	18.0	34.2	0	0	0	0
TUCSON	0.34	0.574	0.483	0.437	0.214	1.708	18.5	10.0	33.4	0	1	0	0
TUSCALOOSA	0.08	0.288	0.419	0.144	0.026	0.877	22.5	12.0	38.5	0	0	1	0
TWIN FALLS	0.03	0.865	0.328	0.447	0.060	1.699	3.6	8.4	36.6	0	1	0	0
UTICA	0.15	1.193	0.840	0.734	0.304	3.070	5.1	8.7	29.5	1	0	0	0
VICTORIA	0.03	0.249	0.343	0.405	0.592	1.589	18.4	7.8	19.3	0	0	1	0
WASHINGTON, D.C.	1.76	0.743	0.529	0.363	0.226	1.861	32.0	7.3	44.0	0	0	1	1
WATERTOWN-CARTHA	0.09	1.644	0.965	0.869	0.238	3.716	3.1	11.0	27.4	1	0	0	0

DESIGN
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
WAUSAU-RHINELAND	0.18	1.036	0.524	0.502	0.397	2.539	1.6	10.9	19.6	0	0	0	0
WHEELING-STEUBEN	0.18	0.957	0.757	0.440	0.241	2.395	3.4	15.1	41.4	0	0	0	0
WICHITA-HUTCHINS	0.47	0.546	0.361	0.217	0.204	1.327	8.1	6.6	32.8	0	0	0	0
WICHITA FALLS-LA	0.21	0.421	0.311	0.281	0.125	1.138	22.7	5.2	32.1	0	0	1	0
WILKES BARRE-SCR	0.49	0.839	0.822	0.540	0.336	2.537	1.6	12.0	36.1	1	0	0	0
WILMINGTON	0.20	0.696	0.665	0.348	0.094	1.804	38.4	12.3	52.7	0	0	1	0
YAKIMA	0.20	0.808	0.516	0.485	0.261	2.070	11.2	14.0	28.1	0	1	0	0
168 TOTAL, A CELL	76.55	0.604	0.481	0.351	0.214	1.650	19.7	9.8	35.3	22	21	33	32

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN
CELL B ($16M/$17M)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
ABILENE-SWEETWAT	0.12	0.315	0.454	0.218	0.114	1.101	14.6	4.8	33.2	0	0	1	0
BEND	0.03	1.335	0.850	0.769	0.121	3.076	1.9	15.1	45.0	0	1	0	0
DALLAS-FT. WORTH	1.80	0.331	0.322	0.206	0.118	0.976	20.0	5.9	34.0	0	0	1	1
DETROIT	2.20	0.807	0.483	0.350	0.249	1.888	24.9	15.4	34.2	0	0	0	1
EL PASO	0.31	0.545	0.552	0.396	0.143	1.636	38.8	10.8	42.5	0	0	1	0
EUGENE	0.22	0.782	0.801	0.672	0.176	2.431	4.6	13.4	45.0	0	1	0	0
GAINESVILLE	0.14	0.429	0.475	0.230	0.237	1.371	14.3	5.0	48.0	0	0	1	0
HARRISBURG-YORK-	0.53	0.751	0.733	0.392	0.335	2.211	7.1	8.4	26.3	1	0	0	0
JACKSONVILLE	0.45	0.757	0.729	0.406	0.355	2.247	23.8	7.5	48.0	0	0	1	0
PORTLAND, ORE.	0.94	0.820	0.681	0.452	0.207	2.161	6.7	10.8	44.8	0	1	0	0
SAN ANGELO	0.04	0.423	0.400	0.259	0.423	1.506	15.4	5.1	19.4	0	0	1	0
SPRINGFIELD, MO.	0.33	0.688	0.478	0.374	0.196	1.737	5.3	8.9	36.4	0	0	0	0
TYLER	0.11	0.401	0.508	0.264	0.186	1.358	25.6	7.3	39.9	0	0	1	0
WACO-TEMPLE	0.32	0.319	0.287	0.236	0.109	0.952	30.8	5.3	38.2	0	0	1	0
14 TOTAL, B CELL	7.52	0.629	0.505	0.337	0.207	1.679	19.1	10.1	36.9	7	16	44	53

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN
CELL C ($4M/$60M)

		ENLISTMENT RATES								REGIONS			
ADI	SIZE	ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	NE	W	S	TOP 12
COLUMBUS, OHIO	0.73	0.706	0.608	0.392	0.326	2.112	11.1	10.3	38.8	0	0	0	0
FT. SMITH	0.15	0.619	0.197	0.256	0.279	1.501	7.4	9.5	37.3	0	0	1	0
INDIANAPOLIS	0.97	0.882	0.726	0.383	0.312	2.302	11.4	11.7	52.8	0	0	0	0
LAFAYETTE, IND.	0.07	0.498	0.413	0.271	0.214	1.395	6.6	8.6	52.8	0	0	0	0
MIAMI	1.11	0.460	0.453	0.246	0.163	1.321	22.7	7.9	47.0	0	0	1	0
PHILADELPHIA	2.81	0.511	0.568	0.309	0.225	1.613	22.6	9.1	20.3	1	0	0	1
SEATTLE-TACOMA	1.38	0.638	0.481	0.411	0.210	1.740	12.1	11.5	31.7	0	1	0	0
TULSA	0.46	0.459	0.376	0.260	0.163	1.258	16.1	6.8	31.2	0	0	1	0
WEST PALM BEACH	0.32	0.554	0.652	0.341	0.210	1.757	19.6	9.8	47.0	0	0	1	0
ZANESVILLE	0.03	0.739	0.578	0.578	0.161	2.057	5.5	13.6	38.8	0	0	0	0
10 TOTAL, C CELL	8.02	0.597	0.548	0.332	0.229	1.706	17.4	9.7	33.9	35	17	25	35

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN
CELL D ($40M/$17M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
ALEXANDRIA, MINN	0.09	1.043	1.055	0.711	0.344	3.153	4.1	8.6	32.3	0	0	0	0
BILOXI-GULFPORT-	0.10	0.499	0.478	0.427	0.112	1.516	19.9	8.5	44.6	0	0	1	0
CASPER-RIVERTON	0.08	0.474	0.290	0.171	0.211	1.146	6.4	6.2	33.1	0	1	0	0
CHEYENNE	0.06	0.617	0.406	0.309	0.390	1.721	10.1	5.4	33.1	0	1	0	0
CLEVELAND	1.65	0.782	0.709	0.512	0.337	2.340	15.3	12.6	50.3	0	0	0	1
DENVER	1.18	0.532	0.423	0.249	0.171	1.376	12.0	6.8	33.1	0	1	0	0
EVANSVILLE	0.26	0.751	0.505	0.454	0.235	1.945	4.8	10.2	40.4	0	0	0	0
GRAND JUNCTION	0.05	0.592	0.769	0.631	0.375	2.367	4.8	10.3	33.1	0	1	0	0
GREENVILLE-NEW B	0.29	0.521	0.539	0.358	0.116	1.535	39.0	9.2	51.0	0	0	1	0
JACKSON, TENN.	0.05	0.393	0.742	0.371	0.175	1.681	25.6	12.3	37.0	0	0	1	0
JONESBORO	0.08	0.660	0.619	0.234	0.206	1.718	2.9	11.5	37.4	0	0	1	0
LAREDO	0.05	0.270	0.083	0.146	0.083	0.583	9.2	17.5	19.3	0	0	1	0
MANKATO	0.05	0.913	0.380	0.457	0.266	2.016	1.8	6.8	32.7	0	0	0	0
MEMPHIS	0.71	0.440	0.497	0.223	0.114	1.274	40.0	11.7	37.0	0	0	1	0
MINNEAPOLIS-ST.	1.45	0.795	0.423	0.372	0.313	1.902	4.4	6.9	31.7	0	0	0	1
NEW ORLEANS	0.80	0.242	0.279	0.171	0.115	0.807	33.1	10.4	44.7	0	0	1	0
SAN ANTONIO	0.68	0.444	0.474	0.433	0.173	1.525	19.6	7.5	19.3	0	0	1	0
YOUNGSTOWN	0.28	0.720	0.881	0.541	0.317	2.459	10.9	18.5	49.0	0	0	0	0
18 TOTAL, D CELL	7.90	0.608	0.512	0.364	0.232	1.716	17.1	9.7	38.3	0	17	35	39

Note: See accompanying list for variable definitions.

APPENDIX B

RAND LETTER
METHODOLOGY FOR ASSIGNING MARKETS TO TEST CELLS

APPENDIX B

Rand
SANTA MONICA, CA 90406

22 April 1983

Dr. G. Thomas Sicilia
Director of Accession Policy
Office, Assistant Secretary of
  Defense (Manpower, Reserve
  Affairs, and Logistics)
U.S. Department of Defense
Washington, DC 20301

Dear Tom:

Enclosed are documents detailing two design options for the DoD Advertising Mix test (Attachments 1 and 2). Both options were created using the methodology for experimental design which we developed for the Enlistment Bonus Test.

Table 1 outlines the basic assumptions under which we prepared the designs. We assume that the test will compare three new advertising programs with a control program. Each new program will be implemented in a "test cell" (a set of local areas) comprising 8 percent of the U.S. population. The control program will be implemented in the remaining areas, containing 76 percent of the population. In preparing design options, our purpose was to assign local areas to the four cells so as to balance the cells on factors that may affect enlistments. The factors we considered are defined in Table 2.

For advertising purposes, local areas are defined by Areas of Dominant Influence (ADIs), which are groups of counties that are mutually exclusive and that jointly include all of the continental United States. ADIs are designated by the Arbitron Company according to predominant local television viewing patterns. However, in some localities there is substantial "spill-in" of stations from other ADIs. For example, television stations from Boston spill into the Providence, Rhode Island ADI, accounting for an estimated 27 percent of the viewing hours in Providence. To minimize this spill-in, which would dilute the test programs' effects, we linked ADIs together in the assignment procedure whenever one of them accounted for more than 15 percent of viewing hours in another's market. Lists of the ADIs and the linkages are given in Attachments 3 and 4.

The designs were created by randomized assignment of ADIs to the test programs, subject to constraints stipulating that the means of certain variables be closely matched across the four test cells. As listed in

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Table 2, we imposed constraints on (1) enlistment rates for each of the four military services and DoD; (2) minority population; (3) unemployment rate; (4) propensity (intention) to enlist, as expressed in surveys; (5) geographic region; and (6) population in large, medium, and small sized ADIs. Among several designs randomly generated by our procedures, we selected the two with the best balance, considering the precision of the matching, the degree of geographic dispersion of the ADIs in each cell, and the effects of imbalances on the variances of statistical contrasts between the test cells. The statistical procedures are those outlined in our recent Note on experimental design for the bonus test.*

Table 3 shows a summary of the cell characteristics for each design. Both designs are fairly well matched on most of the balancing variables. We recommend Option 1 because it is better matched on enlistment rates and because it has better geographic dispersion across the nation.

If you need any more information about this, please let me know.

Best regards,

J. Michael Polich

J. Michael Polich

*S. James Press, *Using the PISE Criterion to Measure the Effects of Imbalance in the Analysis of Covariance*, The Rand Corporation, N-1890-MRAL, 1983.

JMP:lh

Enclosures: Tables 1-3
Attachment 1, Design Option 1
Attachment 2, Design Option 2
Attachment 3, List of ADIs
Attachment 4, Linkages of ADIs

cc: Capt. Louise Wilmot, Office of Accession Policy

Table 1

ADVERTISING MIX TEST CELLS

Cell	Program	Advertising ($Million per Year)[a] Joint Advertising	Service-Specific Advertising	Percent of Nation in Cell
A	Control (FY82 Advertising Level)	16	60	76
B	Reduced Service Advertising	16	17	8
C	Reduced Joint Advertising	4	60	8
D	Increased Joint Advertising	40	17	8

[a]Expenditure rate necessary for a nationwide program. During the test, this rate will be prorated to the size of population in the test cell.

Table 2

BALANCING VARIABLES
Advertising Mix Test Design

Variable Name	Abbreviation	Definition	Source
Size of Population	SIZE*	Number of males age 17-21 in the area, 1982	DMDC estimate from Census data
Enlistment Rates			
Army	ARMY	Number of male high-quality enlistments (high school diploma graduates and seniors with AFQT scores of 50 or above), calendar year 1982, as a percent of 1982 male population age 17-21	DMDC data from MEPCOM ARS system
Navy	NAVY		
Air Force	AF		
Marine Corps	MC		
DoD	DOD		
Nonwhite Population	NONW	Black and Hispanic males age 17-21, as a percent of total male population age 17-21, 1982	Census
Unemployment Rate	UNEM	Unemployment rate in manufacturing, all ages, calendar 1982	Bureau of Labor Statistics, county file
Propensity to Enlist	PROP	Percent of area survey respondents who reported positive propensity to enlist ("definite" or "probable" intention)	1982 Youth Attitude Tracking Study, MEPS level data
Geographic Region		Percent of 1982 area population (males 17-21) living in each major geographic region	Census
Northeast	NE		
West	W		
South	S		
Market Size	TOP 12	Percent of area 1982 population (males 17-21) living in one of the 12 most populous ADIs (which make up one-third of the U.S. population)	Census

*Cells are not actually balanced on this variable. It is used to define the size of the test cell and as an element in computation of the other variables.

Table 3

SUMMARY OF DESIGNS

		ENLISTMENT RATES[b]								REGIONS[f]			
CELL	SIZE[a]	ARMY	NAVY	AF	MC	DOD	NONW[c]	UNEM[d]	PROP[e]	NE	W	S	TOP 12[g]
Option 1													
B	7.90	0.603	0.475	0.349	0.226	1.653	16	9.6	40.9	15	16	47	22
C	7.89	0.599	0.513	0.349	0.214	1.675	17	9.5	31.2	36	17	23	36
D	7.51	0.579	0.509	0.369	0.209	1.667	16	9.9	40.8	3	16	46	46
A	76.70	0.609	0.488	0.348	0.216	1.661	20	9.9	34.9	21	21	32	34
Option 2													
B	8.02	0.608	0.533	0.341	0.217	1.699	19	9.6	34.3	35	32	23	35
C	8.40	0.619	0.529	0.324	0.205	1.677	19	10.1	41.3	6	17	45	21
D	8.46	0.615	0.503	0.360	0.210	1.689	16	9.9	37.2	7	15	45	0
A	75.11	0.602	0.481	0.352	0.218	1.653	20	9.8	34.8	21	20	32	39

[a] SIZE = Percent of U.S. population in the cell.

[b] ENLISTMENT RATES = Number of high-quality enlistments per 100 males 17-21 years old in the population.

[c] NONW = Percent nonwhite.

[d] UNEM = Unemployment rate.

[e] PROP = Percent with positive propensity to enlist (1982 YATS Survey).

[f] REGIONS = Percent of test cell population residing in the region (Northeast, West, South).

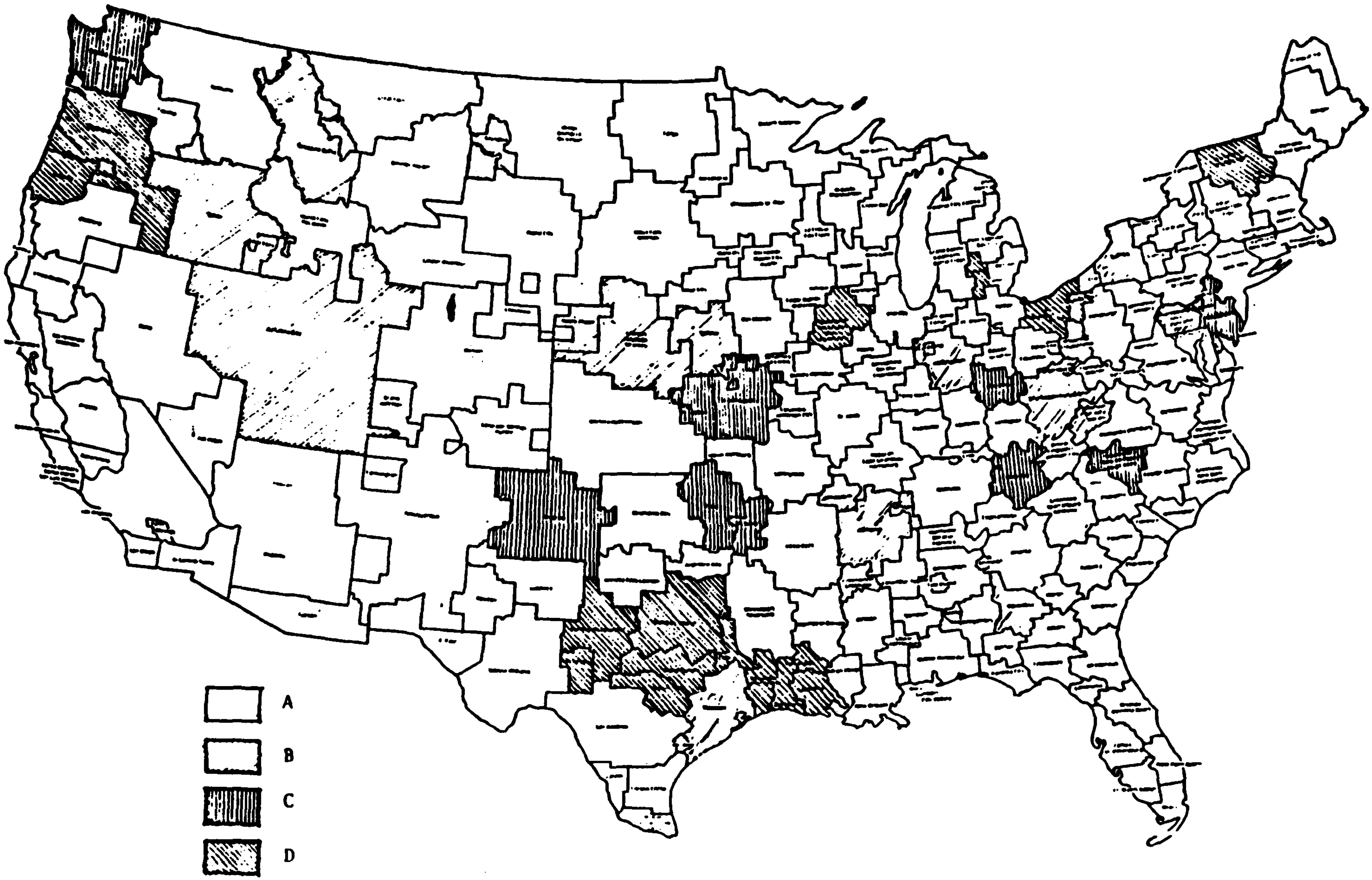
[g] TOP 12 = Percent of test cell population residing in one of the 12 largest markets.

Attachment 1

DESIGN OPTION 1

ADVERTISING MIX TEST DESIGN

OPTION 1



ADVERTISING MIX TEST

DESIGN OPTION 1
CELL B ($16M/$17M)

		ENLISTMENT RATES								REGIONS			
ADI	SIZE	ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	NE	W	S	TOP 12
BLUEFIELD-BECKLEY	0.17	0.977	0.356	0.473	0.276	2.083	6.4	15.8	41.7	0	0	1	0
BOISE	0.19	0.777	0.654	0.442	0.196	2.068	6.2	9.3	36.6	0	1	0	0
BUFFALO	0.67	0.840	0.685	0.673	0.356	2.553	10.8	12.3	43.9	1	0	0	0
CHARLESTON-HUNTI	0.62	0.729	0.333	0.392	0.212	1.666	3.3	14.0	40.9	0	0	1	0
COLUMBUS, GA.	0.29	0.299	0.303	0.116	0.091	0.809	40.4	10.3	38.3	0	0	1	0
HARRISBURG-YORK-	0.53	0.751	0.733	0.392	0.335	2.211	7.1	8.4	26.3	1	0	0	0
HELENA	0.02	0.907	0.907	0.623	0.397	2.833	3.2	7.5	36.4	0	1	0	0
HOUSTON	1.72	0.372	0.352	0.207	0.149	1.081	29.0	6.8	50.7	0	0	1	1
INDIANAPOLIS	0.97	0.882	0.726	0.383	0.312	2.302	11.4	11.7	52.8	0	0	0	0
JACKSON, TENN.	0.05	0.393	0.742	0.371	0.175	1.681	25.6	12.3	37.0	0	0	1	0
JONESBORO	0.08	0.660	0.619	0.234	0.206	1.718	2.9	11.5	37.4	0	0	1	0
LAFAYETTE, IND.	0.07	0.498	0.413	0.271	0.214	1.395	6.6	8.6	52.8	0	0	0	0
LINCOLN-HASTINGS	0.30	0.660	0.384	0.328	0.242	1.614	3.0	4.8	28.2	0	0	0	0
MEMPHIS	0.71	0.440	0.497	0.223	0.114	1.274	40.0	11.7	37.0	0	0	1	0
MILES CITY-GLEND	0.01	0.562	1.526	0.161	0.321	2.570	1.7	6.3	36.4	0	1	0	0
MISSOULA-BUTTE	0.16	0.597	0.703	0.650	0.219	2.168	3.6	10.7	36.4	0	1	0	0
NORTH PLATTE	0.02	1.030	0.485	0.364	0.606	2.485	3.3	11.2	28.0	0	0	0	0
OMAHA	0.40	0.756	0.460	0.560	0.426	2.202	8.0	6.7	27.9	0	0	0	0
PARKERSBURG	0.04	1.024	0.683	1.024	0.735	3.467	1.4	12.0	38.8	0	0	1	0
SALT LAKE CITY	0.85	0.392	0.189	0.256	0.141	0.977	5.9	8.0	30.7	0	1	0	0
TWIN FALLS	0.03	0.865	0.328	0.447	0.060	1.699	3.6	8.4	36.6	0	1	0	0
TOTAL, B CELL	7.90	0.603	0.475	0.349	0.226	1.653	16.3	9.6	40.9	15	16	47	22

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 1
CELL C ($4M/$60M)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
AMARILLO	0.20	0.396	0.488	0.274	0.147	1.305	12.0	5.0	30.8	0	0	1	0
CINCINNATI	0.85	0.890	0.550	0.475	0.283	2.198	10.8	11.3	44.5	0	0	0	0
FT. SMITH	0.15	0.619	0.397	0.256	0.229	1.501	7.4	9.5	37.3	0	0	1	0
GREENSBORO-WINST	0.52	0.630	0.485	0.317	0.189	1.621	25.7	9.3	47.7	0	0	1	0
KANSAS CITY	0.81	0.691	0.568	0.342	0.232	1.833	13.8	7.9	32.9	0	0	0	0
KNOXVILLE	0.47	0.632	0.397	0.412	0.171	1.613	5.6	12.3	47.6	0	0	1	0
PHILADELPHIA	2.81	0.511	0.568	0.309	0.225	1.613	22.6	9.1	20.3	1	0	0	1
ST. JOSEPH	0.05	0.591	0.673	0.388	0.143	1.795	3.8	8.8	32.9	0	0	0	0
SEATTLE-TACOMA	1.38	0.638	0.481	0.411	0.210	1.740	12.1	11.5	31.7	0	1	0	0
TOPEKA	0.21	0.332	0.317	0.242	0.096	0.987	20.5	5.9	32.9	0	0	0	0
TULSA	0.46	0.459	0.376	0.260	0.163	1.258	16.1	6.8	31.2	0	0	1	0
TOTAL, C CELL	7.89	0.599	0.513	0.349	0.214	1.675	16.7	9.5	31.2	36	17	23	36

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 1
CELL D ($40M/$17M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
ABILENE-SWEETWAT	0.12	0.315	0.454	0.218	0.114	1.101	14.6	4.8	33.2	0	0	1	0
ALEXANDRIA, LA.	0.14	0.217	0.164	0.209	0.045	0.635	31.2	13.2	43.3	0	0	1	0
AUSTIN, TEX.	0.38	0.311	0.267	0.246	0.081	0.905	19.5	4.3	19.3	0	0	1	0
BEAUMONT-PORT AR	0.20	0.391	0.423	0.275	0.248	1.337	23.7	10.3	50.9	0	0	1	0
BEND	0.03	1.335	0.850	0.769	0.121	3.076	1.9	15.1	45.0	0	1	0	0
BURLINGTON-PLATT	0.25	0.815	0.673	0.727	0.238	2.452	3.8	8.4	40.1	1	0	0	0
CLEVELAND	1.65	0.782	0.709	0.512	0.337	2.340	15.3	12.6	50.3	0	0	0	1
DALLAS-FT. WORTH	1.80	0.331	0.322	0.206	0.118	0.976	20.0	5.9	34.0	0	0	1	1
DAVENPORT-ROCK I	0.38	0.906	0.583	0.424	0.334	2.248	5.3	13.4	36.4	0	0	0	0
EUGENE	0.22	0.782	0.801	0.672	0.176	2.431	4.6	13.4	45.0	0	1	0	0
LAFAYETTE, LA.	0.25	0.255	0.138	0.096	0.096	0.585	26.0	10.2	45.3	0	0	1	0
LAKE CHARLES	0.10	0.367	0.336	0.189	0.073	0.966	23.1	14.4	50.9	0	0	1	0
LANSING	0.32	0.691	0.362	0.349	0.287	1.689	12.2	13.4	34.2	0	0	0	0
PORTLAND, ORE.	0.94	0.820	0.681	0.452	0.207	2.161	6.7	10.8	44.8	0	1	0	0
SAN ANGELO	0.04	0.423	0.400	0.259	0.423	1.506	15.4	5.1	19.4	0	0	1	0
TYLER	0.11	0.401	0.508	0.264	0.186	1.358	25.6	7.3	39.9	0	0	1	0
WACO-TEMPLE	0.32	0.319	0.287	0.236	0.109	0.952	30.8	5.3	38.2	0	0	1	0
YOUNGSTOWN	0.28	0.720	0.881	0.541	0.317	2.459	10.9	18.5	49.0	0	0	0	0
TOTAL, D CELL	7.51	0.579	0.509	0.369	0.209	1.667	15.8	9.9	40.8	3	16	46	46

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 1
CELL A ($16M/$60M)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
ALBANY, GA.	0.14	0.752	0.649	0.457	0.140	1.999	41.8	9.3	40.1	0	0	1	0
ALBANY-SCHENECTA	0.49	0.905	0.721	0.642	0.286	2.555	7.1	7.8	39.9	1	0	0	0
ALBUQUERQUE	0.48	0.515	0.567	0.429	0.164	1.675	29.0	11.1	32.1	0	1	0	0
ALEXANDRIA, MINN	0.09	1.043	1.055	0.711	0.344	3.153	4.1	8.6	32.3	0	0	0	0
ALPENA	0.02	1.933	1.482	1.031	0.193	4.639	1.0	20.2	34.2	0	0	0	0
ANNISTON	0.06	0.860	0.842	0.215	0.108	2.025	18.4	14.8	38.5	0	0	1	0
ARDMORE-ADA	0.07	0.189	0.349	0.233	0.160	0.931	13.6	7.0	31.0	0	0	1	0
ATLANTA	1.36	0.632	0.582	0.288	0.173	1.675	29.3	7.3	38.1	0	0	1	0
AUGUSTA	0.24	0.617	0.582	0.285	0.134	1.618	49.6	10.0	57.1	0	0	1	0
BAKERSFIELD	0.18	0.497	0.370	0.312	0.191	1.370	24.7	12.5	31.7	0	1	0	0
BALTIMORE	1.05	0.644	0.470	0.341	0.240	1.695	31.9	10.0	44.0	0	0	1	0
BANGOR	0.14	1.019	1.106	0.740	0.249	3.114	1.3	9.3	39.8	1	0	0	0
BATON ROUGE	0.38	0.195	0.308	0.154	0.146	0.804	35.6	10.1	44.6	0	0	1	0
BILLING-HARDIN	0.10	0.510	0.717	0.369	0.261	1.857	7.2	6.7	35.8	0	1	0	0
BILOXI-GULFPORT-	0.10	0.499	0.478	0.427	0.112	1.516	19.9	8.5	44.6	0	0	1	0
BINGHAMTON	0.16	0.866	0.872	0.665	0.351	2.755	3.9	9.0	30.3	1	0	0	0
BIRMINGHAM	0.57	0.564	0.464	0.265	0.121	1.413	25.7	15.4	38.5	0	0	1	0
BOSTON	2.25	0.582	0.528	0.375	0.203	1.689	7.6	7.6	24.1	1	0	0	1
BOWLING GREEN	0.06	0.563	0.334	0.317	0.106	1.319	7.9	10.6	32.6	0	0	1	0
BRISTOL-KINGSPOR	0.36	0.688	0.446	0.438	0.187	1.760	2.3	12.5	47.0	0	0	1	0
CASPER-RIVERTON	0.08	0.474	0.290	0.171	0.211	1.146	6.4	6.2	33.1	0	1	0	0
CEDAR RAPIDS-WAT	0.41	0.994	0.529	0.445	0.374	2.342	3.2	10.2	38.4	0	0	0	0
CHARLESTON, S.C.	0.24	0.558	0.689	0.292	0.131	1.670	45.1	10.1	58.5	0	0	1	0
CHARLOTTE	0.72	0.490	0.539	0.275	0.189	1.492	24.9	9.8	47.3	0	0	1	0
CHATTANOOGA	0.33	0.784	0.490	0.437	0.245	1.956	10.2	12.6	46.1	0	0	1	0
CHEYENNE	0.06	0.617	0.406	0.309	0.390	1.721	10.1	5.4	33.1	0	1	0	0
CHICAGO	3.74	0.482	0.291	0.274	0.239	1.286	27.2	11.0	31.4	0	0	0	1
CHICO-REDDING	0.15	0.869	0.702	0.528	0.328	2.427	6.9	16.0	35.0	0	1	0	0
CLARKSBURG-WESTO	0.08	0.485	0.396	0.524	0.332	1.738	1.3	13.4	41.0	0	0	1	0
COLORADO SPRINGS	0.28	0.792	0.624	0.609	0.202	2.227	20.0	9.3	33.1	0	1	0	0
COLUMBIA, S.C.	0.34	0.671	0.607	0.365	0.126	1.768	49.3	9.2	55.8	0	0	1	0

DESIGN OPTION 1
CELL A ($16M/$60M) (cont.)

		ENLISTMENT RATES								REGIONS			
ADI	SIZE	ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	NE	W	S	TOP 12
COLUMBIA-JEFFERS	0.17	0.518	0.407	0.339	0.129	1.393	5.9	7.6	40.5	0	0	0	0
COLUMBUS-TUPELO	0.18	0.249	0.365	0.139	0.116	0.869	30.5	11.7	38.9	0	0	1	0
COLUMBUS, OHIO	0.73	0.786	0.608	0.392	0.326	2.112	11.1	10.3	38.8	0	0	0	0
CORPUS CHRISTI	0.23	0.433	0.304	0.205	0.129	1.071	17.5	7.0	19.3	0	0	1	0
DAYTON	0.58	1.194	0.662	0.655	0.344	2.854	12.8	12.2	43.6	0	0	0	0
DENVER	1.18	0.532	0.423	0.249	0.171	1.376	12.0	6.8	33.1	0	1	0	0
DES MOINES	0.42	0.848	0.419	0.364	0.310	1.941	3.8	7.8	38.3	0	0	0	0
DETROIT	2.20	0.807	0.483	0.350	0.249	1.888	24.9	15.4	34.2	0	0	0	1
DOTHAN	0.11	0.845	0.427	0.275	0.142	1.690	24.9	11.5	38.5	0	0	1	0
DULUTH-SUPERIOR	0.20	0.932	0.852	0.699	0.514	2.997	3.3	15.6	31.1	0	0	0	0
EL CENTRO-YUMA	0.08	0.376	0.050	0.251	0.238	0.915	33.9	23.4	26.5	0	1	0	0
EL PASO	0.31	0.545	0.552	0.396	0.143	1.636	38.8	10.8	42.5	0	0	1	0
ELMIRA	0.09	1.507	1.359	0.742	0.537	4.145	3.1	11.5	36.3	1	0	0	0
ERIE	0.17	0.638	0.790	0.778	0.249	2.456	5.2	12.6	43.4	1	0	0	0
EUREKA	0.07	0.524	0.277	0.364	0.117	1.282	9.3	17.7	35.9	0	1	0	0
EVANSVILLE	0.26	0.751	0.505	0.454	0.235	1.945	4.8	10.2	40.4	0	0	0	0
FARGO	0.27	0.780	0.303	0.435	0.252	1.770	2.9	6.4	32.6	0	0	0	0
FARMINGTON	0.04	0.515	0.400	0.515	0.314	1.744	39.5	11.1	30.8	0	1	0	0
FLINT-SAGINAW-BA	0.59	0.973	0.713	0.463	0.326	2.475	14.3	17.5	34.2	0	0	0	0
FLORENCE, S.C.	0.13	0.621	0.491	0.353	0.146	1.610	49.8	13.1	57.7	0	0	1	0
FT. MYERS-NAPLES	0.13	0.900	0.900	0.581	0.326	2.707	12.9	9.5	47.0	0	0	1	0
FT. WAYNE	0.28	0.830	0.636	0.374	0.374	2.213	7.0	12.9	52.1	0	0	0	0
FRESNO	0.50	0.481	0.330	0.344	0.129	1.284	26.6	13.5	38.6	0	1	0	0
GAINESVILLE	0.14	0.429	0.475	0.230	0.237	1.371	14.3	5.0	48.0	0	0	1	0
GRAND JUNCTION	0.05	0.592	0.769	0.631	0.375	2.367	4.8	10.3	33.1	0	1	0	0
GRAND RAPIDS-KAL	0.73	0.833	0.570	0.391	0.218	2.013	9.6	13.4	34.2	0	0	0	0
GREAT FALLS	0.08	0.894	0.868	0.544	0.272	2.579	10.4	8.2	36.4	0	1	0	0
GREEN BAY	0.44	1.024	0.653	0.553	0.349	2.579	2.6	11.2	17.7	0	0	0	0
GREENVILLE-NEW B	0.29	0.521	0.539	0.358	0.116	1.535	39.0	9.2	51.0	0	0	1	0
GREENVILLE-SPART	0.64	0.696	0.518	0.246	0.181	1.640	19.7	11.1	54.1	0	0	1	0
GREENWOOD-GREENV	0.09	0.340	0.303	0.109	0.146	0.897	65.6	13.2	40.8	0	0	1	0
HARRISONBURG	0.06	0.797	0.416	0.290	0.036	1.539	3.2	8.9	45.5	0	0	1	0
HARTFORD-NEW HAV	0.92	0.524	0.506	0.420	0.249	1.699	12.4	7.4	28.6	1	0	0	0
HUNTSVILLE-DECAT	0.30	0.686	0.543	0.326	0.249	1.804	16.3	14.8	30.5	0	0	1	0

DESIGN OPTION 1
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
IDAHO FALLS-POCA	0.14	0.436	0.298	0.451	0.116	1.302	5.6	8.2	36.4	0	1	0	0
JACKSON, MISS.	0.32	0.405	0.440	0.228	0.119	1.193	51.1	10.5	40.8	0	0	1	0
JACKSONVILLE	0.45	0.757	0.729	0.406	0.355	2.247	23.8	7.5	48.0	0	0	1	0
JOHNSTOWN-ALTOON	0.34	0.849	0.648	0.545	0.222	2.264	2.8	14.1	32.8	1	0	0	0
JOPLIN-PITTSBURG	0.18	0.889	0.354	0.273	0.174	1.690	4.0	8.0	33.6	0	0	0	0
LA CROSSE-EAU CL	0.20	0.934	0.487	0.396	0.264	2.081	1.4	9.5	31.2	0	0	0	0
LAREDO	0.05	0.270	0.083	0.146	0.083	0.583	9.2	17.5	19.3	0	0	1	0
LAS VEGAS	0.24	0.726	0.595	0.359	0.156	1.837	17.6	10.6	33.3	0	1	0	0
LAUREL-HATTIESBU	0.11	0.514	0.465	0.213	0.107	1.299	28.6	10.6	40.8	0	0	1	0
LEXINGTON	0.37	0.595	0.299	0.299	0.198	1.392	6.3	9.6	40.4	0	0	1	0
LIMA	0.05	0.978	0.848	0.783	0.217	2.826	12.8	14.2	38.8	0	0	0	0
LITTLE ROCK	0.49	0.572	0.547	0.295	0.136	1.550	21.5	10.3	37.3	0	0	1	0
LOS ANGELES	5.11	0.347	0.284	0.211	0.142	0.984	28.6	9.2	31.7	0	1	0	1
LOUISVILLE	0.65	0.842	0.531	0.351	0.248	1.972	12.2	12.1	41.1	0	0	1	0
LUBBOCK	0.21	0.314	0.300	0.203	0.164	0.981	17.9	5.2	30.8	0	0	1	0
MACON	0.17	0.704	0.585	0.561	0.197	2.046	43.5	7.2	38.1	0	0	1	0
MADISON	0.29	0.561	0.345	0.284	0.160	1.350	4.0	7.9	17.7	0	0	0	0
MANKATO	0.05	0.913	0.380	0.457	0.266	2.016	1.8	6.8	32.7	0	0	0	0
MARQUETTE	0.07	1.014	0.907	0.984	0.338	3.243	6.3	20.6	17.7	0	0	0	0
MCALLEN-BROWNSVI	0.25	0.396	0.164	0.211	0.173	0.945	18.8	16.0	19.3	0	0	1	0
MEDFORD	0.13	1.138	1.105	0.561	0.214	3.018	4.9	14.7	43.5	0	1	0	0
MERIDIAN	0.07	0.435	0.528	0.280	0.078	1.320	38.7	12.0	40.3	0	0	1	0
MIAMI	1.11	0.460	0.453	0.246	0.163	1.321	22.7	7.9	47.0	0	0	1	0
MILWAUKEE	0.84	0.683	0.438	0.368	0.288	1.777	12.7	10.6	17.7	0	0	0	0
MINNEAPOLIS-ST.	1.45	0.795	0.423	0.372	0.313	1.902	4.4	6.9	31.7	0	0	0	1
MINOT-BISMARCK-D	0.17	0.550	0.284	0.248	0.139	1.221	7.8	6.4	33.0	0	0	0	0
MOBILE-PENSACOLA	0.51	0.772	0.606	0.381	0.232	1.991	25.7	11.1	39.2	0	0	1	0
MONROE-EL DORADO	0.22	0.339	0.278	0.165	0.122	0.904	31.5	12.7	42.3	0	0	1	0
MONTGOMERY	0.20	0.808	0.399	0.220	0.247	1.674	45.0	13.4	38.5	0	0	1	0
NASHVILLE	0.77	0.653	0.460	0.280	0.242	1.634	17.2	12.0	30.4	0	0	1	0
NEW ORLEANS	0.80	0.242	0.279	0.171	0.115	0.807	33.1	10.4	44.7	0	0	1	0
NEW YORK	7.04	0.354	0.443	0.245	0.199	1.239	27.6	8.4	23.2	1	0	0	1
NORFOLK-PORTSMOU	0.64	0.821	0.433	0.351	0.195	1.799	40.4	7.3	47.4	0	0	1	0
ODESSA-MIDLAND	0.15	0.456	0.512	0.210	0.133	1.311	17.9	6.0	40.7	0	0	1	0

DESIGN OPTION 1
CELL A ($16M/$6M) (cont.)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
OKLAHOMA CITY	0.64	0.343	0.282	0.248	0.119	0.992	13.1	4.8	31.0	0	0	1	0
ORLANDO-DAYTONA	0.61	0.899	0.884	0.664	0.291	2.738	16.7	7.9	38.5	0	0	1	0
OTTUMWA-KIRKSVIL	0.09	0.643	0.503	0.168	0.168	1.482	4.4	8.2	34.9	0	0	0	0
PADUCAH-CAPE GIR	0.36	0.712	0.570	0.426	0.224	1.933	7.2	12.6	39.9	0	0	0	0
PALM SPRINGS	0.30	0.388	0.343	0.374	0.168	1.273	20.3	12.8	31.7	0	1	0	0
PANAMA CITY	0.10	1.030	0.673	0.620	0.189	2.513	16.2	10.6	39.0	0	0	1	0
PEORIA	0.27	0.602	0.606	0.269	0.375	1.852	7.6	12.7	32.2	0	0	0	0
PHOENIX	0.94	0.764	0.580	0.368	0.174	1.886	16.5	9.1	33.3	0	1	0	0
PITTSBURGH	1.36	0.625	0.597	0.424	0.287	1.933	7.0	13.0	41.4	1	0	0	0
PORTLAND-POLAND	0.36	1.124	0.781	0.766	0.303	2.974	1.8	7.6	39.8	1	0	0	0
PRESQUE ISLE	0.04	1.426	0.549	0.713	0.055	2.743	5.3	12.0	39.8	1	0	0	0
PROVIDENCE-NEW B	0.64	0.639	0.511	0.468	0.259	1.877	6.2	10.1	21.8	1	0	0	0
QUINCY-HANNIBAL	0.14	1.123	0.527	0.344	0.367	2.361	4.0	11.3	41.1	0	0	0	0
RALEIGH-DURHAM	0.74	0.736	0.424	0.281	0.208	1.648	40.4	7.9	50.9	0	0	1	0
RAPID CITY	0.11	0.566	0.395	0.380	0.240	1.581	10.8	5.5	34.1	0	0	0	0
RENO	0.16	0.490	0.549	0.430	0.152	1.621	9.3	8.9	34.8	0	1	0	0
RICHMOND	0.53	0.714	0.520	0.295	0.196	1.725	33.0	7.4	47.3	0	0	1	0
ROANOKE-LYNCHBUR	0.44	0.734	0.501	0.439	0.196	1.870	18.3	9.9	46.6	0	0	1	0
ROCHESTER, N.Y.	0.39	0.681	0.507	0.507	0.261	1.935	13.5	7.3	41.1	1	0	0	0
ROCHESTER-MASON	0.15	1.206	0.522	0.557	0.338	2.623	1.3	7.3	34.2	0	0	0	0
ROCKFORD	0.24	0.847	0.566	0.494	0.294	2.201	8.8	15.8	27.8	0	0	0	0
ROSWELL	0.07	0.471	0.581	0.220	0.094	1.365	16.1	5.8	42.5	0	1	0	0
SACRAMENTO-STOCK	1.05	0.597	0.570	0.471	0.158	1.797	19.7	13.5	36.0	0	1	0	0
ST. LOUIS	1.18	0.764	0.559	0.378	0.293	1.995	17.2	10.0	41.9	0	0	0	0
SALINAS-MONTEREY	0.24	0.411	0.402	0.238	0.030	1.082	30.9	11.9	35.0	0	1	0	0
SALISBURY	0.08	1.157	1.473	0.426	0.365	3.422	27.7	10.5	44.5	0	0	1	0
SAN ANTONIO	0.68	0.444	0.474	0.433	0.173	1.525	19.6	7.5	19.3	0	0	1	0
SAN DIEGO	0.96	0.400	0.337	0.269	0.157	1.164	24.7	9.8	19.1	0	1	0	0
SAN FRANCISCO	2.46	0.366	0.349	0.192	0.161	1.068	27.1	8.2	35.0	0	1	0	1
SANTA BARBARA-SA	0.25	0.368	0.322	0.306	0.092	1.089	16.9	8.0	31.7	0	1	0	0
SARASOTA	0.06	0.894	0.715	0.590	0.340	2.539	9.5	7.5	31.3	0	0	1	0
SAVANNAH	0.26	0.451	0.416	0.255	0.098	1.221	40.3	7.8	55.1	0	0	1	0
SELMA	0.03	0.327	0.426	0.327	0.557	1.637	58.8	17.4	38.5	0	0	1	0
SHREVEPORT-TEXAR	0.51	0.331	0.399	0.309	0.129	1.168	29.8	9.7	42.7	0	0	1	0

DESIGN OPTION 1
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
SIOUX CITY	0.17	0.942	0.567	0.468	0.351	2.328	2.5	6.6	32.6	0	0	0	0
SIOUX FALLS-MITC	0.24	0.919	0.423	0.539	0.276	2.158	4.5	5.1	34.7	0	0	0	0
SOUTH BEND-ELKHA	0.33	0.803	0.547	0.299	0.283	1.932	9.7	11.8	34.7	0	0	0	0
SPOKANE	0.38	1.009	0.868	0.517	0.218	2.611	5.8	13.3	25.6	0	1	0	0
SPRINGFIELD, MAS	0.28	0.736	0.725	0.515	0.191	2.167	10.5	7.8	29.3	1	0	0	0
SPRINGFIELD, MO.	0.33	0.688	0.478	0.374	0.196	1.737	5.3	8.9	36.4	0	0	0	0
SPRINGFIELD-DECA	0.39	0.638	0.523	0.429	0.410	2.001	10.0	10.5	39.4	0	0	0	0
SYRACUSE	0.39	0.869	0.701	0.488	0.257	2.315	9.3	8.4	27.4	1	0	0	0
TALLAHASSEE	0.23	0.654	0.461	0.390	0.188	1.694	34.3	6.2	47.4	0	0	1	0
TAMPA-ST. PETERS	0.82	0.852	0.849	0.622	0.283	2.606	14.1	9.0	31.3	0	0	1	0
TERRE HAUTE	0.17	0.682	0.573	0.411	0.411	2.077	4.0	12.4	48.7	0	0	0	0
TOLEDO	0.49	0.698	0.702	0.422	0.364	2.186	9.7	13.1	47.9	0	0	0	0
TRAVERSE CITY-CA	0.15	1.473	0.780	0.760	0.330	3.344	3.7	18.0	34.2	0	0	0	0
TUCSON	0.34	0.574	0.483	0.437	0.214	1.708	18.5	10.0	33.4	0	1	0	0
TUSCALOOSA	0.08	0.288	0.419	0.144	0.026	0.877	22.5	12.0	38.5	0	0	1	0
UTICA	0.15	1.193	0.840	0.734	0.304	3.070	5.1	8.7	29.5	1	0	0	0
VICTORIA	0.03	0.249	0.343	0.405	0.592	1.589	18.4	7.8	19.3	0	0	1	0
WASHINGTON, D.C.	1.76	0.743	0.529	0.363	0.226	1.861	32.0	7.3	44.0	0	0	1	1
WATERTOWN-CARTHA	0.09	1.644	0.965	0.869	0.238	3.716	3.1	11.0	27.4	1	0	0	0
WAUSAU-RHINELAND	0.18	1.036	0.524	0.582	0.397	2.539	1.6	10.9	19.6	0	0	0	0
WEST PALM BEACH	0.32	0.554	0.652	0.341	0.210	1.757	19.6	9.8	47.0	0	0	1	0
WHEELING-STEUBEN	0.18	0.957	0.757	0.440	0.241	2.395	3.4	15.1	41.4	0	0	0	0
WICHITA-HUTCHINS	0.47	0.546	0.361	0.217	0.204	1.327	8.1	6.6	32.8	0	0	0	0
WICHITA FALLS-LA	0.21	0.421	0.311	0.281	0.125	1.138	22.7	5.2	32.1	0	0	1	0
WILKES BARRE-SCR	0.49	0.839	0.822	0.540	0.336	2.537	1.6	12.0	36.1	1	0	0	0
WILMINGTON	0.20	0.696	0.665	0.348	0.094	1.804	38.4	12.3	52.7	0	0	1	0
YAKIMA	0.20	0.808	0.516	0.485	0.261	2.070	11.2	14.0	28.1	0	1	0	0
ZANESVILLE	0.03	0.739	0.578	0.578	0.161	2.057	5.5	13.6	38.8	0	0	0	0
TOTAL, A CELL	76.70	0.609	0.488	0.348	0.216	1.661	20.2	9.9	34.9	21	21	32	34

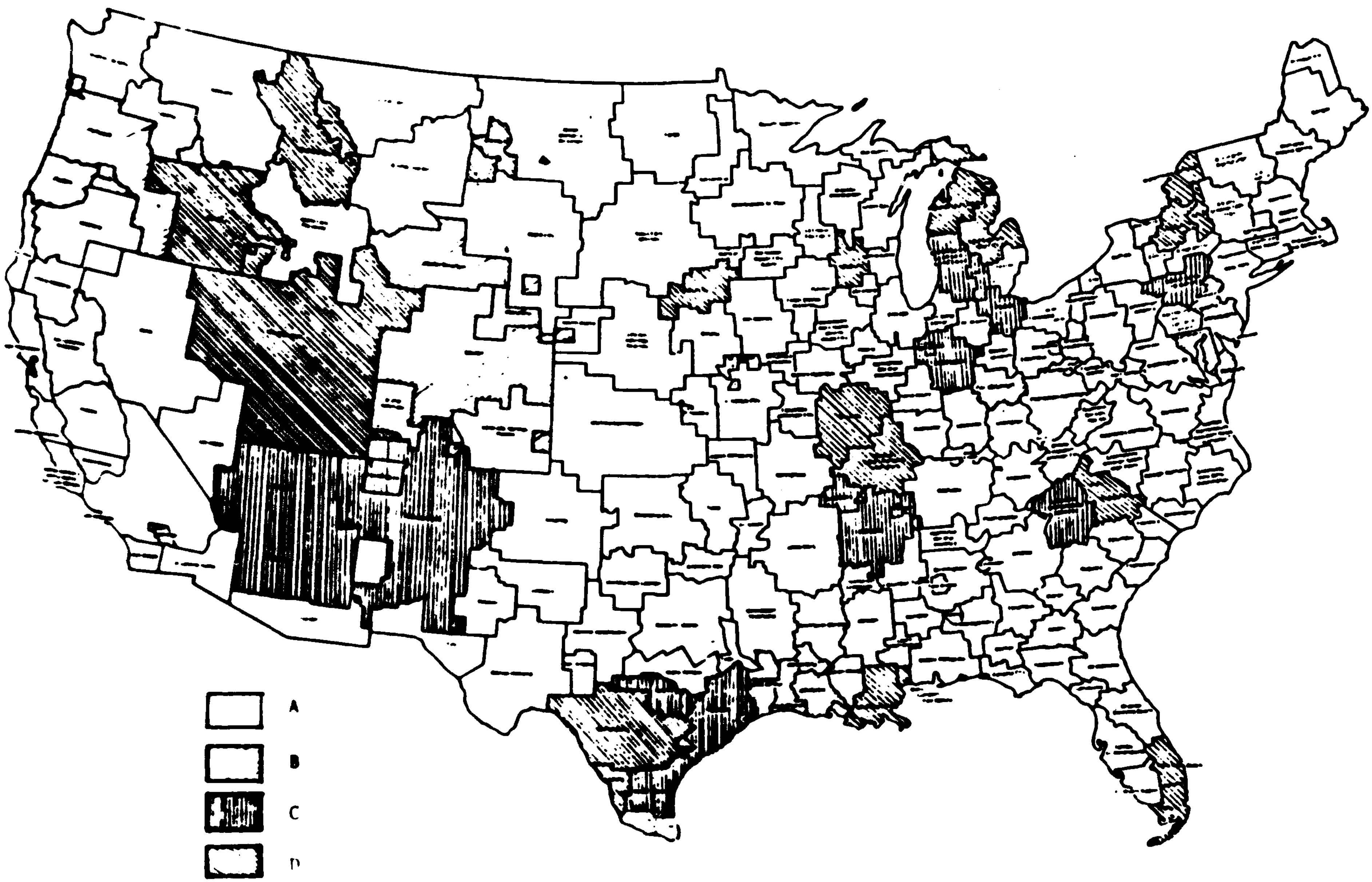
Note: See accompanying list for variable definitions.

Attachment 2

DESIGN OPTION 2

OPTION 2

ADVERTISING MIX TEST DESIGN



ADVERTISING MIX TEST

DESIGN OPTION 2
CELL B ($16M/$17M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
ALEXANDRIA, LA.	0.14	0.217	0.164	0.209	0.045	0.635	31.2	13.2	43.3	0	0	1	0
BALTIMORE	1.05	0.644	0.470	0.341	0.240	1.695	31.9	10.0	44.0	0	0	1	0
BEAUMONT-PORT AR	0.20	0.391	0.423	0.275	0.248	1.337	23.7	10.3	50.9	0	0	1	0
BEND	0.03	1.335	0.850	0.769	0.121	3.076	1.9	15.1	45.0	0	1	0	0
CASPER-RIVERTON	0.08	0.474	0.290	0.171	0.211	1.146	6.4	6.2	33.1	0	1	0	0
CHEYENNE	0.06	0.617	0.406	0.309	0.390	1.721	10.1	5.4	33.1	0	1	0	0
CINCINNATI	0.85	0.890	0.550	0.475	0.283	2.198	10.8	11.3	44.5	0	0	0	0
DENVER	1.18	0.532	0.423	0.249	0.171	1.376	12.0	6.8	33.1	0	1	0	0
EUGENE	0.22	0.782	0.801	0.672	0.176	2.431	4.6	13.4	45.0	0	1	0	0
GRAND JUNCTION	0.05	0.592	0.769	0.631	0.375	2.367	4.8	10.3	33.1	0	1	0	0
LAFAYETTE, LA.	0.25	0.255	0.138	0.096	0.096	0.585	26.0	10.2	45.3	0	0	1	0
LAKE CHARLES	0.10	0.367	0.336	0.189	0.073	0.966	23.1	14.4	50.9	0	0	1	0
PHILADELPHIA	2.81	0.511	0.568	0.309	0.225	1.613	22.6	9.1	20.3	1	0	0	1
PORTLAND, ORE.	0.94	0.820	0.681	0.452	0.207	2.161	6.7	10.8	44.8	0	1	0	0
SALISBURY	0.08	1.157	1.473	0.426	0.365	3.422	27.7	10.5	44.5	0	0	1	0
TOTAL, B CELL	8.02	0.608	0.533	0.341	0.217	1.699	18.6	9.6	34.3	35	32	23	35

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 2
CELL C ($4M/$6M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
ALBUQUERQUE	0.48	0.515	0.567	0.429	0.164	1.675	29.0	11.1	32.1	0	1	0	0
AUSTIN, TEX.	0.38	0.311	0.267	0.246	0.081	0.905	19.5	4.3	19.3	0	0	1	0
CORPUS CHRISTI	0.23	0.433	0.304	0.205	0.129	1.071	17.5	7.0	19.3	0	0	1	0
FARMINGTON	0.04	0.515	0.400	0.515	0.314	1.744	39.5	11.1	30.8	0	1	0	0
GRAND RAPIDS-KAL	0.73	0.833	0.570	0.391	0.218	2.013	9.6	13.4	34.2	0	0	0	0
GREENVILLE-SPART	0.64	0.696	0.518	0.246	0.181	1.640	19.7	11.1	54.1	0	0	1	0
HOUSTON	1.72	0.372	0.352	0.207	0.149	1.081	29.0	6.8	50.7	0	0	1	1
INDIANAPOLIS	0.97	0.882	0.726	0.383	0.312	2.302	11.4	11.7	52.8	0	0	0	0
JACKSON, TENN.	0.05	0.393	0.742	0.371	0.175	1.681	25.6	12.3	37.0	0	0	1	0
JONESBORO	0.08	0.660	0.619	0.234	0.206	1.718	2.9	11.5	37.4	0	0	1	0
LAFAYETTE, IND.	0.07	0.498	0.413	0.271	0.214	1.395	6.6	8.6	52.8	0	0	0	0
LANSING	0.32	0.691	0.362	0.349	0.287	1.689	12.2	13.4	34.2	0	0	0	0
LIMA	0.05	0.978	0.848	0.783	0.217	2.826	12.8	14.2	38.8	0	0	0	0
MEMPHIS	0.71	0.440	0.497	0.223	0.114	1.274	40.0	11.7	37.0	0	0	1	0
PHOENIX	0.94	0.764	0.580	0.368	0.174	1.886	16.5	9.1	33.3	0	1	0	0
TOLEDO	0.49	0.698	0.702	0.422	0.364	2.186	9.7	13.1	47.9	0	0	0	0
WILKES BARRE-SCR	0.49	0.839	0.822	0.540	0.336	2.537	1.6	12.0	36.1	1	0	0	0
TOTAL, C CELL	8.40	0.619	0.529	0.324	0.205	1.677	19.4	10.1	41.3	6	17	45	21

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 2
CELL D ($40M/$17M)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
ALPENA	0.02	1.933	1.482	1.031	0.193	4.639	1.0	20.2	34.2	0	0	0	0
BILOXI-GULFPORT-	0.10	0.499	0.478	0.427	0.112	1.516	19.9	8.5	44.6	0	0	1	0
BOISE	0.19	0.777	0.654	0.442	0.196	2.068	6.2	9.3	36.6	0	1	0	0
CHARLOTTE	0.72	0.490	0.539	0.275	0.189	1.492	24.9	9.8	47.3	0	0	1	0
FLINT-SAGINAW-BA	0.59	0.973	0.713	0.463	0.326	2.475	14.3	17.5	34.2	0	0	0	0
HELENA	0.02	0.907	0.907	0.623	0.397	2.833	3.2	7.5	36.4	0	1	0	0
LAREDO	0.05	0.270	0.083	0.146	0.083	0.583	9.2	17.5	19.3	0	0	1	0
MADISON	0.29	0.561	0.345	0.284	0.160	1.350	4.0	7.9	17.7	0	0	0	0
MIAMI	1.11	0.460	0.453	0.246	0.163	1.321	22.7	7.9	47.0	0	0	1	0
MILES CITY-GLEND	0.01	0.562	1.526	0.161	0.321	2.570	1.7	6.3	36.4	0	1	0	0
MISSOULA-BUTTE	0.16	0.597	0.703	0.650	0.219	2.168	3.6	10.7	36.4	0	1	0	0
NEW ORLEANS	0.80	0.242	0.279	0.171	0.115	0.807	33.1	10.4	44.7	0	0	1	0
PADUCAH-CAPE GIR	0.36	0.712	0.570	0.426	0.224	1.933	7.2	12.6	39.9	0	0	0	0
ST. LOUIS	1.18	0.764	0.559	0.378	0.293	1.995	17.2	10.0	41.9	0	0	0	0
SALT LAKE CITY	0.85	0.392	0.189	0.256	0.141	0.977	5.9	8.0	30.7	0	1	0	0
SAN ANTONIO	0.68	0.444	0.474	0.433	0.173	1.525	19.6	7.5	19.3	0	0	1	0
SIOUX CITY	0.17	0.942	0.567	0.468	0.351	2.328	2.5	6.6	32.6	0	0	0	0
SYRACUSE	0.39	0.869	0.701	0.488	0.257	2.315	9.3	8.4	27.4	1	0	0	0
TRAVERSE CITY-CA	0.15	1.473	0.780	0.760	0.330	3.344	3.7	18.0	34.2	0	0	0	0
TWIN FALLS	0.03	0.865	0.328	0.447	0.060	1.699	3.6	8.4	36.6	0	1	0	0
UTICA	0.15	1.193	0.840	0.734	0.304	3.070	5.1	8.7	29.5	1	0	0	0
VICTORIA	0.03	0.249	0.343	0.405	0.592	1.589	18.4	7.8	19.3	0	0	1	0
WATERTOWN-CARTHA	0.09	1.644	0.965	0.869	0.238	3.716	3.1	11.0	27.4	1	0	0	0
WEST PALM BEACH	0.32	0.554	0.652	0.341	0.210	1.757	19.6	9.8	47.0	0	0	1	0
TOTAL, D CELL	8.46	0.615	0.503	0.360	0.210	1.689	16.2	9.9	37.2	7	15	45	0

Note: See accompanying list for variable definitions.

ADVERTISING MIX TEST

DESIGN OPTION 2
CELL A ($16M/$60M)

ADI	SIZE	ENLISTMENT RATES: ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS: NE	W	S	TOP 12
ABILENE-SWEETWAT	0.12	0.315	0.454	0.218	0.114	1.101	14.6	4.8	33.2	0	0	1	0
ALBANY, GA.	0.14	0.752	0.649	0.457	0.140	1.999	41.8	9.3	40.1	0	0	1	0
ALBANY-SCHENECTA	0.49	0.905	0.721	0.642	0.286	2.555	7.1	7.8	39.9	1	0	0	0
ALEXANDRIA, MINN	0.09	1.043	1.055	0.711	0.344	3.153	4.1	8.6	32.3	0	0	0	0
AMARILLO	0.20	0.396	0.488	0.274	0.1[illegible]7	1.305	12.0	5.0	30.8	0	0	1	0
ANNISTON	0.06	0.860	0.842	0.215	0.108	2.025	18.4	14.8	38.5	0	0	1	0
ARDMORE-ADA	0.07	0.189	0.349	0.233	0.160	0.931	13.6	7.0	31.0	0	0	1	0
ATLANTA	1.36	0.632	0.582	0.288	0.173	1.675	29.3	7.3	38.1	0	0	1	0
AUGUSTA	0.24	0.617	0.582	0.285	0.134	1.618	49.6	10.0	57.1	0	0	1	0
BAKERSFIELD	0.18	0.497	0.370	0.312	0.191	1.370	24.7	12.5	31.7	0	1	0	0
BANGOR	0.14	1.019	1.106	0.740	0.249	3.114	1.3	9.3	39.8	1	0	0	0
BATON ROUGE	0.38	0.195	0.308	0.154	0.146	0.804	35.6	10.1	44.6	0	0	1	0
BILLING-HARDIN	0.10	0.510	0.717	0.369	0.261	1.857	7.2	6.7	35.8	0	1	0	0
BINGHAMTON	0.16	0.866	0.872	0.665	0.351	2.755	3.9	9.0	30.3	1	0	0	0
BIRMINGHAM	0.57	0.564	0.464	0.265	0.121	1.413	25.7	15.4	38.5	0	0	1	0
BLUEFIELD-BECKLE	0.17	0.977	0.356	0.473	0.276	2.083	6.4	15.8	41.7	0	0	1	0
BOSTON	2.25	0.582	0.528	0.375	0.203	1.689	7.6	7.6	24.1	1	0	0	1
BOWLING GREEN	0.06	0.563	0.334	0.317	0.106	1.319	7.9	10.6	32.6	0	0	1	0
BRISTOL-KINGSPOR	0.36	0.688	0.446	0.438	0.187	1.760	2.3	12.5	47.0	0	0	1	0
BUFFALO	0.67	0.840	0.685	0.673	0.356	2.553	10.8	12.3	43.9	1	0	0	0
BURLINGTON-PLATT	0.25	0.815	0.673	0.727	0.238	2.452	3.8	8.4	40.1	1	0	0	0
CEDAR RAPIDS-WAT	0.41	0.994	0.529	0.445	0.374	2.342	3.2	10.2	38.4	0	0	0	0
CHARLESTON, S.C.	0.24	0.558	0.689	0.292	0.131	1.670	45.1	10.1	58.5	0	0	1	0
CHARLESTON-HUNTI	0.62	0.729	0.333	0.392	0.212	1.666	3.3	14.0	40.9	0	0	1	0
CHATTANOOGA	0.33	0.784	0.490	0.437	0.245	1.956	10.2	12.6	46.1	0	0	1	0
CHICAGO	3.74	0.482	0.291	0.274	0.239	1.286	27.2	11.0	31.4	0	0	0	1
CHICO-REDDING	0.15	0.869	0.702	0.528	0.328	2.427	6.9	16.0	35.0	0	1	0	0
CLARKSBURG-WESTO	0.08	0.485	0.396	0.524	0.332	1.738	1.3	13.4	41.0	0	0	1	0
CLEVELAND	1.65	0.782	0.709	0.512	0.337	2.340	15.3	12.6	50.3	0	0	0	1
COLORADO SPRINGS	0.28	0.792	0.624	0.609	0.202	2.227	20.0	9.3	33.1	0	1	0	0
COLUMBIA, S.C.	0.34	0.671	0.607	0.365	0.126	1.768	49.3	9.2	58.5	0	0	1	0

DESIGN OPTION 2
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
COLUMBIA-JEFFERS	0.17	0.518	0.407	0.339	0.129	1.393	5.9	7.6	40.5	0	0	0	0
COLUMBUS, GA.	0.29	0.299	0.303	0.116	0.091	0.809	40.4	10.3	38.3	0	0	1	0
COLUMBUS-TUPELO	0.18	0.249	0.365	0.139	0.116	0.869	30.5	11.7	38.9	0	0	1	0
COLUMBUS, OHIO	0.73	0.786	0.608	0.392	0.326	2.112	11.1	10.3	38.8	0	0	0	0
DALLAS-FT. WORTH	1.80	0.331	0.322	0.206	0.118	0.976	20.0	5.9	34.0	0	0	1	1
DAVENPORT-ROCK I	0.38	0.906	0.583	0.424	0.334	2.248	5.3	13.4	36.4	0	0	0	0
DAYTON	0.58	1.194	0.662	0.655	0.344	2.854	12.8	12.2	43.6	0	0	0	0
DES MOINES	0.42	0.848	0.419	0.364	0.310	1.941	3.8	7.8	38.3	0	0	0	0
DETROIT	2.20	0.807	0.483	0.350	0.249	1.888	24.9	15.4	34.2	0	0	0	1
DOTHAN	0.11	0.845	0.427	0.275	0.142	1.690	24.9	11.5	38.5	0	0	1	0
DULUTH-SUPERIOR	0.20	0.932	0.852	0.699	0.514	2.997	3.3	15.6	31.1	0	0	0	0
EL CENTRO-YUMA	0.08	0.376	0.050	0.251	0.238	0.915	33.9	23.4	26.5	0	1	0	0
EL PASO	0.31	0.545	0.552	0.396	0.143	1.636	38.8	10.8	42.5	0	0	1	0
ELMIRA	0.09	1.507	1.359	0.742	0.537	4.145	3.1	11.5	36.3	1	0	0	0
ERIE	0.17	0.638	0.790	0.778	0.249	2.456	5.2	12.6	43.4	1	0	0	0
EUREKA	0.07	0.524	0.277	0.364	0.117	1.282	9.3	17.7	35.9	0	1	0	0
EVANSVILLE	0.26	0.751	0.505	0.454	0.235	1.945	4.8	10.2	40.4	0	0	0	0
FARGO	0.27	0.780	0.303	0.435	0.252	1.770	2.9	6.4	32.6	0	0	0	0
FLORENCE, S.C.	0.13	0.621	0.491	0.353	0.146	1.610	49.8	13.1	57.7	0	0	1	0
FT. MYERS-NAPLES	0.13	0.900	0.900	0.581	0.326	2.707	12.9	9.5	47.0	0	0	1	0
FT. SMITH	0.15	0.619	0.397	0.256	0.229	1.501	7.4	9.5	37.3	0	0	1	0
FT. WAYNE	0.28	0.830	0.636	0.374	0.374	2.213	7.0	12.9	52.1	0	0	0	0
FRESNO	0.50	0.481	0.330	0.344	0.129	1.284	26.6	13.5	38.6	0	1	0	0
GAINESVILLE	0.14	0.429	0.475	0.230	0.237	1.371	14.3	5.0	48.0	0	0	1	0
GREAT FALLS	0.08	0.894	0.868	0.544	0.272	2.579	10.4	8.2	36.4	0	1	0	0
GREEN BAY	0.44	1.024	0.653	0.553	0.349	2.579	2.6	11.2	17.7	0	0	0	0
GREENSBORO-WINST	0.52	0.630	0.485	0.317	0.189	1.621	25.7	9.3	47.7	0	0	1	0
GREENVILLE-NEW B	0.29	0.521	0.539	0.358	0.116	1.535	39.0	9.2	51.0	0	0	1	0
GREENWOOD-GREENV	0.09	0.340	0.303	0.109	0.146	0.897	65.6	13.2	40.8	0	0	1	0
HARRISBURG-YORK-	0.53	0.751	0.733	0.392	0.335	2.211	7.1	8.4	26.3	1	0	0	0
HARRISONBURG	0.06	0.797	0.416	0.290	0.036	1.539	3.2	8.9	45.5	0	0	1	0
HARTFORD-NEW HAV	0.92	0.524	0.506	0.420	0.249	1.699	12.4	7.4	28.6	1	0	0	0
HUNTSVILLE-DECAT	0.30	0.686	0.543	0.326	0.249	1.804	16.3	14.8	30.5	0	0	1	0
IDAHO FALLS-POCA	0.14	0.436	0.298	0.451	0.116	1.302	5.6	8.2	36.4	0	1	0	0

DESIGN OPTION 2
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
JACKSON, MISS.	0.32	0.405	0.440	0.228	0.119	1.193	51.1	10.5	40.8	0	0	1	0
JACKSONVILLE	0.45	0.757	0.729	0.406	0.355	2.247	23.8	7.5	48.0	0	0	1	0
JOHNSTOWN-ALTOON	0.34	0.849	0.648	0.545	0.222	2.264	2.8	14.1	32.8	1	0	0	0
JOPLIN-PITTSBURG	0.18	0.889	0.354	0.273	0.174	1.690	4.0	8.0	33.6	0	0	0	0
KANSAS CITY	0.81	0.691	0.568	0.342	0.232	1.833	13.8	7.9	32.9	0	0	0	0
KNOXVILLE	0.47	0.632	0.397	0.412	0.171	1.613	5.6	12.3	47.6	0	0	1	0
LA CROSSE-EAU CL	0.20	0.934	0.487	0.396	0.264	2.081	1.4	9.5	31.2	0	0	0	0
LAS VEGAS	0.24	0.726	0.595	0.359	0.156	1.837	17.6	10.6	33.3	0	1	0	0
LAUREL-HATTIESBU	0.11	0.514	0.465	0.213	0.107	1.299	28.6	10.6	40.8	0	0	1	0
LEXINGTON	0.37	0.595	0.299	0.299	0.198	1.392	6.3	9.6	40.4	0	0	1	0
LINCOLN-HASTINGS	0.30	0.660	0.384	0.328	0.242	1.614	3.0	4.8	28.2	0	0	0	0
LITTLE ROCK	0.49	0.572	0.547	0.295	0.136	1.550	21.5	10.3	37.3	0	0	1	0
LOS ANGELES	5.11	0.347	0.284	0.211	0.142	0.984	28.6	9.2	31.7	0	1	0	1
LOUISVILLE	0.65	0.842	0.531	0.351	0.248	1.972	12.2	12.1	41.1	0	0	1	0
LUBBOCK	0.21	0.314	0.300	0.203	0.164	0.981	17.9	5.2	30.8	0	0	1	0
MACON	0.17	0.704	0.585	0.561	0.197	2.046	43.5	7.2	38.1	0	0	1	0
MANKATO	0.05	0.913	0.380	0.457	0.266	2.016	1.8	6.8	32.7	0	0	0	0
MARQUETTE	0.07	1.014	0.907	0.984	0.338	3.243	6.3	20.6	17.7	0	0	0	0
MCALLEN-BROWNSVI	0.25	0.396	0.164	0.211	0.173	0.945	18.8	16.0	19.3	0	0	1	0
MEDFORD	0.13	1.138	1.105	0.561	0.214	3.018	4.9	14.7	43.5	0	1	0	0
MERIDIAN	0.07	0.435	0.528	0.280	0.078	1.320	38.7	12.0	40.3	0	0	1	0
MILWAUKEE	0.84	0.683	0.438	0.368	0.288	1.777	12.7	10.6	17.7	0	0	0	0
MINNEAPOLIS-ST.	1.45	0.795	0.423	0.372	0.313	1.902	4.4	6.9	31.7	0	0	0	1
MINOT-BISMARCK-D	0.17	0.550	0.284	0.248	0.139	1.221	7.8	6.4	33.0	0	0	0	0
MOBILE-PENSACOLA	0.53	0.772	0.606	0.381	0.232	1.991	25.7	11.1	39.2	0	0	1	0
MONROE-EL DORADO	0.22	0.339	0.278	0.165	0.122	0.904	31.5	12.7	42.3	0	0	1	0
MONTGOMERY	0.20	0.808	0.399	0.220	0.247	1.674	45.0	13.4	38.5	0	0	1	0
NASHVILLE	0.77	0.653	0.460	0.280	0.242	1.634	17.2	12.0	30.4	0	0	1	0
NEW YORK	7.04	0.354	0.441	0.245	0.199	1.239	27.6	8.4	23.2	1	0	0	1
NORFOLK-PORTSMOU	0.64	0.821	0.431	0.351	0.195	1.799	40.4	7.3	47.4	0	0	1	0
NORTH PLATTE	0.02	1.030	0.485	0.364	0.606	2.485	3.3	11.2	28.0	0	0	0	0
ODESSA-MIDLAND	0.15	0.456	0.512	0.210	0.133	1.311	17.9	6.0	40.7	0	0	1	0
OKLAHOMA CITY	0.64	0.343	0.282	0.248	0.119	0.992	13.1	4.8	31.0	0	0	1	0
OMAHA	0.40	0.756	0.460	0.560	0.426	2.202	8.0	6.7	27.9	0	0	0	0

DESIGN OPTION 2
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNFM	PROP	REGIONS NE	W	S	TOP 12
ORLANDO-DAYTONA	0.61	0.899	0.884	0.664	0.291	2.738	16.7	7.9	38.5	0	0	1	0
OTTUMWA-KIRKSVIL	0.04	0.643	0.503	0.168	0.168	1.482	4.4	8.2	34.9	0	0	0	0
PALM SPRINGS	0.30	0.388	0.343	0.374	0.168	1.273	20.3	12.8	31.7	0	1	0	0
PANAMA CITY	0.10	1.030	0.673	0.620	0.189	2.513	16.2	10.6	39.0	0	0	1	0
PARKERSBURG	0.04	1.024	0.683	1.024	0.735	3.467	1.4	12.0	38.8	0	0	1	0
PEORIA	0.27	0.602	0.606	0.269	0.375	1.852	7.6	12.7	32.2	0	0	0	0
PITTSBURGH	1.36	0.625	0.597	0.424	0.287	1.933	7.0	13.0	41.4	1	0	0	0
PORTLAND-POLAND	0.36	1.124	0.781	0.766	0.303	2.974	1.8	7.6	39.8	1	0	0	0
PRESQUE ISLE	0.04	1.426	0.549	0.713	0.055	2.743	5.3	12.0	39.8	1	0	0	0
PROVIDENCE-NEW B	0.64	0.639	0.511	0.468	0.259	1.877	6.2	10.1	21.8	1	0	0	0
QUINCY-HANNIBAL	0.14	1.123	0.527	0.344	0.367	2.361	4.0	11.3	41.1	0	0	0	0
RALEIGH-DURHAM	0.74	0.736	0.424	0.281	0.208	1.648	40.4	7.9	50.9	0	0	1	0
RAPID CITY	0.13	0.566	0.395	0.380	0.240	1.581	10.8	5.5	34.1	0	0	0	0
RENO	0.16	0.490	0.549	0.430	0.152	1.621	9.3	8.9	34.8	0	1	0	0
RICHMOND	0.53	0.714	0.520	0.295	0.196	1.725	33.0	7.4	47.3	0	0	1	0
ROANOKE-LYNCHBUR	0.44	0.734	0.501	0.439	0.196	1.870	18.3	9.9	46.6	0	0	1	0
ROCHESTER, N.Y.	0.39	0.681	0.507	0.507	0.241	1.935	13.5	7.3	41.1	1	0	0	0
ROCHESTER-MASON	0.15	1.206	0.522	0.557	0.338	2.623	1.3	7.3	34.2	0	0	0	0
ROCKFORD	0.24	0.847	0.566	0.494	0.294	2.201	8.8	15.8	27.8	0	0	0	0
ROSWELL	0.07	0.471	0.581	0.220	0.094	1.365	16.1	5.8	42.5	0	1	0	0
SACRAMENTO-STOCK	1.05	0.597	0.570	0.471	0.158	1.797	19.7	13.5	36.0	0	4	0	0
ST. JOSEPH	0.05	0.591	0.673	0.388	0.143	1.795	3.8	8.8	32.9	0	0	0	0
SALINAS-MONTEREY	0.24	0.411	0.402	0.238	0.030	1.082	30.9	11.9	35.0	0	1	0	0
SAN ANGELO	0.04	0.423	0.400	0.259	0.423	1.506	15.4	5.1	19.4	0	0	1	0
SAN DIEGO	0.96	0.400	0.337	0.269	0.157	1.164	24.7	9.8	19.1	0	1	0	0
SAN FRANCISCO	2.46	0.366	0.349	0.192	0.161	1.068	27.1	8.2	35.0	0	1	0	1
SANTA BARBARA-SA	0.25	0.368	0.322	0.306	0.092	1.089	16.9	8.0	31.7	0	1	0	0
SARASOTA	0.06	0.894	0.715	0.590	0.340	2.539	9.5	7.5	31.3	0	0	1	0
SAVANNAH	0.26	0.451	0.416	0.255	0.098	1.221	40.3	7.8	55.1	0	0	1	0
SEATTLE-TACOMA	1.38	0.638	0.481	0.411	0.210	1.740	12.1	11.5	31.7	0	1	0	0
SELMA	0.03	0.327	0.426	0.327	0.557	1.637	58.8	17.4	38.5	0	0	1	0
SHREVEPORT-TEXAR	0.51	0.331	0.399	0.309	0.129	1.168	29.8	9.7	42.7	0	0	1	0
SIOUX FALLS-MITC	0.24	0.919	0.423	0.539	0.276	2.158	4.5	5.1	34.7	0	0	0	0
SOUTH BEND-ELKHA	0.33	0.803	0.547	0.299	0.283	1.932	9.7	11.8	34.7	0	0	0	0

DESIGN OPTION 2
CELL A ($16M/$60M) (cont.)

ADI	SIZE	ENLISTMENT RATES ARMY	NAVY	AF	MC	DOD	NONW	UNEM	PROP	REGIONS NE	W	S	TOP 12
SPOKANE	0.38	1.009	0.868	0.517	0.218	2.611	5.8	13.3	25.6	0	1	0	0
SPRINGFIELD, MAS	0.28	0.736	0.725	0.515	0.191	2.167	10.5	7.8	29.3	1	0	0	0
SPRINGFIELD, MO.	0.33	0.688	0.478	0.374	0.196	1.737	5.3	8.9	36.4	0	0	0	0
SPRINGFIELD-DECA	0.39	0.638	0.523	0.429	0.410	2.001	10.0	10.5	39.4	0	0	0	0
TALLAHASSEE	0.23	0.654	0.461	0.390	0.188	1.694	34.3	6.2	47.4	0	0	1	0
TAMPA-ST. PETERS	0.82	0.852	0.849	0.622	0.283	2.606	14.1	9.0	31.3	0	0	1	0
TERRE HAUTE	0.17	0.682	0.573	0.411	0.411	2.077	4.0	12.4	48.7	0	0	0	0
TOPEKA	0.21	0.332	0.317	0.242	0.096	0.987	20.5	5.9	32.9	0	0	0	0
TUCSON	0.34	0.574	0.483	0.437	0.214	1.708	18.5	10.0	33.4	0	1	0	0
TULSA	0.46	0.459	0.376	0.260	0.163	1.258	16.1	6.8	31.2	0	0	1	0
TUSCALOOSA	0.08	0.288	0.419	0.144	0.026	0.877	22.5	12.0	38.5	0	0	1	0
TYLER	0.11	0.401	0.508	0.264	0.186	1.358	25.6	7.3	39.9	0	0	1	0
WACO-TEMPLE	0.32	0.319	0.287	0.236	0.109	0.952	30.8	5.3	38.2	0	0	1	0
WASHINGTON, D.C.	1.76	0.743	0.529	0.363	0.226	1.861	32.0	7.3	44.0	0	0	1	1
WAUSAU-RHINELAND	0.18	1.036	0.524	0.582	0.397	2.539	1.6	10.9	19.6	0	0	0	0
WHEELING-STEUBEN	0.18	0.957	0.757	0.440	0.241	2.395	3.4	15.1	41.4	0	0	0	0
WICHITA-HUTCHINS	0.47	0.546	0.361	0.217	0.204	1.327	8.1	6.6	32.8	0	0	0	0
WICHITA FALLS-LA	0.21	0.421	0.311	0.281	0.125	1.138	22.7	5.2	32.1	0	0	1	0
WILMINGTON	0.20	0.696	0.665	0.348	0.094	1.804	38.4	12.3	52.7	0	0	1	0
YAKIMA	0.20	0.808	0.516	0.485	0.261	2.070	11.2	14.0	28.1	0	1	0	0
YOUNGSTOWN	0.28	0.720	0.881	0.541	0.317	2.459	10.9	18.5	49.0	0	0	0	0
ZANESVILLE	0.03	0.739	0.578	0.578	0.161	2.057	5.5	13.6	38.8	0	0	0	0
TOTAL, A CELL	75.11	0.602	0.481	0.352	0.218	1.653	19.7	9.8	34.8	21	20	32	39

*Note: See accompanying list for variable definitions.

List of ADI's by Size of Market

NUMBER	ADI NAME	PRODUCTION CODE NUMBER	MALES 17-21	PERCENT	CUMULATIVE PERCENT	CELL*
1	NEW YORK	009	680640	7.039	7.039	
2	LOS ANGELES	013	494032	5.109	12.148	
3	CHICAGO	051	362063	3.744	15.892	
4	PHILADELPHIA	011	271260	2.805	18.698	C
5	SAN FRANCISCO	065	238079	2.462	21.160	A-1
6	BOSTON	003	217891	2.253	23.414	
7	DETROIT	057	212523	2.198	25.612	B
8	DALLAS-FT. WORTH	109	174125	1.801	27.413	B
9	WASHINGTON, DC	019	170069	1.759	29.172	
10	HOUSTON	201	166770	1.725	30.897	A-1
11	CLEVELAND	035	159423	1.649	32.545	D
12	MINNEAPOLIS-ST. PAUL	107	140193	1.450	33.995	D
13	SEATLE-TACOMA	105	133033	1.376	35.371	C
14	ATLANTA	197	131883	1.364	36.735	A-1
15	PITTSBURGH	029	131766	1.363	38.098	
16	ST. LOUIS	075	114253	1.182	39.279	
17	DENVER	241	113841	1.177	40.456	D
18	MIAMI	127	107483	1.112	41.568	C
19	BALTIMORE	021	101695	1.052	42.620	
20	SACRAMENTO-STOCKTON	067	101676	1.052	43.672	A-1
21	INDIANAPOLIS	083	94252	0.975	44.646	C
22	SAN DIEGO	015	92778	0.960	45.606	
23	PHOENIX	275	91368	0.945	46.550	
24	PORTLAND, OR	233	90610	0.937	47.487	B
25	HARTFORD-NEW HAVEN	025	89287	0.923	48.410	
26	SALT LAKE CITY	291	82471	0.853	49.264	
27	CINCINNATI	093	81941	0.847	50.111	A-1
28	MILWAUKEE	111	80913	0.837	50.948	A-1
29	TAMPA-ST. PETERSBURG	131	79533	0.823	51.771	
30	KANSAS CITY	157	78004	0.807	52.578	A-1
31	NEW ORLEANS	245	77310	0.800	53.377	D
32	NASHVILLE	181	74398	0.769	54.146	
33	RALEIGH-DURHAM	351	71777	0.742	54.888	A-1
34	GRAND RAPIDS-KALAMAZOO-BATTLE CREEK	059	71045	0.735	55.624	
35	COLUMBUS, OH	121	70224	0.726	56.349	C
36	CHARLOTTE	279	69437	0.718	57.068	A-1
37	MEMPHIS	179	68218	0.706	57.774	D
38	SAN ANTONIO	271	65771	0.680	58.453	D
39	BUFFALO	135	64668	0.669	59.122	A-1
40	LOUISVILLE	209	62476	0.646	59.768	
41	GREENVILLE-SPARTANBURG-ASHEVILLE	213	61822	0.639	60.407	
42	PROVIDENCE-NEW BEDFORD	047	61694	0.638	61.046	
43	OKLAHOMA CITY	263	61596	0.637	61.683	
44	NORFOLK-PORTSMOUTH-NEWPORT NEWS-HAMP	283	61488	0.636	62.319	
45	CHARLESTON-HUNTINGTON	257	60390	0.625	62.944	

* Those markets not labeled fall into the larger control cell A (White-76% of country).

Codes represent: A_1 = Yello Control Cell
B = Blue
C = Green
D = Red

NUMBER	ADI NAME	PRODUCTION CODE NUMBER	MALES 17-21	PERCENT	CUMULATIVE PERCENT	CELL*
46	ORLANDO-DAYTONA BEACH	329	59162	0.612	63.555	
47	FLINT-SAGINAW-BAY CITY	063	57052	0.590	64.145	
48	DAYTON	095	55881	0.578	64.723	
49	BIRMINGHAM	221	54766	0.566	65.289	
50	HARRISBURG-YORK-LANCASTER-LEBANON	043	51290	0.530	65.819	B
51	MOBILE-PENSACOLA	383	51190	0.529	66.349	
52	RICHMOND	285	51142	0.529	66.878	
53	GREENSBORO-WINSTON SALEM-HIGH POINT	281	49859	0.516	67.394	
54	SHREVEPORT-TEXARKANA	321	48887	0.506	67.900	
55	FRESNO	071	48819	0.505	68.404	
56	TOLEDO	055	47854	0.495	68.899	
57	ALBANY-SCHENECTADY-TROY	149	47824	0.495	69.394	
58	LITTLE ROCK	319	47746	0.494	69.888	
59	WILKES BARRE-SCRANTON	143	47577	0.492	70.380	A-1
60	ALBUQUERQUE	367	46399	0.480	70.860	
61	KNOXVILLE	215	45578	0.471	71.331	
62	WICHITA-HUTCHINSON	307	45202	0.467	71.798	
63	TULSA	269	44195	0.457	72.255	C
64	JACKSONVILLE	335	43618	0.451	72.706	B
65	ROANOKE-LYNCHBURG	345	42355	0.438	73.145	
66	GREEN BAY	315	42106	0.435	73.580	
67	DES MOINES	303	40347	0.417	73.997	
68	CEDAR RAPIDS-WATERLOO	173	39318	0.407	74.404	
69	OMAHA	301	38232	0.395	74.799	
70	SYRACUSE	141	38107	0.394	75.193	
71	ROCHESTER, NY	139	37307	0.386	75.579	
72	SPRINGFIELD-DECATUR-CHAMPAIGN	077	37278	0.386	75.965	
73	AUSTIN, TX	203	37015	0.383	76.348	
74	SPOKANE	337	36772	0.380	76.728	
75	DAVENPORT-ROCK ISLAND-MOLINE	177	36515	0.378	77.106	A-1
76	BATON ROUGE	249	36328	0.376	77.482	
77	LEXINGTON	211	35777	0.370	77.851	A-1
78	PADUCAH-CAPE GIRARDEAU-HARRISBURG G	187	35235	0.364	78.215	A-1
79	BRISTON-KINGSPORT-JOHNSON-CITY	217	34715	0.359	78.575	
80	PORTLAND-POLAND SPRING	123	34329	0.355	78.930	
81	JOHNSTOWN-ALTOONA	033	32864	0.340	79.270	
82	TUCSON	277	32725	0.338	79.608	A-1
83	COLUMBIA, SC	361	32630	0.337	79.945	
84	CHATANOOGA	199	32261	0.334	80.279	
85	SOUTH BEND-ELKHART	053	32148	0.332	80.611	
86	SPRINGFIELD, MO	427	31557	0.326	80.938	B
87	WACO-TEMPLE	205	31317	0.324	81.262	B
88	JACKSON, MISS.	373	31105	0.322	81.584	
89	LANSING	061	30957	0.320	81.904	
90	WEST PALM BEACH	129	30513	0.316	82.220	C
91	EL PASO	371	30078	0.311	82.530	B

NUMBER	ADI NAME	PRODUCTION CODE NUMBER	MALES 17-21	PERCENT	CUMULATIVE PERCENT	CELL*
92	LINCOLN-HASTINGS-KEARNEY	331	28931	0.299	82.829	
93	PALM SPRINGS	577	28592	0.296	83.126	
94	HUNTSVILLE-DECATUR-FLORENCE	185	28555	0.295	83.420	A-1
95	COLUMBUS, GA	409	28419	0.294	83.715	
96	MADISON	113	28155	0.291	84.005	
97	GREENVILLE-NEW BERN-WASHINGTON	353	27625	0.286	84.292	D
98	SPRINGFIELD, MASS.	045	27184	0.281	84.572	
99	YOUNGSTOWN	031	26797	0.277	84.849	D
100	COLORADO SPRINGS-PUEBLO	243	26767	0.277	85.127	
101	FT. WAYNE	091	26745	0.277	85.403	
102	PEORIA	175	26403	0.273	85.676	
103	FARGO	393	25760	0.266	85.942	
104	EVANSVILLE	207	25557	0.264	86.207	D
105	SAVANNAH	425	25476	0.263	86.460	
106	BURLINGTON-PLATTSBURGH	151	23938	0.248	86.718	
107	LAFAYETTE, LA	253	23913	0.247	86.965	
108	SANTA BARBARA-SANTA MARIA-SAN LUIS OBI	017	23881	0.247	87.212	
109	MCALLEN-BROWNSVILLE	435	23710	0.245	87.457	
110	LAS VEGAS	455	23685	0.245	87.702	
111	CHARLESTON, SC	423	23658	0.245	87.947	
112	ROCKFORD	119	23484	0.243	88.190	
113	AUGUSTA	421	23178	0.240	88.430	
114	SIOUX FALLS-MITCHELL	389	23172	0.240	88.670	A-1
115	SALINAS-MONTEREY	069	23116	0.239	88.908	A-1
116	CORPUS CHRISTI	433	22400	0.232	89.140	A-1
117	TALLAHASSEE	413	22319	0.231	89.371	
118	MONROE-EL DORADO	327	21243	0.220	89.591	
119	EUGENE	235	20980	0.217	89.807	B
120	LUBBOCK	437	20695	0.214	90.021	
121	WICHITA FALLS-LAWTON	405	19946	0.206	90.227	
122	TOPEKA	313	19866	0.205	90.433	A-1
123	LA CROSSE-EAU CLAIRE	117	19699	0.204	90.637	A-1
124	AMARILLO	403	19686	0.204	90.841	
125	WILMINGTON	355	19240	0.199	91.040	
126	YAKIMA	339	19182	0.198	91.237	A-1
127	MONTGOMERY	411	19056	0.197	91.435	
128	BEAUMONT-PORT ARTHUR	247	18922	0.196	91.631	
129	DULUTH-SUPERIOR	381	18888	0.195	91.826	
130	BOISE	445	17893	0.185	92.011	
131	WAUSAU-RHINELANDER	115	17368	0.180	92.191	A-1
132	BAKERSFIELD	073	17294	0.179	92.370	
133	COLUMBUS-TUPELO	448	17270	0.179	92.548	
134	JOPLIN-PITTSBURG	429	17216	0.178	92.726	A-1
135	WHEELING-STEUBENVILLE	103	17036	0.176	92.902	
136	MACON	219	16763	0.173	93.075	A-1
137	TERRE HAUTE	087	16565	0.171	93.247	
138	MINOT-BISMARCK-DICKINSON	462	16540	0.171	93.418	
139	ERIE	147	16452	0.170	93.588	
140	BLUEFIELD-BECKLEY-OAK HILL	347	16275	0.168	93.756	
141	SIOUX CITY	391	16238	0.168	93.925	

NUMBER	ADI NAME	PRODUCTION CODE NUMBER	MALES 17-21	PERCENT	CUMULATIVE PERCENT	CELL*
142	COLUMBIA-JEFFERSON CITY	229	16221	0.168	94.092	
143	BINGHAMTON	145	15934	0.165	94.257	
144	RENO	459	15110	0.156	94.413	
145	MISSOULA-BUTTE	342	15086	0.156	94.569	
146	CHICO-REDDING	089	14958	0.155	94.724	A-1
147	TRAVERSE CITY-CADILLAC	451	14863	0.154	94.878	
148	FT. SMITH	325	14861	0.154	95.032	C
149	ODESSA-MIDLAND	439	14261	0.147	95.178	
150	ROCHESTER-MASON CITY-AUSTIN	165	14184	0.147	95.326	
151	UTICA	155	14168	0.147	95.473	
152	IDAHO FALLS-POCATELLO	295	13747	0.142	95.614	A-1
153	BANGOR	357	13647	0.141	95.755	
154	ALBANY, GA	419	13560	0.140	95.895	
155	ALEXANDRIA, LA	255	13384	0.138	96.034	
156	QUINCY-HANNIBAL	227	13085	0.135	96.169	
157	GAINESVILLE	621	13058	0.135	96.304	B
158	FLORENCE, SC	359	13045	0.135	96.439	
159	RAPID CITY	469	12901	0.133	96.572	
160	FT. MYERS-NAPLES	133	12559	0.130	96.703	
161	MEDFORD	237	12129	0.125	96.828	
162	ABILENE-SWEETWATER	441	11445	0.118	96.946	B
163	DOTHAN	415	10530	0.109	97.055	
164	LAUREL-HATTIESBURG	379	10312	0.107	97.162	A-1
165	TYLER	323	10235	0.196	97.268	B
166	BILOXI-GULFPORT-PASCAGOULA	363	9829	0.102	97.370	D
167	LAKE CHARLES	251	9527	0.099	97.459	
168	PANAMA CITY	417	9510	0.098	97.566	
169	BILLING-HARDIN	457	9207	0.095	97.661	
170	ELMIRA	140	8758	0.091	97.753	
171	ALEXANDRIA, MINN.	395	8436	0.087	97.839	D
172	WATERTOWN-CARTHAGE	153	8396	0.087	97.926	
173	GREENWOOD-GREENVILLE	375	8246	0.085	98.011	
174	SALISBURY	023	8212	0.085	98.097	
175	EL CENTRO-YUMA	039	7981	0.083	98.179	
176	CLARKSBURG-WESTON	261	7827	0.081	98.260	
177	GREAT FALLS	299	7715	0.080	98.340	
178	TUSCALOOSA	231	7638	0.079	98.419	
179	CASPER-RIVERTON	471	7591	0.079	98.498	D
180	JONESBORO	431	7275	0.075	98.572	D
181	LAFAYETTE, IND.	085	7023	0.073	98.645	C
182	ARDMORE-ADA	265	6873	0.071	98.716	
183	EUREKA	467	6866	0.071	98.787	A-1
184	MARQUETTE	317	6507	0.067	98.854	
185	MERIDIAN	377	6438	0.067	98.922	
186	ROSWELL	369	6373	0.066	98.987	
187	CHEYENNE	465	6158	0.064	99.051	D
188	BOWLING GREEN	195	5687	0.059	99.110	
189	SARASOTA	645	5593	0.058	99.168	
190	ANNISTON	603	5579	0.058	99.225	
191	HARRISONBURG	287	5524	0.057	99.282	
192	MANKATO	449	5257	0.054	99.336	D

NUMBER	ADI NAME	PRODUCTION CODE NUMBER	MALES 17-21	PERCENT	CUMULATIVE PERCENT	CELL*
193	GRAND JUNCTION	473	5070	0.052	99.389	D
194	ST. JOSEPH	159	4903	0.051	99.440	A-1
195	LAREDO	273	4806	0.050	99.490	D
196	LIMA	101	4600	0.048	99.537	
197	JACKSON, TENN.	183	4581	0.047	99.584	D
198	SAN ANGELO	443	4251	0.044	99.628	B
199	PARKERSBURG	259	3807	0.039	99.667	
200	PRESQUE ISLE	161	3646	0.38	99.706	
201	OTTUMWA-KIRKSVILLE	305	3577	0.037	99.742	
202	FARMINGTON	649	3498	0.036	99.778	
203	TWIN FALLS	293	3354	0.035	99.814	
204	VICTORIA	513	3210	0.033	99.846	A-1
205	ZANESVILLE	125	3112	0.032	99.878	C
206	SELMA	225	3054	0.032	99.911	
207	BEND	591	2471	0.026	99.936	B
208	HELENA	297	1765	0.018	99.954	
209	NORTH PLATTE	385	1650	0.017	99.971	
210	ALPENA	627	1552	0.016	99.986	
211	MILES CITY-GLENDIVE	653	1245	0.013	100.000	

ADI LINKAGES FOR ADVERTISING MIX TEST
(MINIMIZING 15% SPILL-IN)

LINKAGE GROUP	ADI NAME
1	BANGOR ME PRESQUE ISLE ME
2	BOSTON MA PROVIDENCE RI-NEW BEDFORD MA PORTLAND-POLAND SPRING ME
3	NEW YORK NY HARTFORD-NEW HAVEN CT SPRINGFIELD MA
4	SYRACUSE NY UTICA NY WATERTOWN NY
5	BINGHAMTON NY ELMIRA NY
6	BALTIMORE MD SALISBURY MD
7	WASHINGTON DC HARRISONBURG VA RICHMOND VA
8	BLUEFIELD-BECKLEY-OAK HILL WV CHARLESTON-HUNTINGTON WV PARKERSBURG WV
9	PITTSBURGH PA JOHNSTOWN-ALTOONA PA WHEELING WV-STEUBENVILLE OH CLARKSBURG-WESTON WV
10	CLEVELAND OH YOUNGSTOWN OH
11	COLUMBUS OH ZANESVILLE OH
12	TOLEDO OH LIMA OH
13	FLINT-SAGINAW-BAY CITY MI APLENA MI TRAVERSE CITY-CADILLAC MI

LINKAGE GROUP	ADI NAME
14	INDIANAPOLIS IN
	LAFAYETTE IN
15	GREEN BAY WI
	MARQUETTE MI
16	MINNEAPOLIS-ST PAUL MN
	MANKATO MN
	ALEXANDRIA MN
17	OTTUMWA IA-KIRKSVILLE MO
	QUINCY IL-HANNIBAL MO
18	OMAHA NE
	LINCOLN-HASTINGS NE
	NORTH PLATTE NE
19	KANSAS CITY MO
	ST JOSEPH MO
	TOPEKA KS
20	MEMPHIS TN
	JONESBORO AR
	JACKSON TN
21	NASHVILLE TN
	BOWLING GREEN KY
22	ATLANTA GA
	MACON GA
23	COLUMBIA SC
	FLORENCE SC
24	BIRMINGHAM AL
	ANNISTON AL
	TUSCALOOSA AL
25	JACKSON MS
	GREENWOOD-GREENVILLE MS
26	JACKSONVILLE FL
	GAINESVILLE FL
27	TAMPA-ST PETERSBURG FL
	SARASOTA FL
28	MIAMI FL
	WEST PALM BEACH FL

LINKAGE GROUP	ADI NAME
29	MONTGOMERY AL
	SELMA AL
	PANAMA CITY FL
	DOTHAN AL
30	TALLAHASSEE FL
	ALBANY GA
31	NEW ORLEANS LA
	BILOXI-GULFPORT MS
32	BEAUMONT TX
	LAFAYETTE LA
	LAKE CHARLES LA
	ALEXANDRIA LA
33	DALLAS TX
	TYLER TX
	ABILENE-SWEETWATER TX
	SAN ANGELO TX
	WACO-TEMPLE TX
34	OKLAHOMA CITY OK
	ARDMORE OK
35	TULSA OK
	FT SMITH AR
36	SAN ANTONIO TX
	VICTORIA TX
	LAREDO TX
37	LUBBOCK TX
	ROSWELL NM
38	ALBUQUERQUE NM
	FARMINGTON NM
39	DENVER CO
	GRAND JUNCTION CO
	CHEYENNE WY
	CASPER-RIVERTON WY
40	SALT LAKE CITY UT
	TWIN FALLS ID
	HELENA MT
	MILES CITY-GLENDIVE MT
	MISSOULA-BUTTE MT
	BOISE ID

LINKAGE GROUP	ADI NAME
41	LOS ANGELES CA
	SANTA BARBARA-SANTA MARIA CA
	BAKERSFIELD CA
	PALM SPRINGS CA
	SAN DIEGO CA
	EL CENTRO CA-YUMA AZ
42	SAN FRANCISCO CA
	SALINAS-MONTEREY CA
	SACRAMENTO-STOCKTON CA
	CHICO-REDDING CA
	EUREKA CA
43	PORTLAND OR
	EUGENE OR
	BEND OR

APPENDIX C

THE FY 1984 ADVERTISING MIX TEST: REVIEW OF PLANNED ADVERTISING EXPENDITURES (SEPTEMBER 1984)

APPENDIX C

THE FY 1984 ADVERTISING MIX TEST

Review of Planned Advertising Expenditures

September 1984

Wharton ARC
Applied Research Center
The Wharton School
University of Pennsylvania
Philadelphia, Pennsylvania 19104

PREFACE

This report has been prepared under Office of Naval Research Contract N00014-83-C-0663. It is the final report for Task 1 described in the Management Plan prepared for the FY 1984 Advertising Mix Test and constitutes Subtask 1.6 of that Plan.

The information in this report was the most current available as of 15 June 1984. Source documents include:

JRAP Factbook dated 9 April 1984 as updated by telephone
Army Factbook dated 7 November 1984
Navy Factbook dated 12 June 1984
USAF Factbook dated November 1983
USMC Factbook transmitted 31 May 1984 with addendum per J. Walker Thompson dated 5 June 1984.

The report was prepared by Vincent P. Carroll, principal investigator for the FY 1984 Advertising Mix Test, and Associate Director of the Wharton Applied Research Center (WARC) at the University of Pennsylvania and by Judith Mauer, Project Manager.

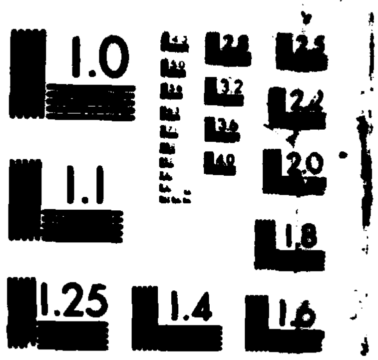
ACKNOWLEDGEMENTS

We are most grateful to Captain Louise Wilmot, USN, Deputy Director, Accession Policy, OASD (MI&L); Lieutenant Colonel John Ford, USA, Accession Policy, OASD (MI&L); and Jerry Allen (CACI) for their review and helpful comments on drafts of this report and for their continued advice and support. We are also grateful to the advertising directors of the military Services and the Joint Recruiting Advertising Program and to their staffs for the many hours of arduous work devoted to the development and revision of the advertising plans reviewed in this report. Finally, we thank Charlotte N Hill (WARC), Danette Gyovai, and Jean Drennan (CACI) for their valuable assistance in the preparation of this report.

CONTENTS

AD-A186 775 DOD (DEPARTMENT OF DEFENSE) ADVERTISING MIX TEST COMPARISON OF JOINT-SERV..(U) ASSISTANT SECRETARY OF DEFENSE (FORCE MANAGEMENT AND PERSONNE.. V P CARROLL 3/4

UNCLASSIFIED JUL 87 F/G 5/1 NL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1.25
1.4
1.6
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4.0

THE FY 1984 ADVERTISING MIX TEST
REVIEW OF PLANNED ADVERTISING EXPENDITURES

BACKGROUND

The primary purpose of the FY 1984 Advertising Mix Test is to help the Department of Defense determine the optimum budget level for DoD recruiting advertising and the best mix of Joint and Service-specific advertising. Directed by the Secretary of Defense, the test varies the level and mix of active, enlisted, non-prior-service (NPS) advertising expenditures in four matched groups of markets. The experimental design for the test, established in an 8 July 1983 memorandum from the Assistant Secretary of Defense for Manpower, Installations and Logistics, was subsequently modified in response to budgetary constraints. To prepare for the test, the advertising directors for the Joint Recruiting Advertising Program (JRAP) and the Services submitted two planning documents: an advertising plan allocating the national budget levels being simulated in each treatment condition between working media and non-working media expenditures; and a translation plan for simulating the hypothetical national budget for each treatment condition in its associated test cell.

As the prime contractor, Wharton Applied Research Center (WARC) is responsible for providing a series of reports documenting the planning, implementation, data collection, and analysis phases of the year-long test. This report compares advertising expenditures planned by JRAP and the Services with the modified experimental design and summarizes planned media activity.

REVIEW OF ADVERTISING AND TRANSLATION PLANS

Experimental Designs

Table 1 presents the budget levels envisioned in the original concept design. The control cell (White) is based on actual FY 1982 advertising expenditures for JRAP and the Services. The three experimental conditions are designed to test a wide range of total DoD recruiting advertising budget levels and different budget allocations to JRAP and Service-specific advertising. Apportionment of the Service-specific advertising budget to individual Services is fixed according to historical (FY 1979-81) advertising budget shares and is, therefore, not a treatment variable.

Table 1

Initial Design of the FY 1984 Advertising Mix Test

Cell	Coverage of Youth Market	Advertiser	Simulated National Budgets ($M)	Cell Design Buget ($M)
		JRAP	15.8	12.0
White	76%	Services	67.7	51.4
		Total*	83.5	63.5
		JRAP	15.8	1.3
Blue	8%	Services	14.7	1.2
		Total*	30.5	2.4
		JRAP	4.0	0.3
Green	8%	Services	67.7	5.4
		Total*	71.7	5.7
		JRAP	40.0	3.2
Red	8%	Services	14.7	1.2
		Total*	54.7	4.4

*Totals may not add due to rounding

As a result of reductions in funds available to JRAP and Navy, the original concept design was modified. The Navy reduction of $2.1 million was distributed proportionally across all cells. JRAP maintained the design level of spending in all experimental conditions and in a matched subset of the control cell markets consisting of 16% of the youth population (Cell White A1). The $2.3 million underfunding of JRAP's increased test costs was entirely absorbed in the remainder of the control cell (Cell White A). These funding adjustments preserved the design characteristics of the test. Table 2 presents the modified test design.

Table 2

Fielded Design of the FY 1984 Advertising Mix Test

Cell	Coverage of Youth Market	Advertiser	Simulated National Budgets ($M)	Cell Design Buget ($M)
		JRAP	12.0	7.2
White A	60%	Services	65.1	39.1
		Total*	77.1	46.3
		JRAP	15.8	2.5
White A1	16%	Services	65.1	10.4
		Total*	80.9	12.9
		JRAP	15.8	1.3
Blue	8%	Services	14.6	1.2
		Total*	30.4	2.4
		JRAP	4.0	0.3
Green	8%	Services	65.1	5.2
		Total*	69.1	5.5
		JRAP	40.0	3.2
Red	8%	Services	14.6	1.2
		Total*	54.6	4.4

*Totals may not add due to rounding

Advertising Plans

Each of the military recruiting advertisers prepared advertising plans for each of the four treatment conditions. These plans established levels of spending for local advertising, national advertising and production, labor and administrative categories. In keeping with current and historical practice, the proportion of the total budget allocated to each of these categories was not constrained by the test design. Table 3 summarizes these allocations for the treatment conditions.

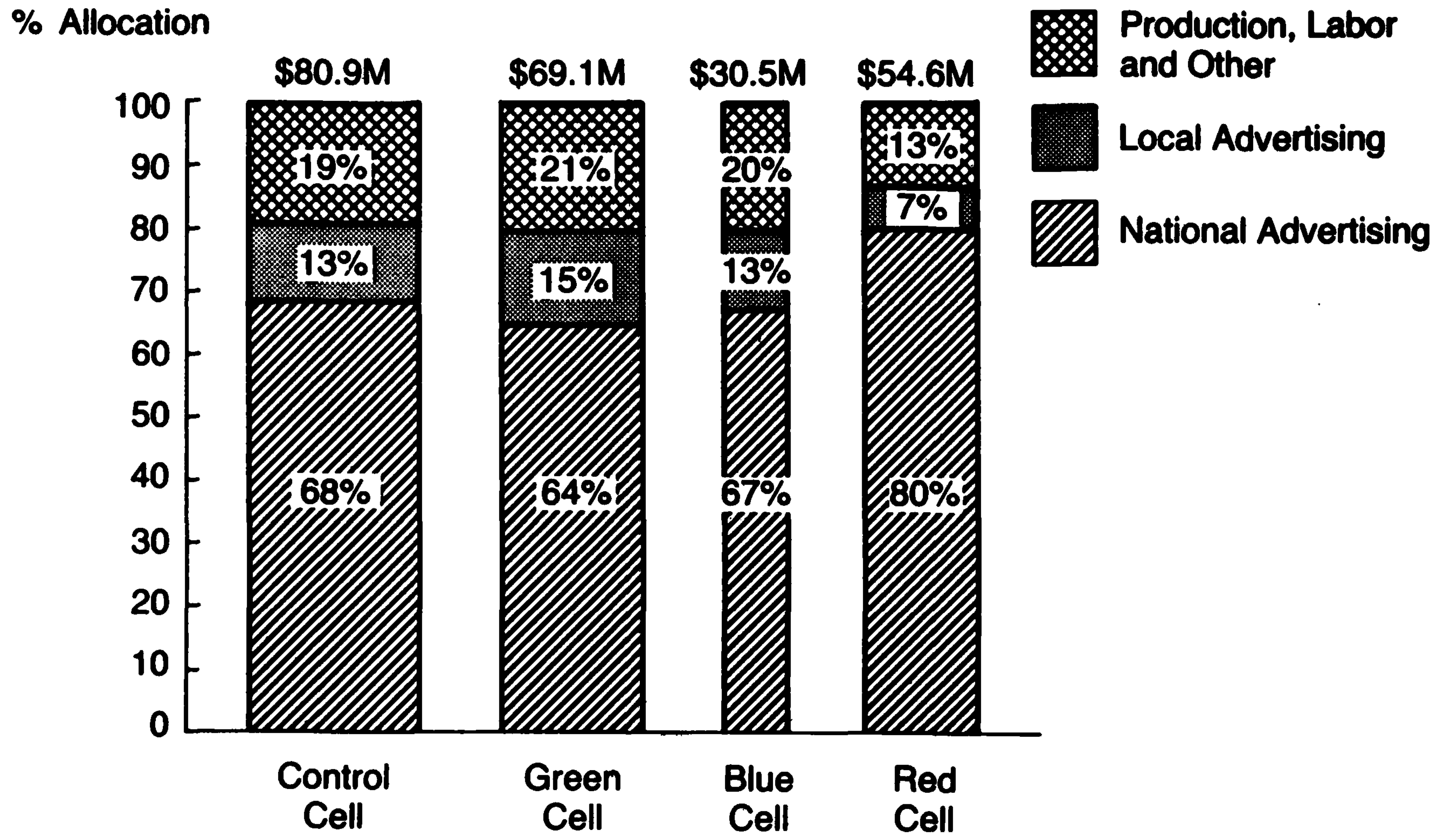
Table 3

Allocation of Simulated Advertising Budgets By Test Cell and Expenditure Category

Cell	Advertiser	Total Budget	Local Advertising	National Advertising	Production and Labor	Other
	JRAP	15.8	0.0	14.2	1.6	0.0
White	Services	65.1	10.3	41.0	13.0	0.8
	Total	80.9	10.3	55.2	14.6	0.8
	JRAP	15.8	0.0	14.1	1.7	0.0
Blue	Services	14.6	3.8	6.3	4.5	0.0
	Total	30.4	3.8	20.4	6.2	0.0
	JRAP	4.0	0.0	3.1	0.9	0.0
Green	Services	65.1	10.3	41.0	13.0	0.8
	Total	69.1	10.3	44.1	13.9	0.8
	JRAP	40.0	0.0	37.3	2.7	0.0
Red	Services	14.6	3.8	6.3	4.5	0.0
	Total	54.6	3.8	43.6	7.2	0.0

Figure 1 depicts the proportional allocation of the total DoD advertising budget to working and non-working media categories. Nearly identical proportional allocations are evident for Cells White and Blue. Cell Green has a higher aggregate proportional allocation to the local advertising and production categories while Cell Red has a proportionately higher allocation for national advertising. These allocation patterns are consistent with the strengths proposed for Service-specific and JRAP advertising, respectively. That is, the reliance on local advertising in Cell Green provides for a stronger linking mechanism between advertising and the recruiting force while Cell Red reflects production efficiencies resulting from lower production costs. The next section reviews plans for implementing these advertising plans in the test cells.

Figure 1. Proportional Allocation of Simulated Budgets to Working and Non-Working Media Expenditure Categories



Translation Plans

Having established plans for distributing working and non-working media expenditures appropriate to each hypothetical national budget, the advertisers prepared translation plans for implementing their decisions in the test cells. Table 4 summarizes working media expenditures planned by JRAP and the Services.

Table 4

Working Media Expenditures Planned for Each Test Cell

Cell	Males 17-21 Years (000)	Advertiser	Total Working Media Budget ($M)	Local Advertising ($M)	National Advertising ($M)
		JRAP	6.190	0.000	6.190
White A	5,868	Services	31.732	6.642	25.090
		Total	37.922	6.642	31.280
		JRAP	2.272	0.000	2.272
White A1	1,534	Services	8.460	1.771	6.689
		Total	10.732	1.771	8.961
		JRAP	1.125	0.000	1.125
Blue	728	Services	0.978	0.357	0.621
		Total	2.103	0.357	1.746
		JRAP	0.303	0.000	0.303
Green	776	Services	4.389	0.884	3.505
		Total	4.692	0.884	3.808
		JRAP	2.985	0.000	2.985
Red	764	Services	1.024	0.357	0.667
		Total	4.009	0.357	3.652

Working Media Correspondence Between Advertising and Translation Plans

Table 5 compares the total working media expenditures planned for each cell with those implied by the advertising plans. An examination of this table reveals some planned expenditures significantly in excess of those implied by the advertising plans. For example, in the treatment condition simulated by Cell Red, the Services' advertising plans allocated only about 70% of their total national budgets to working media. Applying this allocation to the Services' Cell Red budgets implies working media expenditures of $0.830 million in the cell. The Services' translation plans show working media allocations of $1.024 million, a discrepancy of about 23%. Similar discrepancies are observed in the other cells for both JRAP and the Services. These differences occur primarily because the test allows

Table 5

Working Media Expenditures Implied by Advertising Plans vs. Working Media Expenditures Observed in Translation Plans

	Cell Blue		Cell Green		Cell Red	
	JRAP	Services	JRAP	Services	JRAP	Services
Working Media Percentage from Advertising Plans	89.2	69.2	77.5	78.8	93.3	69.2
Cell Budgets ($M)	1.3	1.2	0.3	5.2	3.2	1.2
Implied Cell Working Media Budget ($M)	1.160	0.830	0.233	4.098	2.984	0.830
Working Media Budget from Translation Plan ($M)	1.125	0.978	0.303	4.389	2.985	1.024
% Deviation	-3.0	17.8	30.0	7.1	0.0	23.4

use of some national media (e.g., national magazines) which cannot effectively be blanked out in the test markets. Although some overdelivery in the test cells was expected to result from these media, prohibiting their use could have severely biased the test. Planned overdeliveries of JRAP advertising in Cell Green and of Service advertising in Cells Blue and Red appear to result from use of these media.

Correspondence of Per Capita Expenditures Across Cells

Despite this variance between the translation plans and advertising plans, the cross-cell comparisons of per capita expenditures in Table 6 indicate that the total design characteristics have been maintained in the aggregate. As total cell budgets decline (from Cell White to Cell Blue), per capita media expenditures also decline. Moreover, the relationships between JRAP or Services cell budgets and per capita media expenditures across cells are generally maintained. For example, in Cells Green and Red, JRAP is simulating national budgets of $4 million and $40 million, respectively. The per capita media expenditures by JRAP in Cells Green and Red, $0.39 and $3.91, respectively, generally reflect the same 1:10 ratio. Similarly, in cells with the same total Service budget (e.g., Cells Blue and Red), the Service per capita expenditure levels are identical. Other cross-cell comparisons are generally consistent with these examples.

Correspondence of Per Capita Expenditures Within Cells

Within-cell comparisons of per capita expenditures for the JRAP and Services' plans also conform to the experimental design. For example, in Cell Red where JRAP and the Services are simulating national budgets of $40 million and $14.6 million, respectively, their per capita media expenditure of $3.91 and $1.34 approximate the same ratio. Within-cell comparisons for the other treatment conditions exhibit this same general correspondence.

Conclusions

The apportionments of simulated national budgets between working and non-working media categories in the advertising plans submitted by JRAP and the Services appear to be reasonable and realistic.

Although the translation plans do not exactly replicate the proportional allocations to working and non-working media categories observed in the advertising plans, the structure of the planned per capita media expenditures is highly consistent with the fielded experimental design.

Table 6

Planned Working Media Expenditures Per 17-21-Year-Old Male

Cell	Advertiser	Planned Per Capita Expenditures ($)
	JRAP	1.05
White A	Services	5.40
	Total*	6.46
	JRAP	1.48
White A1	Services	5.51
	Total*	6.99
	JRAP	1.55
Blue	Services	1.34
	Total*	2.89
	JRAP	0.39
Green	Services	5.65
	Total*	6.04
	JRAP	3.91
Red	Services	1.34
	Total*	5.25

*Totals may not add due to rounding

SUMMARY OF PLANNED NATIONAL MEDIA ACTIVITY

The second purpose of this report is to summarize national media activity planned by JRAP and the Services.

National Advertising Media Expenditures

Table 7 presents a summary of planned national advertising by media category, and Table 8 expresses those planned expenditures as percents of advertisers' cell budgets.

Table 7

Planned Media Expenditures for National Advertising (Millions of Dollars)

Cell	Advertiser	TV	Radio	Mag/ Print	Direct Mail	Outdoor	Total*
	JRAP	4.9	0.0	1.2	0.08	0.00	6.2
White A	Services	12.9	3.9	6.8	1.39	0.14	25.1
	Total*	17.8	3.9	8.0	1.47	0.14	31.3
	JRAP	1.7	0.0	0.6	0.02	0.00	2.3
White A1	Services	3.4	1.0	1.8	0.37	0.04	6.6
	Total*	5.1	1.0	2.4	0.39	0.04	8.9
	JRAP	0.8	0.0	0.3	0.02	0.00	1.1
Blue	Services	0.0	0.0	0.5	0.10	0.01	0.6
	Total*	0.8	0.0	0.8	0.12	0.01	1.7
	JRAP	0.1	0.0	0.2	0.01	0.00	0.3
Green	Services	1.8	0.6	0.9	0.19	0.05	3.5
	Total*	1.9	0.6	1.1	0.20	0.05	3.8
	JRAP	2.6	0.0	0.3	0.02	0.00	3.0
Red	Services	0.0	0.0	0.5	0.10	0.02	0.7
	Total*	2.6	0.0	0.8	0.12	0.02	3.6

*Totals may not add due to rounding

The data in Tables 7 and 8 clearly reflect that in each cell, television is the predominant medium, followed by magazine/print media. Not surprisingly, in the lowest budget cell (Blue), considerably more reliance is placed on less expensive media (magazine/print and direct mail). Furthermore, the Services' decisions to eliminate electronic media in Cells Blue and Red are consistent with advertising theories suggesting that a threshold level of spending (beyond the limited resources available) is required. In Cell Red, the only case where an advertiser (JRAP) has a higher budget than in the control cell, a substantially larger percentage of the national advertising budget is allocated to television.

Table 8

Planned Media Expenditures for National Advertising
(Percent of Advertiser's Cell Budget)

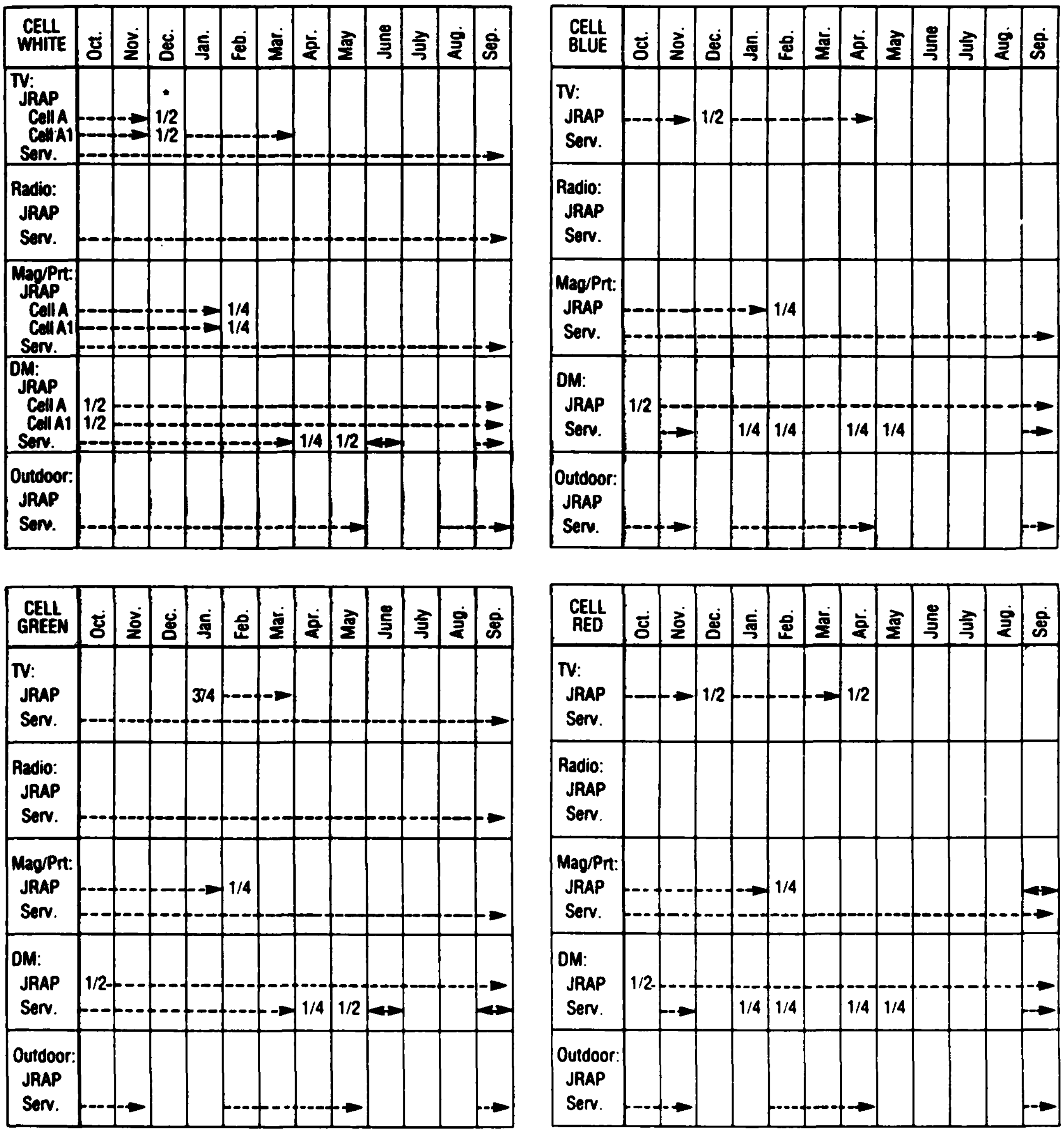
Cell	Advertiser	TV	Radio	Mag/ Print	Outdoor
	JRAP	78.6	0.0	20.0	0.0
White A	Services	51.5	15.4	27.0	0.5
	Total*	56.9	12.5	25.6	0.4
	JRAP	74.4	0.0	24.6	0.0
White A1	Services	51.5	15.4	27.0	0.5
	Total*	57.3	11.2	27.0	0.4
	JRAP	73.6	0.0	24.9	0.0
Blue	Services	0.0	0.0	82.0	1.6
	Total*	47.5	0.0	45.1	0.5
	JRAP	37.3	0.0	59.4	0.0
Green	Services	51.5	15.9	25.8	1.2
	Total*	50.7	14.6	28.0	1.2
	JRAP	88.0	0.0	11.2	0.0
Red	Services	0.0	0.0	81.1	3.6
	Total*	71.9	0.0	24.1	0.6

*Totals may not add due to rounding

Timing of National Advertising Media Schedules

Figure 2 depicts planned FY 1984 media schedules for JRAP and the Services by month for each test cell. Essentially, these schedules demonstrate that when use of a medium is planned, there is little difference in the timing of that use across cells.

Figure 2
FY 1984 Media Schedules by Treatment Condition



* Fractions refer to the approximate portion of the month utilized for that media; for example, in Cell White, JRAP would be using TV advertising for only half of December.

APPENDIX D

CHAVARRIE MEMO
DATA COLLECTION FOR ADVERTISING MIX TEST

APPENDIX D

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

MANPOWER,
RESERVE AFFAIRS
AND LOGISTICS
(Military Personnel & Force Management)

7 - OCT 1983

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (M&RA)
ASSISTANT SECRETARY OF THE NAVY (M&RA)
ASSISTANT SECRETARY OF THE AIR FORCE (MRA&I)

SUBJECT: Data Collection for the Department of Defense Advertising Mix Test

This memorandum forwards the data collection plan for the Department of Defense Advertising Mix Test.

The plan defines the data requirements and reporting formats, medium and schedule. The plan is divided into two parts with supporting appendices:

Part I - Data to be provided by Advertisers (Army, Navy, Air Force, Marine Corps and Joint Advertising Program)

Part II - Data to be furnished by the Defense Manpower Data Center (DMDC)

Appendix A - Detailed administrative guidance

Appendix B - Glossary of terms and definitions of data elements

I am happy to acknowledge the cooperation we have received from your staff in completing this difficult task. We will continue to work very closely with your staff during the test period. My point of contact for this effort is Mr. Ron Liveris at 697-9267.

E. A. Chavarrie
Lieutenant General, USAF
Deputy Assistant Secretary

PART I - DATA TO BE PROVIDED BY ADVERTISERS

ITEM 1 - RECRUITER STAFF

DATA REQUIRED:

Part 1. Number of production recruiters by month by Main Station for FY 1981, FY 1982, FY 1983.

Part 2. Number of production recruiters by month by ADI for Test Cells A1, B, C, and D (see Appendix C for definition of test cell ADIs) for period of test starting with October 1983 data.

Part 3. Number of new recruiters by month by Main Station for period of test but starting with April 1983.

REPORTING FORMATS:

1. Heading: Main Station Recruiter Report Historical Data; Service: Calendar Year and Month
   Fields: Main Station Name and Number
   Production Recruiter Count (Enlisted, NPS, Active-Duty)

2. Heading: ADI Recruiter Report; Service; Calendar Year and Month
   Fields: ADI Name and Number
   Production Recruiter Count (Enlisted, NPS, Active-Duty)

3. Heading: New Recruiter Report; Service; Calendar Year and Month
   Fields: Main Station Name and Number
   New Recruiter Count (Enlisted, NPS, Active-Duty)

REPORTING MEDIUM:

1. Magnetic Tape
2. Hard Copy Report
3. Hard Copy Report

REPORTING SCHEDULE:

1. Single submission due by January 15, 1984.
2. Monthly within 60 days of month's end beginning with October 1983 data.
3. April 1983 to September 1983 data due by November 15, 1983. Thereafter, monthly within 60 days of month's end.

RESPONSIBILITY:

Each Service will provide the data directly to Wharton Applied Research Center (WARC).

ITEM 2 - LOCAL ADVERTISING

DATA REQUIRED:

Part 1. Summary of local advertising expenditures by Main Station by month for FY 1981, 1982 and 1983.

Part 2. Monthly summary of local advertising expenditures by ADI for test cells A1, B, C and D for period of test starting with October 1983 data.

REPORTING FORMATS:

1. Heading: Main Station Local Advertising Report; Service; Calendar Year and Month
   Fields: Main Station Name and Number
   Program ID*
   Total Net Cost of Local Advertising
   Net Cost of Electronic Advertising
   Net Cost of All Other Forms of Local Advertising

2. Heading: ADI Local Advertising Report; Service; Calendar Year and Month
   Field: ADI Name and Number
   Program ID*
   Total Net Cost of Local Advertising
   Net Cost of Local Electronic Advertising
   Net Cost of All Other Forms of Local Advertising

REPORTING MEDIUM: Hard Copy or Magnetic Tape

REPORTING SCHEDULE:

1. Single submission due January 15, 1984.

2. Enlisted, NPS, active-duty program data to be reported monthly within 60 days of month's end starting with October 1983 data. Each month's report should contain updates or corrections as necessary to previous month's data. All other program data may be reported quarterly within 60 days of quarter's end beginning with first quarter FY 1984 data.

RESPONSIBILITY:

Each Service will provide data directly to Wharton Applied Research Center.

*Programs include: (01) Enlisted, NPS, Active-Duty; (02) Active Duty Officer; (03) Reserve-Duty Officer; (04) Reserve-Duty Enlisted; (05) Prior Service; (06) Special Programs

ITEM 3 - NATIONAL LEAD SUMMARY

DATA REQUIRED:

Part 1. Number of gross and qualified enlisted, NPS, active-duty national advertising leads generated each month by ADI for the test period and one quarter beyond.

Part 2. Criteria used by Services for qualifying leads (e.g. age, education, etc).

REPORTING FORMATS:

1. Heading: National Advertising Lead Summary Report; Calendar Year and Month.
   Fields: Service/Joint
   ADI Name and Number
   Gross Lead Count
   Qualified Lead Count

2. Heading: Lead Qualification Criteria; Service.
   Fields: Age
   Education
   Other (e.g. duplicate inquiries)

REPORTING MEDIUM:

1. Magnetic Tape
2. Hard copy

REPORTING SCHEDULE:

1. Monthly within 60 days of month's end starting with October 1983 data and ending with the third month after completion of the test.
2. Criteria in use on 1 October 1983 and any changes since that date are due 30 November 1983. Changes in criteria after 30 November should be reported as changes occur.

RESPONSIBILITY:

1. Each Service and the Joint Recruiting Advertising Program Director will provide data directly to Wharton Applied Research Center.
2. Each Service will provide data directly to Wharton Applied Research Center with a copy furnished OASD(MRA&L)(MP&FM)(AP).

ITEM 4 - NATIONAL ADVERTISING EXPENDITURES

DATA REQUIRED:

Listing of national advertising expenditures by appearance or insertion by month for the period FY 1981 through the period of the test.

REPORTING FORMATS:

Heading: National Advertising; Service/Joint; Calendar Month; Calendar Year; Program ID*

Fields: Lead Generation Code (Does ad contain a lead generation mechanism)
Magazine or Newspaper Name or Code
Magazine or Newspaper Edition and Insertion Size
Magazine Issue Date
Magazine or Newspaper Net Cost
Television Network or Spot Code
Television Program and Station(s) Exhibiting Ad
Television Ad Length; Date; Exact Time of Airing; Daypart or Daypart Code
Television Ad Net Cost
Radio Network or Spot Code
Radio Program and Station(s) Airing Ad
Radio Ad Length; Date; Exact Time of Airing; Daypart or Daypart Code
Radio Ad Net Cost
Billboard ADI Number; Date Visible; Ad Length of Run
Billboard Net Cost
Direct Mail Audience Identifier Code
Direct Mail Size of Mailing (Gross Pieces Mailed) and Mailing Date
Direct Mail Net Cost
ADI Name; ADI Number; Direct Mail Pieces Sent to ADI

REPORTING MEDIUM: Magnetic Tape

REPORTING SCHEDULE:

Each advertiser will provide a file layout diagram and coding sheets to WARC for review by November 15, 1983. Enlisted, NPS, active-duty program data for the period of the test beginning with October 1983 data will be reported monthly within 60 days of month's end. Data for programs other than the enlisted, NPS, active-duty program for the period of the test may be reported quarterly within 60 days of quarter's end beginning with first quarter FY 1984 data. FY 1981 and FY 1982 data for all programs is due in a single submission on January 15, 1984. FY 1983 data for all programs is due in a single submission on February 28, 1984.

RESPONSIBILITY:

Each Service and the Joint Recruiting Advertising Program Director will provide data directly to Wharton Applied Research Center.

* Programs include: (01) Enlisted, NPS, Active-Duty, (02) Active-Duty Officer; (03) Reserve-Duty Officer; (04) Reserve-Duty Enlisted; (05) Prior Service; (06) Special Programs.

ITEM 5 - MISSION OR GOALS AND RECRUITING POLICIES

DATA REQUIRED:

Part 1. Enlisted, NPS, active-duty contract/accession mission for each main station by month for the period of FY 1981 through the end of the test.

Part 2. A narrative description of major recruiting policies in effect during the test.

REPORTING FORMATS:

1. Heading: Mission Report; Service; Calendar Year and Month
   Fields: Main Station Name and Number
   Enlisted, NPS, Active-Duty Contract Mission (sex; education-HSDG, HS senior, NHSDG; AFQT 1-3A, 3B, 4)
   Enlisted, NPS, Active-Duty Accession Mission (sex; education-HSDG, HS senior, NHSDG; AFQT 1-3A, 3B, 4)

2. Heading: Recruiting Policies; Service; Calendar Year and Quarter
   Topics: The following topics should be addressed in this report:

   - Enlistment Standards (education and AFQT eligibility standards and national goals)
   - DEP Policies and Constraints (DEP size and mix goals; DEP eligibility restrictions, maximum time restrictions)
   - Fiscal Policies and Constraints (e.g. vehicle mileage and applicant travel restrictions)
   - Marketing Strategies and Priorities (e.g. trade-offs between PS and NPS and male and female accessions)
   - Enlistment Options (e.g. Enlistment Bonus, Educational Benefits, terms of enlistment
   - Enlistment Processing Policies (e.g. MEPS operating hours)

REPORTING MEDIUM:

1. Magnetic Tape or Hard Copy
2. Hard Copy

REPORTING SCHEUDLE:

1. Data for FY 1981 through FY 1983 due December 15, 1983. Data for first quarter FY 1984 due December 15, 1983. Data for each subsequent quarter will be reported within the first week of the start of the quarter except for the Navy which will report monthly by the middle of the month starting with January 1984.

2. Quarterly starting with the first quarter of FY 1984 and ending with last quarter of test. Data for each quarter will be reported within 15 days of quarter's end.

RESPONSIBILITY:

1. Each Service will provide data directly to Wharton Applied Research Center.

2. Each Service will provide the data to Wharton Applied Research Center with a copy to OASD (MRA&L) (MP&FM) (AP).

ITEM 6 - TEST COSTS

DATA REQUIRED:

Part 1. Updates of actual and projected costs for advertising related to the DoD Advertising Mix Test.*

Part 2. Updates and explanations of costs for advertising media purchasing inefficiencies (cut-out, block-out, buy-up and non-reimbursable costs) and advertising data collection resulting from the test.

REPORTING FORMAT (see Appendix D):

1. Heading: DoD Advertising Mix Test Costs; Service/Joint; Reporting Data (Calendar Year, Month and Day)

Fields: Advertising Period Covered**
FY Appropriations (e.g. FY 1983 funding, FY 1984 funding)
National Media Placement Costs (TV, radio, magazine, other media)
National Media Production Costs
Direct Mail Costs
Local/Regional Advertising Costs
Other Costs (Specify)

2. Heading: Advertising Media Purchasing Inefficiencies and Data Collection Costs; Service/Joint; Reporting Date (Calendar Year, Month and Day)

Fields: Advertising Period Covered**
FY Year Appropriations
Advertising Data Collection Costs
Test Cell (B-Blue, C-Green, D-Red)
Special Costs (cut-out, black-out, buy-up and non-reimbursable costs)

Topics: Explain Special Costs and Advertising Data Collection Costs.

REPORTING MEDIUM:

Hard Copy

REPORTING SCHEDULE:

1 & 2: Quarterly starting with advertising for first quarter of FY 1983 and for the first 9 months of the test. Data will be reported within 15 days of quarter's end. One special report estimating test costs for FY 1984 advertising will be submitted by November 30, 1983.

RESPONSIBILITY:

Each Service and the Joint Recruiting Advertising Program Director will provide data directly to OASD (MRA&L)(MP&FM)(AP).

*Includes costs for all categories identified in "Format V" for enlisted NPS. active-duty advertising for test purposes. It includes costs for black-outs, cut-outs, buy-outs and non-reimbursable costs.

**Data will be reported for advertising covering two periods: Advertising from the start of the test to the start of the current month; advertising from the start of the test to the start of sixth month after the current month.

ITEM 7 - MAIN STATION - COUNTY CROSSWALK

DATA REQUIRED:

A list of counties included in each Main Station for the period FY 1981 through the end of the test. (Note changes and time of changes since October 1, 1980).

REPORTING FORMAT:

Heading: Main Station-County Crosswalk; Service. Effective Date.
Fields: FIPS State Code
FIPS County Code
Main Station Name and Number

REPORTING MEDIUM:

Magnetic Tape

REPORTING SCHEDULE:

Currently available crosswalk and any changes dating from FY 1981 forward should be reported in a one time submission due November 15, 1983. Any changes which occur from the currently available status should be reported with this data or as changes occur. These changes may be submitted in hard copy form if substantial time will be required for data processing.

RESPONSIBILITY:

Each Service will provide data directly to Wharton Applied Research Center.

PART II - DEFENSE MANPOWER DATA CENTER

The data items are requested from DMDC. Services will work with DMDC to assure that data elements described below are available at DMDC and are adequate for evaluation purposes.

ITEM 1 - ENLISTED FIRST APPLICANTS; ENLISTED CONTRACTS; INDIVIDUALS IN DEP

DATA REQUIRED:

1. Number of enlisted first applicants by month, Service/DoD and ADI for FY 1981 through FY 1984.

2. Number of enlisted contracts by month, Service/DoD and ADI for FY 1981 through FY 1984.

3. Number of individuals in the DEP from each ADI for each Service starting with September 1980 and ending with September 1984.

REPORTING FORMAT:

1. Heading: Number of Enlisted First Applicants; Service/DoD; Calendar Year and Month.

   Fields: ADI Name and Number
   Total First Applicants by Sex and Education/AFQT quality indices

2. Heading: Number of Enlisted Contracts; Service/DoD; Calendar Year and Month

   Fields: ADI Name and Number
   Total (NPS plus PS) Contracts
   NPS Contracts by Sex and Education/AFQT quality indices
   PS (male plus female) contracts

3. Heading: Number of Individuals in DEP; Service/DoD; Calendar Year and Month

   Fields: ADI Name and Number
   Total Number in DEP by Sex and Education/AFQT quality indices
   Total Number Scheduled for Active-Duty Next Month by Sex and Education/AFQT quality indices
   DEP attrition by Sex, Education/AFQT quality indices, contract data and ship date.

REPORTING MEDIUM:

Magnetic Tape

REPORTING SCHEDULE:

FY 1981 and FY 1982 Data Due November 30, 1983; FY 1983 Data Due January 31, 1984; Data for period of test due monthly within 120 days of month's end beginning with October 1983 data

RESPONSIBILITY:

DMDC (via West Coast POC) using MEPCOM source data will provide data directly to Wharton Applied Research Center.

ITEM 2 - YOUTH ATITUDE TRACKING STUDY DATA (YATS)

DATA REQUIRED:

Male responses in Fall 1981, Fall 1982, Fall 1983 and Fall 1984 YATS.

REPORTING FORMAT

As formatted on existing magnetic tape.

REPORTING MEDIUM:

Magnetic Tape

REPORTING SCHEDULE:

Fall 1981 and Fall 1982 YATS responses due November 30, 1983
Fall 1983 YATS responses due February 28, 1984
Fall 1984 YATS responses due February 28, 1985

RESPONSIBILITY:

DMDC (via East Coast POC) will provide data directly to Wharton Applied Research Center.

ITEM 3 - RECRUITING ENVIRONMENT

DATA REQUIRED:

Selected economic and demographic data available from DMDC. Specific requirements are to be defined by October 31, 1983.

REPORTING FORMAT:

To be determined

REPORTING MEDIUM:

To be determined

REPORTING SCHEDULE:

To be determined

RESPONSIBILITY:

DMDC (via East Coast POC) will provide the data directly to Wharton Applied Research Center.

APPENDIX A - ADMINISTRATIVE GUIDANCE

1. OASD (MRA&L) (AP) point of contact - LTC. John Ford A 227-9267.

   Address: OASD (MRA&L) (MP&FM) (AP)
   (Attn: LTC. John Ford), Rm. 2B271
   The Pentagon
   Washington, D.C. 20301

2. Defense Manpower Data Center points of contact: East Coast - Mr. Paul Nickens (202) 696-5837; West Coast - Ms. Helen Hagen (408) 375-2111.

	EAST COAST	WEST COAST
Address:	Defense Manpower Data Center (Attn: Mr. Paul Nickens) 4th Floor 1600 Wilson Boulevard Arlington, VA 22209	Defense Manpower Data Center (Attn: Ms. Helen Hagen) 550 El Camino Estero Monterrey, CA 93940

3. Wharton Applied Research Center point of contact - Ms. Judith Mauer (215) 898-4768.

   Please send all data elements which indicate direct provision to the Wharton Applied Research Center to:

   Wharton Applied Research Center
   Joint Services Advertising Project
   Suite 100
   3508 Market Street
   Philadelphia, PA 19104

4. Clearly label (externally) each data submission, file layout diagram or coding sheet submitted to include:

   - Service or source
   - Data item(s) covered (e.g. National Advertising-enlisted, non-prior service, active duty advertising program).
   - Period covered (e.g. - Dec. 1983)
   - Point of contact of service or source organization.

5. Wharton Applied Research Center will acknowledge in writing the receipt of each data submission to the source organization point of contact within 48 hours of receipt.

6. Because of the large number of magnetic tapes to be processed the following standard tape specifications are required:

   - EBCIDIC (Standard IBM)
   - 1600 bits per inch (no compressed data please)
   - 9 track
   - 80 characters per record

- Blocking factor 80
- Non-variable record lengths
- Unlabeled

7. Provide a comprehensive file layout diagram and coding sheets with each magnetic tape submission.

8. Indicate return address for magnetic tape submissions. Tapes will be returned without being erased.

APPENDIX B - GLOSSARY OF TERMS AND DEFINITIONS OF DATA ELEMENTS

ADI: Area of dominant influence as defined by Arbitron Corporation. An ADI is composed of counties a plurality of whose residents watch television emanating from the same location. For the purposes of the Joint Services Advertising Experiment ADIs are strictly defined by the 1981-82 Arbitron boundaries. ADI names and numbers will correspond to the Arbitron 1981-82 name and number convention. All Data collected on an ADI basis will include data only from those counties which are defined by the 1981-82 Arbitron boundaries.

BILLBOARD ADI: The ADI on which the billboard ad displayed is located.

BILLBOARD DATE VISIBLE: Defined as the date that a billboard ad is actually affixed to the billboard.

DAYPART: Defined as the section of the day in which an ad appeared. This item can be measured and reported on whatever basis the agency or Service generally use. The measure for each medium should be kept consistent throughout the test period and should be clearly indicated on coding sheets provided with the data submission.

DEP: Delayed entry program is composed of individuals who have signed enlistment contracts but have not yet reported for active-duty training or assignment. Counts of DEP personnel will account for all individuals in DEP as of the end of a given calendar month.

DIRECT MAIL AUDIENCE IDENTIFIER CODE: Defined as a code to indicate the audience to which direct mail is directed. Indicate target market, influencer and any other specific audiences which may be appropriate. Please clearly identify this coding scheme on coding sheets submitted and maintain code consistency throughout the test.

DIRECT MAIL MAILING DATE: Defined as the date that direct mail advertising is first provided to the Post Office for handling and delivery.

ELECTRONIC ADVERTISING: Defined in this document as paid advertising appearing on either radio or television.

EXACT TIME OF AIRING: Defined as the hour, a.m. or p.m., minute, and second when an ad began its appearance. For ads appearing in multiple time zones use Eastern Time.

FIRST APPLICANT: Defined as an individual taking the non-institutional Armed Services Vocational Aptitude Battery test sequence for the first time. Counts of first applicant personnel will account for all individuals who have taken the ASVAB during a given calendar month.

FULFILLED LEAD: Defined as a national advertising lead to whom material or information has been provided and whose name has been or could be forwarded to a Service recruiting organization for follow-up.

LEAD GENERATION CODE: A code to indicate whether a particular ad contains any of the following:

- Toll free telephone number
- Business reply card
- On-page coupon
- Post card
- Self-addressed envelope

LOCAL ADVERTISING: Local advertising is that advertising which is purchased or authorized at a local level. It is generally administered through the recruiting Main Station command structure.

MAGAZINE OR NEWSPAPER INSERTION SIZE: Defined as the size of a magazine or newspaper insertion measured in whatever standard format the reporting Service generally uses. All newspaper insertions should be measured on the same basis. All magazine insertions should be measured on the same basis.

MAGAZINE OR NEWSPAPER ISSUE DATE: Defined as the date the publication is first available for sale to the general public. (If there is no general public sale then the mailing date of the first subscription piece of the publication issue will be used.

MAIN STATION: Army District Recruiting Command, Navy Recruiting District, Marine Corps Recruiting Station, or Air Force Squadron.

NATIONAL ADVERTISING LEAD: Defined here as the provision, on request of an individual respondent, of material about enlisted program opportunities or features. The request for additional information is generated by:

- Calling a toll-free telephone number
- Sending in a reply card or on-page coupon
- Mailing back a post card or envelope

which appear in or are contained in national advertising presentations.

NEW RECRUITER: Service recruiting personnel who are beginning the first field recruiting assignment of their first tour of recruiting duty and who have or are expected to have an enlisted, NPS, active-duty mission (or goal) or mission-part.

NET COST: Defined in this document as the cost expended to all vendors for paid advertising appearances net of all discounts, rebates, allowances, and advertising agency fees, commissions, or allowances.

PROGRAM I.D.: Where called for in this document please use the following program codes:

(01) Enlisted, NPS, Active-Duty Program
(02) Active-Duty Officer Program
(03) Reserve-Duty Officer Program
(04) Reserve-Duty Enlisted Program

(05) Prior Service Program
(06) Special Programs

<u>PRODUCTION RECRUITER</u>: Services recruiting personnel who have an enlisted, NPS, active-duty mission (or goal) or mission-part. A recruiter will be defined as being in a market, ADI, or Main Station as of the first calendar day of a given month.

<u>RADIO AD LENGTH</u>: Defined as the duration of a radio ad in seconds.

<u>RADIO NETWORK OR SPOT CODE</u>: A code to identify the radio network on which a radio ad was purchased and appeared. Alphabetic codes (e.g. NBC, CBS, ABC) are acceptable. If the ad was not purchased and distributed by a network then use a spot code to indicate that the ad was purchased on a spot basis. Alpha (e.g. zzz) or numeric (e.g. 999) codes are acceptable.

<u>RADIO STATIONS EXHIBITING ADS</u>: Defined as a listing of all stations which exhibited a given radio ad. An alternative form of data submission is acceptable for this item as follows: A service can elect to provide a comprehensive and complete list of all stations affiliated with each network used. In this case the Service will list as stations only those stations where the ad did not air. Stations where the ad did not air will be listed whether the ad did not clear on a specific-station ordered or because a specific station was cut-out or blacked-out for purposes of this or any other test. If this form of data submission is elected it is the responsibility of each service to update the list of affiliated stations for each network as necessary.

<u>TELEVISION AD LENGTH</u>: Defined as the duration of a television ad in seconds.

<u>TELEVISION NETWORK OR SPOT CODE</u>: A code to identify the television network on which a television ad was purchased and appeared. Alphabetic codes (e.g. NBC, CBS, ABC) are acceptable. If the ad was not purchased and distributed by a network then use a spot code to indicate that the ad was purchased on a spot basis. Alpha (e.g. zzz) or numeric (e.g. 999) codes are acceptable.

<u>TELEVISION STATIONS EXHIBITING ADS</u>: Defined as a listing of all stations which exhibited a given television ad. An alternative form of data submission is acceptable for this item as follows: A Service can elect to provide a comprehensive and complete list of all stations affiliated with each network used. In this case the Service will list as stations only those stations where the ad did not air. Stations where the ad did not air will be listed whether the ad did clear on a specific station ordered or because a specific station was cut-out or blacked-out for purposes of this or any other test. If this form of data submission is elected it is the responsibility of each service to update the list of affiliated stations for each network as necessary.

APPENDIX C - ADIs BY TEST CELLS

CELL A (White)

Albany, GA
Albany-Schenectady, NY
Albuquerque
Alexandria, LA
Alpena
Amarillo
Anniston
Ardmore, ADA
Atlanta
Augusta
Austin, TX
Bakersfield
Baltimore
Bangor
Baton Rouge
Beaumont-Port Arthur
Billings-Hardin
Binghamton
Birmingham
Bluefield-Beckley
Boise
Boston
Bowling-Green
Bristol-Kingport
Buffalo
Burlington-Plattsburgh
Cedar Rapids-Waterloo
Charleston, SC
Charleston-Huntington
Charlotte
Chattanooga
Chicago
Chico-Redding
Cincinnati
Clarksburg-Weston
Colorado Springs
Columbia, SC
Columbia-Jefferson City
Columbus, GA
Columbus-Tupelo
Corpus Christi
Davenport-Rock Island
Dayton
Des Moines
Dothan
Duluth-Superior
El Centro-Yuma
Elmira
Erie
Eureka
Fargo
Farmington
Flint-Saginaw
Florence, SC
Fort Myers-Naples
Fort Wayne
Fresno
Grand Rapids-Kalamazoo
Great Falls
Green Bay
Greensboro-Winston
Greenville-Spartanburg
Greenwood-Greenville
Harrisonburg
Hartford-New Haven
Helena
Houston
Huntsville-Decatur
Idaho Falls-Pocatello
Jackson, MI
Johnston-Altoona
Joplin-Pittsburg
Kansas City
Knoxville
La Crosse-Eau Claire
Lafayette, LA
Lake Charles
Lansing
Las Vegas
Laurel-Hattiesburg
Lexington
Lima
Lincoln-Hastings
Little Rock
Los Angeles
Louisville
Lubbock
Macon
Madison
Marquette
McAllen-Brownsville
Medford
Meridian
Miles City-Glendale
Milwaukee
Minot-Bismark
Missoula-Butte
Mobile-Pensacola

CELL A Cont'd.

Monroe-El Dorado
Montgomery
Nashville
New York
Norfolk-Portsmouth
North Platte
Odessa-Midland
Oklahoma City
Omaha
Orlando-Daytona
Ottumwa-Kirksville
Paducah-Cape Girardea
Palm Springs
Panama City
Parkersburg
Peoria
Phoenix
Pittsburgh
Portland-Poland
Presque Isle
Providence-New Bedford
Quincy-Hannibal
Raleigh-Durham
Rapid City
Reno
richmond
Roanoke-Lynchburg
Rochester, NY
Rochester-Mason
Rockford
Roswell
Sacremento-Stock
St. Joseph
St. Louis
Salinas-Monterey
Salisbury
Salt Lake City
San Diego
San Francisco
Santa Barbara-SA
Sarasota
Savannah
Selma
Shreveport-Texarkana
Sioux City
Sioux Falls-Mitchell
Soputh Bend-Elkhart
Syracuse
Tallahassee
Tampa-St Peters
Terre Haute
Toledo
Topeka
Traverse City-Cadillac
Tucson
Tuscaloosa
Twin Falls
Utica
Victoria
Washington, DC
Watertown-Carthage
Wausau-Rhinelander
Whelling-Steubenville
Wichita-Hutchins
Wichita Falls-Lawton
Wilkes Barre-Scranton
Wilmington
Yakima

CELL A-1

Atlanta
Buffalo
Charlotte
Chico-Redding
Cincinnati
Corpus Christi
Davenport-Rock Island
Eureka
Houston
Huntsville-Decatur
Idaho Falls-Pocatello
Joplin-Pittsburgh
Kansas City
La Crosse-Eau Claire
Laurel-Hattiesburg
Lexington
Macon
Milwaukee
Paducah-Cape Girardeal
Raleigh-Durham
Sacramento-Stockton
St. Joseph
Salinas-Monterey
San Francisco
Sioux Falls-Mitchell
Topeka
Tucson
Victoria
Wausau-Rhineland
Wilkes Barre-Scranton
Yakima

CELL B (Blue)

Abilene-Sweetwater
Bend
Dallas-Ft. Worth
Detroit
El Paso
Eugene
Gainesville
Harrisburg-York
Jacksonville
Portland, OR
San Angelo
Springfield, MO
Tyler
Waco-Temple

CELL C (Green)

Columbus, OH
Ft. Smith
Indianapolis
Lafayette, IN
Miami
Philadelphia
Seattle-Tacoma
Tulsa
West Palm Beach
Zanesville

CELL D (Red)

Alexandria, MN
Biloxi-Gulfport
Casper-Riverton
Cheyenne
Cleveland
Denver
Evansville
Grand Junction
Greenville-New Bern
Jackson, TN
Jonesboro
Laredo
Mankato
Memphis
Minneapolis-St. Paul
New Orleans
San Antonio
Youngstown

APPENDIX D - FORMAT FOR SUBMITTING TEST COSTS

I. Advertiser (e.g. Army)

II. Reporting Data (Calendar Year, Month, Day)

III. Actual and Projected Advertising Costs* (by FY Appropriation)

Cost Category	Period 1 (Completed) (e.g. First quarter FY 1984) FY 1983 Funds	FY 1984 Funds	Total	Period 2 (Projected) (e.g. First 3 quarters FY 19^4) FY 1983 Funds	FY 1984 Funds	Total
National Media Placement						
(Television)						
(Radio)						
(Magazine)						
(Other Media)						
National Media Production						
Direct Mail						
Local/Regional Advertising						
Other (Specify)						
Total						

IV. Special Costs - Provide and explain costs for cut-outs, black-outs buy-ups, and non-reimbursable costs by treatment cell (Blue, Green, Red Cells), and FY appropriation for both periods. Also identify and explain advertising data collection costs uniquely resulting from the test.

* All enlisted, NPS, active-duty advertising costs identified by category in "Format V" for test purposes including costs for cut-outs, black-outs and buy-ups and non-reimbursable costs.

APPENDIX E

THE FY 1984 ADVERTISING MIX TEST: A CRITERION FOR EVALUATING ADVERTISING POLICIES (SEPTEMBER 1984)

APPENDIX E

THE FY 1984 ADVERTISING MIX TEST

A Criterion for Evaluating Advertising Policies

September 1984

WhartonARC
Applied Research Center
The Wharton School
University of Pennsylvania
Philadelphia, Pennsylvania 19104

PREFACE

This report has been prepared under Office of Naval Research Contract N00014-83-C-0663. It is the final report for Task 4 described in the Management Plan prepared for the FY 1984 Advertising Mix Test and constitutes Subtask 4.6 of that Plan.

The report was prepared under the direction of Vincent P. Carroll, principal investigator for the FY 1984 Advertising Mix Test, and Associate Director of the Wharton Applied Research Center (WARC) at the University of Pennsylvania. Other authors of this report are Ambar Rao (OR/MS Dialogue and New York University), Judith Mauer (WARC), Jerry Allen (CACI), Barry Bayus (WARC), and Hau Lee (Stanford University).

ACKNOWLEDGEMENTS

We are most grateful to Captain Louise Wilmot, USN, Deputy Director, Accession Policy, OASD (MI&L), and Lieutenant Colonel John Ford, USA, Accession Policy OASD (MI&L), for their review and helpful comments on drafts of this report and for their continued advcie and support. We are indebted to Dr. Barry Goodstaedt of Arthur D. Little, Inc. for his contracution to developing and tsting interview prototcol and instruments used in the research effort; and to Amy McMannus and Rananoorthy Parameswaren of WARC who conducted many of these interviews. Finally, we thank Charlotte N. Hill, (WARC), Danette Gyovai, and Jean Drennan (CACI), for their valuable assistance in the preparation of this report.

CONTENTS

EXECUTIVE SUMMARY

BACKGROUND

The primary purpose of the FY 1984 Advertising Mix Test is to help the Department of Defense determine the optimum budget level for DoD recruiting advertising and the best mix of Joint and Service-specific programs. Directed by the Secretary of Defense, the test varies the level and mix of advertising expenditures in accordance with a controlled experimental design. The design has been implemented in four matched groups of markets and a detailed market level data base is being assembled for subsequent analysis. As the prime contractor, Wharton Applied Research Center (WARC) is responsible for providing a series of reports documenting the planning, implementation, data collection, and analysis phases of the year-long test. This report discusses the development of a criterion for evaluating the advertising test. Although pre-viewed in this paper, detailed discussions of measures of effectiveness and analytical methods to be used in evaluating the criterion will be deferred to subsequent reports.

METHODOLOGY

WARC undertook three research tasks to support development of a criterion for evaluating the test:

- A literature review of advertising and marketing research relevant to evaluating advertising effectiveness

- Primary exploratory research in the form of semistructured interviews aimed at identifying and categorizing prevailing motivations for collaborative industry advertising

- Mathematical models of the effect of advertising on military enlistments

After a brief introduction in Chapter 1, separate discussions of the three research tasks occupy Chapters 2, 3, and 4 of the report. The final chapter provides conclusions based on the research efforts and presents a test evaluation criterion.

FINDINGS OF THE LITERATURE REVIEW

Although several studies have focused on generic or commodity advertising for agricultural products, the overwhelming majority of advertising research has been conducted at the firm or brand level. There are two broad lines of this research: One attempting to relate aggregate phenomena such as firm or brand sales to advertising resources and a second investigating the impact of advertising resources on consumer attributes such as awareness of advertising, copy recall, and intention to buy.

Considerable support exists in the literature for aggregate sales response models. These models have also been applied to the Service-specific military enlistment environment with some success.

Although there is no clear consensus on the role of consumer attribute variables, there is some significant evidence that stated purchase intention measures are valid predictors of purchase behavior. The literature review reinforces the requirement that any intermediate variables employed in evaluating the test must be rigorously tested for both validity and reliability.

No guidance is provided in the literature concerning the simultaneous evaluation of industry advertising and firm-specific advertising. Several studies have estimated the effect of advertising on sales for a number of firms in the same industry. However, results of these investigations have differed sharply, and none of these analyses considered a collaborative or jointly sponsored advertising campaign. Other studies have estimated the effects of advertising on sales for generic or commodity advertising campaigns but have not simultaneously considered firm-specific campaigns.

A distinction between national, corporate advertising and cooperative (largely trade channel) industry advertising was identified. In a recent book on this topic, Young and Greyser (1983) assert that:

> "There exists very little in the way of formal evaluation methods for assessing co-op's effectiveness. The usual advertising tracking services and evaluation services offer no systematic way of helping managers assess co-op's effectiveness."

Previous studies of military recruiting advertising are of limited usefulness. The focus of the effort to understand the effects of military recruiting advertising has been primarily at the individual Service level. Although a substantial number of enlistment supply models have been developed since the inception of the All Volunteer Force in 1973, very few of these studies estimate the effect of advertising on enlistments. Those models which do make these estimates disagree about the underlying model structure and about the advertising effect on enlistments. Despite the lack of consensus about the magnitude of advertising effects, the literature on military advertising indicates that marketing variables do have significant effects. The fielding of a controlled experiment such as the FY 1984 Advertising Mix Test is advocated in this literature.

The underlying themes in the evaluation literature are sales effectiveness and economic efficiency. In the private sector, these competing factors are incorporated into profit maximization models where advertising budgets are set so that the incremental contribution from the last sale just equals the advertising cost of achieving the sale. Unfortunately, since a mechanism for measuring recruiting "sales" in terms of dollars is lacking, the concept of profit maximization cannot be applied directly to evaluating military recruiting advertising policies.

FINDINGS OF INDUSTRY INTERVIEWS

Although collaborative advertising is not rare in the marketplace, the literature dealing with its evaluation offers little guidance for evaluating the FY 1984 Advertising Mix Test. To gain a better understanding of motivations for collaborative advertising, WARC project staff interviewed 20 industry trade associations. **Five major motivations for collaborative advertising were identified:**

- To achieve economies of scale
- To address secondary target groups
- To address primary target groups in a different way
- To eliminate "free riders"
- To stimulate goodwill

These objectives fall naturally into the efficiency/ effectiveness dichotomy familiar from the literature review and translate fairly directly into hypotheses about the roles of Joint and Service-specific advertising.

FINDINGS OF CONCEPTUAL MODELS

Four conceptual models were developed to aid in understanding advertising contributions to the enlistment process. **The models hypothesize two kinds of contributions from military recruiting advertising:**

- Direct contributions to closing enlistment contracts
- Indirect contributions to improved attitudes toward military service among youths approaching and in the prime enlistable age and among their influencers.

The conceptual models minimize the sum of Service-specific and Joint advertising expenditures (efficiency) while assuring sufficient advertising expenditures that each Service meets its enlistment contract requirements (effectiveness).

In addition to the recurring themes of efficiency and effectiveness, several unique elements of the recruiting environment were highlighted in the formulation and evaluation of these conceptual models:

- The minimal impact of repeat purchases
- A strictly sequential buying cycle
- An intermediate stated purchase intention measure with significant predictive validity
- Policy constraints prescribing quotas and quality standards
- A narrow and transitory primary target group
- Impact of influencers
- Considerable brand switching by applicants

CONCLUSION

The literature review, the survey of industry advertisers and the conceptual model development each support the use of both efficiency and effectiveness criteria for evaluating the FY 1984 Advertising Mix Test.

Strong support was found for using aggregate sales reponse (or the responses of intermediate variables which validly predict sales) as an effectiveness criterion. Short-term sales response contributions include meeting accession missions, meeting contract missions and maintaining quality standards. Longer-term enlistment contributions of advertising include maintaining favorable attitudes toward military service generally and toward individual branches as well as promoting favorable behavior among high-quality youth.

Strong support was also found for using an economic efficiency criterion. In the private sector, economic efficiency is typically conceptualized as profit maximization. Because recruiting "sales" cannot presently be translated into dollars, profit maximization is replaced by cost minimization as an economic efficiency criterion for evaluating the test.

Consequently the following criterion will be used to evaluate the advertising budget policies being tested in the FY 1984 Advertising Mix Test:

EVALUATION CRITERION

The recommended advertising policy will be one providing the necessary short-term and long-term contributions to the attainment of the Services' enlistment requirements at minimum advertising cost to the Department of Defense.

CHAPTER 1
INTRODUCTION

The FY 1984 Advertising Mix Test is one of the most ambitious and complex research initiatives undertaken in the area of military recruiting. Further, it is likely the most intricate and ambitious of marketing field experiments conducted to date. The objective of the experiment is to evaluate the effectiveness of enlisted, active-duty, non-prior-service (NPS) military recruiting advertising. As a result, the test is designed to provide a solid quantitative and analytic basis for establishing the funding level for such advertising by the military and for the division of such advertising funding between the Joint Recruiting Advertising Program (JRAP) and the individual Services.

The experiment was initiated because "the Department of Defense does not have a methodology which relates and quantifies the effect of varying levels of advertising to actual enlistment."[1] The experiment has been designed as "an in-market test which would generate quantitative data to help answer the question: 'What is the optimum mix of Joint/Service-specific recruitment advertising for achieving active, enlisted, NPS goals at different levels of total DoD recruitment advertising?'"[2]

Given the objectives and motivations for the test, this report is concerned with recommending the basis on which alternative advertising policies may be evaluated.

Evaluating the effectiveness of advertising is a complex issue. Military recruiting advertising occurs at different levels of execution, as does advertising in many other environments. At one level, specific products, services and programs are advertised. Examples include the Army College Fund, the Delayed Entry Program, and the Navy Nuclear Program. Additionally, each of the Services advertises for reserves, officers, and prior-service personnel. At another level, the Services advertise to differentiate themselves from one another and from other employment or training opportunities. Finally, the Department of Defense collaborates in advertising through the Joint Recruiting Advertising Program.

This same variety of levels of advertising prevails in many private sector organizations. For example, financial institutions such as commercial banks or Savings and Loan Associations frequently advertise specific products or programs such as checking or NOW accounts, individual retirement accounts, etc. At another level, they attempt to differentiate the institution itself by advertising such features as reliable service,

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[1]Memorandum dated 8 July 1983 from Dr. Lawrence J. Korb, Assistant Secretary of Defense (Manpower, Reserve Affairs & Logistics) to the Assistant Secretaries of the Army, Navy, and Air Force.

[2]Korb, 8 July 1983.

convenient hours and locations, friendly or fast response. Finally, these institutions collaborate to advertise the more generic benefits of the "industry" of Savings and Loans Associations or Full-Service Banks.

Since this test is the first systematic research effort aimed at investigating advertising effectiveness across different levels of advertising execution, no generally accepted evaluation criterion is available. Consequently, three research initiatives were undertaken:

- **A literature review of advertising and marketing research relevant to evaluating advertising effectiveness.** The review focused on firm or brand advertising, industry advertising, and advertising for military enlistments.

- **Primary exploratory research in the form of semi-structured interviews with industry trade associations aimed at identifying and categorizing prevailing motives for collaborative industry advertising.**

- **Mathematical models of advertising's effect on military enlistments. These models were conceptual mathematical representations of Service-specific and Joint advertising effects developed from a DoD perspective.**

The results of these separate research initiatives are discussed in the next three chapters of this report. The final chapter of this report presents conclusions based on the three research tasks and describes the recommended criterion for evaluating the FY 1984 Advertising Mix Test. The final chapter also briefly describes some candidate evaluation measures and analytical methods. This description of the candidate measures and analytical methods is preliminary and subject to change. A detailed discussion of measures of advertising effectiveness and analytical methods will be the subject of a separate report.

CHAPTER 2
A LITERATURE REVIEW

INTRODUCTION

This chapter presents a review of the advertising and marketing research literature relevant to evaluating advertising effectiveness. The review is organized into three sections covering commercial advertising at the brand or firm level of analysis, commercial advertising at the industry or multi-firm level of analysis, and advertising for military enlistments. A final section summarizes the relevance of this literature to developing a criterion for evaluating the FY 1984 Advertising Mix Test.

COMMERCIAL ADVERTISING FROM A BRAND OR FIRM PERSPECTIVE

The overwhelming majority of advertising research in the commercial sector has been conducted at the firm or brand level of advertising execution. A large body of this research has investigated the sales effects of advertising.

One of the earliest and most widely cited aggregate response models is presented by Vidale and Wolfe (1957). After presenting the results of many empirical studies, they formulated a dynamic model of sales as a function of three components: sales decay, a saturation effect, and an advertising response coefficient. Nerlove and Arrow (1962) had a different conceptualization for the effects of advertising. Their model considered advertising to affect the accumulation of "goodwill," and the goodwill in turn to affect sales.

Three comprehensive review articles cover more recent work assessing the aggregate sales effects of advertising. They examine a large number of field experiments and analyses of historical data. One article, Little (1979), focuses on the aggregate modeling of the advertising/sales relationship. The others, Aaker and Carman (1982), and Simon and Arndt (1980), focus on the implication of this body of research for the practitioner. The relevant elements of these articles are discussed below.

At the level of firm- or brand-specific advertising, Little (1979) concludes that several phenomena have empirical support and should be considered in building aggregate models of advertising responses:

- **Sales respond dynamically upward and downward to increases and decreases in advertising and frequently do so at different rates.** Thus, advertising/sales relationships frequently involve cumulative or lag effects. The lag effects observed have been different for increases in advertising than for decreases.

- **The steady-state response of sales to advertising can follow a concave or S-shaped curve.** The sales response to advertising exhibits diminishing returns and may exhibit a threshold effect as well. There are often positive sales at zero advertising.

- **Competitive advertising affects sales at the firm or brand level.** Hence, firm or brand sales often depend not only on the advertising level and policy of the firm or brand but also on the advertising level of competitors.

- **The dollar effectiveness of advertising can change over time as a result of changes in media, copy, and other factors.**

- **Products sometimes respond to increased advertising with a sales increase that falls off even as advertising is held constant.** Hence, the effects of an increased level of advertising can decay even when the increased level of advertising is maintained over time.

Aaker and Carman (1982) provide a useful taxonomy by which the impact of advertising may be classified into five specific aspects of the advertising/sales relationship. This classification scheme is useful since there has been considerable confusion in the literature about the terminology used in discussing the advertising/sales relationship. The specific aspects of the advertising/sales relationship discussed by them are as follows:

- **The short-run brand demand advertising effect.** This effect is the brand sales generated in a time period which were caused by advertising run during the same period.

- **The short-run carryover effect.** This effect is the brand sales generated during the subsequent few time periods after the advertising has appeared.

- **The primary demand advertising effect.** This is the effect of advertising in generating overall category or industry sales (rather than changing market shares).

- **The response of competitive marketing to an increase or decrease in brand advertising.** Changing the brand or firm advertising may cause brand or firm competitors to change their advertising or marketing expenditures.

- **The long-run advertising impact on the process of goodwill creation, persistence and decay.** This effect may involve many purchase cycles and could involve primary demand expansion. The major long-term effect for most established products is to affect a brand's "goodwill" or the loyalty it enjoys among its customers.

Military Services' recruiting advertising may be expected to affect enlistments in some or all of these ways. The competitive effect and goodwill effect may be reduced substantially in the military environment. The competitive effect is reduced in the short-term by the military advertising budgeting process. The goodwill effect is reduced by the one-time nature of the purchase decision. Other long-term effects of advertising on enlistments are quite possible in the military recruiting area and could include, for example, the effects of advertising on the population not yet old enough to enlist.

Recently, aggregate response models have incorporated advertising effects into new product diffusion models. These models represent the "level of spread of an innovation among a given set of prospective adopters in terms of a simple mathematical function of time that has elapsed since the introduction of the innovation" (Mahajan and Muller, 1979). Generally, diffusion models track the flow of customers across three distinct market segments: people who are not aware of the product, people who are aware of but have not bought the product, and those who have made a purchase. The concepts of external and internal influence on the potential adopter are important in these models. Mahajan and Muller (1979) define external influence as direct influence on the purchase behavior of an individual through marketing, promotional material, or personal discussion with professional sales people. Internal influence, on the other hand, results from social interaction and is that effect exerted by members of a social system on each other (e.g., word of mouth). Although there have been various extensions to these models (as best summarized and reviewed by Mahajan and Muller (1979), and Engel, Kollat and Blackwell (1978)), these authors admit that their usefulness is limited by a distinct lack of empirical validation and testing. While diffusion model constructs are not directly useful to the FY 1984 Advertising Mix Test, the underlying behavioral processes (i.e., personal influences) warrant further attention. Preliminary research using longitudinal follow-up data for Youth Attitude Tracking Study respondents is promising.

These aggregate sales response models use the estimated sales effect of advertising as a basis for evaluating advertising effectiveness. Economic criteria are used to choose between alternatives deemed adequately effective. For example, profit maximizing formulations set advertising budgets so that the incremental revenue from the last additional sale is just equal to the additional costs (including advertising) needed to achieve these sales (i.e., the advertising budget is increased until marginal profit is zero). Budgets are set for competing marketing alternatives using similar criteria.

An additional stream of brand or firm advertising research has been conceptualized at the consumer or micro-level. One of the earliest formal models of the entire purchase process was proposed by Nicosia (1966). Nicosia viewed the purchase process as consisting of three components (motivation, attitude, purchase) which he expressed quantitatively in the form of a system of differential equations. This model was limited, however, since he only included consumer motivations and attitudes as the relevant variables. Extensions to this model include such considerations as memory components, information search elements, external influence and individual characteristics (Katz and Lazarsfeld (1955), McGuire (1976), Newell and Simon (1972)).

More recently, Bettman (1979) has proposed yet another model based explicitly upon information processing theory. He views the consumer as an active seeker and evaluator of information. That is, the consumer is characterized as having a set of goals from which point he/she interacts with his or her environment, seeking information, processing that information, and then selecting among a set of alternatives. The basic components of Bettman's choice process include processing capacity, motivation, attention and perception, information acquisition and evaluation, memory, decision processes and learning. Choice provides the focal point of the theory, and the emphasis is not simply on outcomes but on the processes underlying the choice decision.

Despite what appear to be very different model structures, all of these theories have certain elements in common (Lunn, 1974):

- A focus on choice as a process, rather than choice just as the purchasing act itself
- A view of choice as purposeful behavior, with the consumer being an active information seeker and user of both internal and external information
- A belief that behavior is caused and thus can be explained
- A belief that consumers limit the amount of information processed
- The idea that feedback based on outcomes from choices can affect later decisions

A number of researchers including Strong (1925), Rogers (1982), and Lavidge and Stiener (1961) have described and extended the basic "Hierarchy of Effects" model. Generally, this model proposes three major stages in the consumer purchase process. The various iterations of this model are based on the assumption that knowledge precedes attitudinal change, which precedes behavioral change. However, these models have been criticized. Palda (1966) presents empirical evidence which contradicts the Lavidge and Stiener model. Others have questioned these models on two grounds: (1) all individuals do not necessarily move through each successive stage; and (2) it is inconclusive that attitude change must precede behavioral change. Indeed some evidence attests to the reverse notion that attitude change follows behavioral change (Kiesler, Collins, and Miller (1969); Krugman (1965)).

The critical problem with the consumer behavior models, however, is the difficulty of empirically testing and evaluating them for validity and reliability. As a result, some marketing researchers have recently turned to stochastic models of behavior (e.g., Massey, Montgomery, and Morrison (1970)). Recent publications include those of Bass (1974), Kalwani and Morrison (1977), and Lehman (1976). All of these models make the assumption that consumer behavior has a large random component which is in principle unpredictable. These models are generally concerned with predicting purchase behavior through the use of probability density functions of individual purchase probabilities and aggregate switching matrices associated with brand loyalty. Although data limitations continue to retard their usefulness, some success has been achieved with these models.

When applied to assessing advertising effectiveness, these consumer behavior studies focus on "intermediate" variables such as awareness of advertising, copy recall, attitudes toward the category or brand, and stated purchase intention. In general, no clear consensus has emerged on the role of intermediate variables. Key issues in this area are predictive validity (the degree to which a change in an intermediate variable such as advertising awareness accurately predicts a change in a behavior of interest such as sales or purchase action), instrument or measurement validity (the degree to which changes in the intermediate variable itself can be validly assessed), and reliability (the degree to which effects detected among one group or sample can be generalized). A notable exception here is the use of purchase intention measures to predict purchase behavior. Kalwani and Silk (1982) conclude a comprehensive review of this literature with the statement that "for users of intentions data, this paper offers some welcome evidence that, across a broad range of conditions, such measures do possess a statistically significant degree of predictive validity."

With the exception of stated purchase intentions, then, micro-level consumer behavior constructs using intermediate variables do not seem to be promising approaches to evaluating the FY 1984 Advertising Mix Test. Furthermore, any intermediate variables employed in evaluating the test or any constructs which rely on them must be rigorously tested for both validity and reliability.

ADVERTISING FROM AN INDUSTRY PERSPECTIVE

At the level of industry or collaborative advertising, limited guidance for the test is provided in the literature. No systematic empirical evidence is available for the simultaneous evaluation of collaborative or industry advertising and firm-specific advertising. However, a number of studies have estimated the effect of advertising on sales for firms in the same industry.

These efforts have included work by Lambin (1972) on gasoline, Beckwith (1972), Sexton (1970), and Aaker, Carman, and Jacobson (1982) on frequently purchased consumer goods, Simon (1969) on liquor and Buzzell and Baker (1972) on domestic automobiles. In addition, a substantial amount of work has been done using data on cigarette sales and advertising for the major tobacco companies. These efforts have included Telser (1962), Schnabel (1972), Schmallensee (1972), Peles (1971), Bass (1969), Dominquez and Page (1971), Rao (1972) and Horsky (1977). Miles and Snow (1982) qualitatively evaluate these data.

Results of these investigations have differed sharply. Simon (1969) reports consistent under-advertising by all brands in one industry, while Aaker, Carman, and Jacobson (1982) report over-advertising by all brands in another industry. None of these analyses considered a collaborative or jointly sponsored advertising campaign.

Other studies have estimated the effect of advertising on sales for generic industry advertising of several agricultural commodities. Since the early 1970's, the Federal Government has provided a stimulus for such advertising in the agricultural sector through "Research and Promotion" enabling legislation for various commodities. Studies of the sales effect of generic commodity advertising include works by Ward (1973, 1974, 1975, 1976), Ward and Behr (1980), and Ward and Davis (1978), Hochman, Regev and Ward (1974) on citrus fruits and Thompson and Eiler (1975, 1977), Clement, Henderson and Eley (1965), and Thompson, Eiler and Forker (1976) on fluid milk advertising. Generally, these efforts use aggregate response models to assess the effect of generic advertising on returns to commodity producers and on industry structure. Some assessments also consider industry price setting and regulatory mechanisms (e.g., Thompson and Eiler (1975, 1977), Ward (1975)). As a whole, these studies successfully estimated the sales effect of industry advertising and used economic theory to inform both advertising decisions and other industry policy decisions. Importantly, however, none of these efforts considered firm-specific advertising efforts.

A limited amount of normative literature exists regarding collaborative or jointly sponsored industry advertising. In the only publication addressing the role of collaborative industry advertising, Hugh Agnew (1926) presents a historical review of industry advertising which he categorizes as actually a type of "cooperative" advertising. Industry advertising is that in which producers of products in the same industry promote the entire industry by combined efforts in advertising. Historically, the objectives of industry advertising were to improve market conditions, to combat a common enemy, to prepare background for the campaigns of members firms and in general to increase sales.

According to Agnew, early industry advertising efforts addressed several different specific purposes. Campaigns were developed to educate the consumer. For example, the National Electric Light Association campaign showed the difficulties of maintaining electric light service so that patrons would understand why service is interrupted by storms and accidents. Campaigns were also designed to defend the industry from outside attacks. The American Face Brick Association campaign directed its efforts at combating the propaganda that brick houses were more damp, unsanitary, and expensive than houses constructed with other building materials. Correction of bad trade practices was another rationale for industry advertising. When competition led to the practice of guaranteeing auto tires in terms of mileage, the Rubber Association of American saw this as a bad trade practice and tried to correct it by showing how it was actually the care of tires that made them last and that a mileage guarantee would lead to consumer neglect. Finally, towards the goals of expanding sales, the "Say it With Flowers" campaign extended the practice of sending flowers at times of sorrow to sending flowers on festive occasions throughout the year.

Agnew defines two other types of "cooperative" advertising: (1) where a supplier and distributor jointly collaborate to promote a product or products in which they are mutually interested (e.g., G.E. collaborates with a local appliance store in promoting G.E. washing machines); and (2) where a manufacturer of one product recommends its products specifically for use with the product of another manufacturer. This latter type of cooperative advertising is used most often in the marketing plan of firms making goods which consumers purchase frequently.

In a recent book, Young and Greyser (1983) discuss cooperative advertising. Their definition of cooperative advertising is limited largely to trade channel advertising and is categorized as:

- "Horizontal cooperative advertising" which refers to "advertising sponsored in common by a group of retailers"

- "Ingredient-producer cooperative advertising" which is "supported by raw materials manufacturers"

- "Vertical cooperative advertising" which is "initiated and implemented by retailers and partially paid for by . . . manufacturers"

They discuss the disadvantages of cooperative advertising which include the facts that: (1) sharing the costs of delivering the "message" often results in conflicts regarding the ad content, (2) the flow of money from manufacturer to retailer is reversed from its normal direction resulting in pressure on the manufacturer to maintain the goodwill of the retailer, and (3) dual signature advertising containing both a message from the retailer and the brand message from the manufacturer in the same ad results in a more complicated information-processing challenge for the consumer.

Given these potential problems, the authors then discuss the value of engaging in cooperative advertising and conclude that cooperative advertising:

- Has been an accepted trade practice for years and may be viewed as routine

- Is a competitive tool within the trade that appears to be a necessary door-opener with almost all large retailers

- Serves the simple function of telling consumers where the brand is available

- Results in increased distribution and aids retailers in creating immediate sales for the company's products

- Is viewed as a short-term sales stimulant since consumers can be susceptible to effective personal selling and other retail persuasion

- Can be effective when the consumer is closer to the point of purchase

Young and Greyser explain further that national advertising, unlike cooperative advertising, is seen as building the image of both the company and the product over the long term. Since there is a perennial conflict about how much of the limited advertising resources should be spent on national versus cooperative advertising, Young and Greyser, using the hierarchy of effects model, argue that national advertising dollars should be spent on the awareness, knowledge and liking end of the continuum and that cooperative advertising should focus on the preference and action end. Since military enlistments are not distributed through large retail channels, neither the Joint nor the Service-specific advertising campaigns are cooperative campaigns in the Young and Greyser sense. Nevertheless, their hierarchy of effects argument results in at least two testable hypotheses for the FY 1984 Advertising Mix Test: (1) Service-specific advertising is more effective in increasing enlistments and applicants, and (2) Joint advertising is more effective in improving attitudes and awareness.

With respect to evaluation criteria per se for cooperative advertising these authors assert that:

> "There exists very little in the way of formal evaluation methods for assessing co-op's effectiveness. The usual advertising tracking services and evaluation services offer no systematic way of helping managers assess co-op's effectiveness."

Robert Miles (1982) discusses at length the strategies used by the Tobacco Institute (the trade association founded by the "Big Six" tobacco manufacturers in 1958) in direct response to the mounting controversy over smoking and health. Prior to this time, as Lester Telser's study (1962) confirms, there was substantial competition in the form of advertising among the tobacco companies[1] despite Telser's conclusion that their levels of advertising were high enough to place them at the point where they were experiencing diminishing returns. A serious threat from the external environment was the precipitating factor that drew these tobacco rivals together for the purpose of protecting their mutual interests. The concerted efforts of the Federal Trade Commission to restrict cigarette advertising and label cigarette products with health warnings provided the impetus for the Tobacco Institute to initiate an intensive lobbying effort that continued through the late 1960's. Further, Miles discusses extensively the forms of industry collaboration which evolved from 1953 through the early 1970's. However, for the purposes of this review, a summary of the conditions and factors at the individual firm level which help explain why collaborative associations emerge or decline may be more relevant. His observations include the following:

- Often joint ventures are formed in anticipation of or in response to a major external stimulus.

- Legal norms prohibit collaborative efforts among competitors within a given industry if that effort would tend to reduce competition in that industry.

- Joint ventures tend to be formed more often in industries characterized by a homogenous population of firms. "Where

[1]Telser notes that cigarettes ranked fourth highest in advertising expenditures across all categories listed in The Source Book of Income (IRS).

member firms compete with the same product lines for similar market segments, the relevance and potential effect of external influences and threats, as well as opportunities, should affect them similarly."

- Firms will take an industry approach if they believe they can achieve greater economies of scale and/or greater concentration of power by pooling their resources and taking a united stand to deal with an external threat. However, the benefits that a firm gains in these areas must be weighed against the relative potential loss of individual organizational autonomy.

MILITARY RECRUITING ADVERTISING

As in commercial advertising research, studies of military recruiting advertising have almost exclusively been limited to the level of the individual Service. A substantial number of enlistment supply models have been developed since the inception of the All Volunteer Force in 1973. Morey and McCann (1983) provide a review of 26 such studies conducted since 1975. Perelman (1983) provides another such review. Generally, these efforts have been retrospective analyses of historical data. Further, the effect of advertising on enlistments is estimated in relatively few of these efforts. Where these effects are estimated or evaluated, broad disagreement exists about the underlying model structures and about the effects of advertising on enlistments.

In an early analysis of the AVF, Huck (1974) conceptualized an enlistment response function to advertising expenditures which exhibited diminishing marginal returns and provided for positive enlistments at zero advertising levels.

Recent empirical studies specifically involving advertising variables include Morey and McCann (1980) who examined the effects of national advertising and recruiter levels on Navy recruiting performance using monthly cross-sectional data for 1976 and 1977. They found significant advertising effects (elasticities of 0.19 for total contracts, and 0.12 for high school graduate contracts) and recruiter effects (elasticities of 0.44 for total contracts and 0.58 for high school graduate contracts), as well as lagged effects for both. They also reported an elasticity of 0.16 for advertising on national leads generated. Goldberg (1982) analyzed Navy high school graduate enlistment contracts also and found elasticities of 0.98 for recruiters and 0.25 for advertising. He noted that only current recruiter levels were important, and that the effects of advertising were distributed over time. Hanssens and Levien (1983) discuss another econometric study of the Navy recruiting market. Their econometric model was composed of three equations--national leads, Delayed Entry Program (DEP) contracts, and immediate shipment contracts--which were estimated individually. Their model included effects for advertising wear out (as discussed in Simon (1982)) and a motivational component of personal selling (operationalized as a function of quotas). Among their results, a strong effect of advertising on national leads (elasticities of 0.44) was found. In addition, they found a significant DEP effect on leads (0.18) and quota effect on DEP contracts (-0.16). They also found significant one month lags for advertising.

Carroll and Rao (1981) report on the results of a field experiment conducted for the Navy during FY 1980. They report significant effects of the level of DoD advertising and recruiters on total DoD contracts, indicating that these variables had an effect on "primary demand" for enlistment opportunities. They also report significant effects on Navy local advertising and Joint advertising (which was not a treatment component) on different categories of Navy enlistment contracts achieved. Short-term carry-over effects of three to four months for some advertising elements were evidenced.

As noted, some researchers have attempted to estimate the effect of military advertising on the intermediate variable of leads. As Morey and McCann point out, however, "the only lead data bases available were for so-called national leads, the result of national advertising campaigns . . . ." Until better lead data is available which includes leads from local advertising sources as well as self-initiated lead activity (walk-ins or call-ins to the recruiting station), considerable potential measurement error impairs this approach. This error may occur because substitution across these lead categories may be quite substantial as is indicated by the number of enlistees who do not pass through the intermediate state of becoming national "leads." For example, such national "leads" account for less than 25 percent of all reported recruiter contact (Market Facts (1980), Carroll et al (1982)).

In summary, the review of the literature on military advertising reveals that marketing variables have significant effects. However, disagreement exists on the magnitudes of these effects, and even on the underlying model structures. Bass (1981) compares and discusses the methodological weaknesses in the models of Fernandez, Goldberg and Morey and McCann. He states that "although the studies do provide some useful information, the policy implications should be viewed with caution. The three studies should be viewed as primitive and exploratory." Bass goes on to suggest, however, that research in this area shows promise, and an experimental approach should be considered.

In concluding their review article, Morey and McCann make several recommendations for needed research:

- Integration of other lead data into enlistment equations
- Incorporating the level of other Services' marketing efforts into enlistment equation systems
- Assessing the impact of quotas on enlistment achievement
- Quantifications of uncertainty in decision making models by specifying confidence intervals around forecast values

- Use of controlled experiments

These suggestions have considerable merit in assessing the FY 1984 Advertising Mix Test.

SUMMARY AND CONCLUSIONS

Considerable support for aggregate sales response models of advertising effectiveness exists in the literature at the brand- or firm-level of analysis. These models have also been applied in the military enlistment environment with some success amd have support in research on commodity advertising. The key advertising phenomena discussed by Little (1979) should be considered in evaluating advertising response for the FY 1984 Advertising Mix Test.

Several components of advertising's effects on sales have been hypothesized and investigated in these aggregate efforts. Several of these components are most relevant to military enlistment advertising and to the FY 1984 Advertising Mix test. Specifically, the short-run brand demand effect, the short-run carry-over effect, and the primary demand effect are most salient to this effort. The competitive response effect is attenuated in the military enlistment arena by the military advertising budgeting process. The long-run effects of advertising on goodwill conceptualized as repeat purchase are of little relevance to this study. However, the narrow and transitory nature of the primary target group for military recruiting warrants investigation of other long-term effects such as the development of positive attitudes among individuals who are entering and leaving the group.

The literature provides support for the use of stated purchase intention measures as statistically valid predictors of sales. Recent methodological advances (see, for example, Morrison (1979)) in this area are encouraging. Orvis (1982) provides direct support for the use of such a measure in the military recruiting area. He has demonstrated the predictive validity of a series of "propensity" measures elicited from respondents to the Youth Attitude Tracking Study.

The literature provides limited guidance for evaluating the effectiveness of industry advertising. No empirical evidence is presented supporting the development of a criterion for evaluating collaborative industry advertising campaigns simultaneously with evaluating firm-specific advertising effectiveness. Also, relatively little relevant normative theory is available for this purpose. A key issue then is the extent to which collaborative advertising may be reasonably evaluated by a criterion compatible with that used for brand- or firm-specific advertising. This issue is discussed in the next chapter of this report.

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CHAPTER 3
MOTIVATIONS FOR COLLABORATIVE INDUSTRY ADVERTISING

Why do organizations decide to collaborate on advertising? What are the objectives of collaborative industry advertising? Do these objectives differ in kind or degree from the objectives of firm- or brand-specific advertising? Can collaborative advertising be expected to operate in a different way than firm- or brand-specific advertising? Little theoretical, normative, or empirical support is available in the literature to answer these and similar questions.

However, these questions are important to the evaluation of the FY 1984 Advertising Mix Test. Since 1978, the Office of the Assistant Secretary of Defense and the military Services have collaborated in enlistment recruiting advertising through the Joint Recruiting Advertising Program. A central issue in the FY 1984 Advertising Mix Test is the assessment of the appropriate mix of Joint and Service-specific advertising. Clearly, any meaningful evaluation of the test must incorporate any differences in objectives or operations between Joint and Service-specific advertising.

Since little guidance is available in the literature to identify any such differences, the Wharton project staff conducted primary exploratory research aimed at identifying and categorizing prevailing motives for collaborative industry advertising. This exploratory research was conducted in the form of semi-structured interviews with industry trade associations which have recently conducted collaborative advertising campaigns.

This chapter reviews the methodology employed and the sample interviewed in this exploratory effort, describes the findings regarding the motives or objectives for collaborative industry advertising, and discussess the relevance of the findings to the evaluation of the FY 1984 Advertising Mix Test.

METHODOLOGY

A sample of 20 industry trade associations was identified as the subject group for this research task. The associations selected were chosen using the following guidelines: (1) multimillion dollar advertising budgets; (2) a strong representation by industries providing financial services (because of their comparability with each other); (3) industries competing with other industries for market share (e.g., the beef or the pork industry); and (4) a diverse mixture of industries.

The project team subsequently excluded one of the 20 candidate organizations from the sample because its advertising campaign was not collaboratively funded. The remaining 19 organizations (Table 3.1) willingly participated in the research.

Cognizant representatives from each organization were interviewed by the Wharton project staff. These representatives were Directors of Advertising, Directors of Marketing, or Executive Directors of the organizations as deemed appropriate by the responding organization. In

Table 3.1
COLLABORATIVE ADVERTISING SURVEY PARTICIPANTS

Florida Department of Citrus
National Pork Producers Council
American Dairy Association
Florida Fruit and Vegetable Association
National Live Stock and Meat Board
American Florists Marketing Council
Quality Bakers of America
Investment Company Institute
Communication Workers of America
U.S. Committee for Energy Awareness
The American Bankers Association
American Council of Life Insurance
International Ladies' Garment Workers' Union
Savings and Loan Foundation, Inc.
Independent Insurance Agents of America
American Sheep Products Council, Inc.
American Gas Association
American Heart Association
Linen Supply Association of America

one case the commercial advertising agency was viewed as the most knowledgeable source for responding to interview questions.

Fairly indepth, semi-structured interviews were conducted with these representatives. Because of the exploratory nature of this research, interview lengths were permitted to vary and ranged from 30 minutes to more than 90 minutes. An initial set of four interviews was conducted by personal interview. These interviews were used to refine the interview protocols and topic guides as well as to elicit specific information. These personal interviews were conducted using two topic guides (Appendix I). One topic guide was designed for interviewing an industry group or association; the other was targeted for an advertising agency representing the group or association. In addition, the topic guides were intended to elicit both direct answers and secondary information. The secondary information was used to corroborate the direct answers.

For instance, in the case of Communications Workers of America (CWA), to check for consistency, actual media decisions were compared to its stated criteria.

Telephone interviews were then conducted with representatives of the remaining 15 organizations. Overall, the level of cooperation of all respondents interviewed was excellent.

CHARACTERIZING COLLABORATIVE ADVERTISERS

It became apparent early in the research effort that simple characteristics like a particular industry structure and an industry-wide interest in market expansion or cost reduction are insufficient to distinguish collaborative from competitive advertisers.

Commodity, non-brand industries with many small members do not adequately define collaborative advertisers. For example, small pork farmers collectively advertise while highly differentiated, huge mutual fund organizations also collaborate in market expansion advertising. Conversely, Florida's fruit and vegetable growers formed a cooperative, but they do not collaborate on advertising because an adequate representation of the interests of 27 commodities as a group or in part is difficult. Clearly, a particular market structure fails to isolate industry from firm-specific advertisers.

Similarly, a common interest in market expansion advertising does not necessarily sufficiently unify an industry to act collectively. Such advertising is meant to expand the entire market and/or to reduce the cost of doing business. Yet, some industries collaborate in advertising while others do not. In addition, some industry members use the market expansionary goals of industry advertising without collaborating with other industry members. For example, AT&T ("Reach out and touch someone") and Campbell's Soup ("Soup is Good Food") each conduct market-expansion advertising campaigns without collaboration with other potential competitors in their industry. Not only must other conditions exist to allow the collaboration to occur, but also industry members must have a mutual interest in the same type of market expansion. As noted in the literature review, expansion campaigns can:

- Generally educate the consumer as to the benefits of a product
- Combat an enemy that distributes misinformation about the product
- Expand the product's selling season
- Suggest new uses for the product
- Build an overall image/emotion for the product

Members of an industry must share an interest in a particular type of market expansion for cooperative advertising.

In general, industry members will support collaborative advertising in situations where they cannot or will not advertise individually. As noted above, these situations will not be defined by a particular market structure or a general industry-wide interest in market expansion. Instead, a specific mutual interest must be established among industry members or must already exist as a result of cooperation in other industry functions (trade shows, standard setting, government lobbying, new product research, etc.). Then, industry members can weigh the benefits and costs of industry-wide cooperation in advertising.

FIVE MOTIVATIONS FOR INDUSTRY ADVERTISING

Given a common interest in a particular type of market expansion advertising and in lowering the costs of doing business, an industry may have a unique set of reasons for deciding to advertise collectively. In fact, the industry groups WARC interviewed did articulate various subsets of reasons, but, taken together, they described the following five major motivations for collaboration in advertising:

- To take advantage of economies of scale in advertising
- To address secondary target groups that are different from those they could reach individually
- To address the primary target group from a different perspective than could be achieved individually
- To eliminate "free-riders" (industry members that benefit without paying) resulting from using generic message content
- To stimulate goodwill and mutual support within the entire industry

Economies Of Scale

The most common reason given for an industry uniting to advertise collectively is economies of scale. As long as the industry members share a common message, an association can purchase a larger, more professional ad campaign than its members can individually. For example, the American Florists Marketing Council was established by small, independent florists throughout the United States. As a group, these florists receive the benefits of quality posters and countercards, and a national advertising campaign for Grandparents Day. Clearly, none of these florists could have individually afforded these advertisements. The benefit of reduced advertising production cost unified the florist industry.

In addition, collective action enables member firms to reduce media costs in advertising. Frequently, members do not possess the infrastructure, skill or time to handle advertising on their own. In such cases they pool their media expertise (e.g., Linen Promotion Council, Savings and Loan Foundation) so as to make more effective use of their advertising dollars.

Another economies of scale distinction between collaborative advertising and firm- or brand-specific advertising is campaign scope. Advertising on a joint basis may take place on a national scale whereas individual firms concentrate on the geographical areas of their operations. This is typically the case with agencies such as the American Gas Association and the Investment Company Institute. In various cases, reprints of national advertisements have been effectively used by member companies to promote their products in their own markets.

Finally, collaborative advertising also creates a valuable option for the industry members based on economies of scale. When an industry is performing poorly, the industry members have the option to increase advertising expenditures. In contrast, individual advertisers often reduce advertising expenses in a failing industry. Because each member has a relatively small vested interest in the campaign and the potential benefits of improving industry sales exist, members see an advantage to increasing collaborative advertising. For example, Investment Company Institute, an assocation of mutual funds, launched a $5 million dollar campaign after mutual funds lost $60 million to money market competition. The mutual funds opted to contribute incremental dollars to advertising their common message against a common threat.

Economies of scale effects were most frequently cited by fragmented industries as a reason for industry collaboration. These results may be interpreted two ways. Industries with many participants selling a commodity or non-branded product may collaborate because product differentiation among industries' members is not possible. More concentrated industries (oligopolies and monopolies) may avoid collaboration because differentiation is paramount. On the other hand, the U.S. regulatory environment may preclude collaboration in oligopolies, and as a result, only fragmented industries collectively may advertise to gain economies of scale.

Since the Department of Defense is not subject to anti-trust regulation, economies of scale may support its use of Joint advertising. To the extent that commonality exists among the Services as to what the military offers a potential recruit, Joint advertising may allow production cost savings. Similarly, coordinating all media purchases through one channel or agency may generate media cost savings.

However, the perceived requirement for Service differentiation may preclude effective Joint advertising. Generic Joint advertising to reduce media and promotion costs of advertising may not satisfy the individual Services' requirements as effectively as Service-specific advertising. Therefore, the potential recruits' differential response to Joint and Service-specific advertising must be measured to determine if the economies of scale and effectiveness of Joint advertising outweigh the effectiveness of Service advertising. Though potential economies of scale seem to be a clear reason for fragmented industries to collectively advertise, it may not necessarily be a sufficient reason for the Department of Defense to advertise jointly. Nevertheless, the achievement of scale economies can be hypothesized for Joint advertising.

Reaching Secondary Target Groups With the Same Message

In certain cases, industry members advertise collectively because as a group they can reach audiences that in turn will influence the behavior of the primary target group. In other words, collaborative advertising can be a more effective means of indirect advertising. For example, the 12 local chapters of the Communication Workers of America cannot effectively make their individual interests known to key politicians in Washington. By deciding to act together on key common issues, they are able to project a united front and to better reach national legislators. CWA hopes that this presentation of a national platform will cause legislators to influence AT&T management toward accepting CWA's demands.

Similarly, Joint advertising may be hypothesized to be more effective than Service-specific advertising in reaching audiences that will influence young Americans to enlist. A Joint campaign designed to enhance positive attitudes about military service by highlighting the common benefits of all the Services may more readily appeal to the general population. Parents, friends and guidance counselors may then be motivated to encourage members of the primary target group to consider contacting a military recruiter. In addition, this indirect advertising may encourage direct enlistment by non-target group individuals. Hence, Joint advertising may be hypothesized to encourage more enlistments among older individuals or among others not in the primary target market.

Reaching The Primary Target Group From A New Perspective

A number of industry groups perceived collaborative advertising to be more credible than individual firm advertising. The representatives of the financial service industries in particular felt this to be the case. For instance, Investment Company Institute cited improved credibility as a major reason for collaborative advertising. In many cases the goal of collaborative advertising was described as the "creation of an appropriate image." Therefore, advertising collectively enabled firms to take a different posture when advertising. In other words, attitudinal changes were perceived to be the foremost aim of such advertising. However, members would generally agree to contribute to the budget for such advertising only when they were reasonably convinced of their ability to build upon it and take advantage of it. Several instances were reported where specific campaigns were undertaken to address a specific problem. Collaborative advertising was used as one tool among several others to address the situation. In the context of the Department of Defense, one can hypothesize that Joint advertising is perceived as more credible among certain segments of the youth population and that it is more effective in enhancing the image of the military and improving basic attitudes toward enlistment.

Eliminating Free Riders

Eliminating a free rider problem can also induce industry members to advertise collectively. The free rider problem usually arises in a non-branded, commodity industry where product differentiation among industry members is difficult. An individual firm using a generic message in advertising inadvertently benefits its competitors. So, one firm is paying for others to receive advertising benefits and non-advertisers are receiving benefits without paying. This externality is called the free-rider problem. Some collaborative industry advertisers reported that collaborative advertising reduced or eliminated this problem because it provided a mechanism by which all industry members contribute to the advertising campaign. The Florida orange growers, for example, suffered free-rider and quality control problems. Not only did non-advertisers obtain the benefits of generic orange advertising, but growers of poor-quality oranges also received the benefits of the induced demand for high quality fruit. Because Florida oranges were not brand-names, consumers could not distinguish advertised high-quality oranges. As a result, the growers asked the state to regulate quality standards and tax all growers (on a per crate basis) to fund generic Florida orange advertising. Collaborative advertising substantially mitigated the free-rider problem.

In contrast to non-branded, commodity industries, the free-rider problem may not discourage the use of the generic messages by individual firms in monopolistic or single dominant player industries. For example, Campbell's Soup advertises the generic message -- "Soup is Good Food." Since Campbell dominates the soup industry, it ignores the spillover benefits of its ads for other soup manufacturers. Similarly, AT&T advertises to "Reach Out and Touch Someone" despite free-riders.

Joint advertising may obviate a free-rider situation which may be hypothesized to arise when one service conducting a generic advertising campaign (e.g., "Get Experience") may benefit other Services. Collaborative advertising removes the need to reallocate budgets among the Services to account for spillover effects.

However, it is not clear whether a free-rider problem can arise at the Department of Defense. The Department of Defense consists of four competitive, "branded" Services. If the Services are sufficiently differentiated from one another, a free-rider problem will not occur when a Service uses a generic message: all the benefits of advertising will be accrued by the advertiser. Spillover effects may be insufficient to require Joint advertising.

Instead, Joint advertising may remove a different externality than advertising spillover. In fact, it may control the extent to which the Services can differentiate themselves from one another. If the Department of Defense allowed only Service-specific advertising, the Services may concentrate their advertising on gaining market share rather than on expanding the market. The Services may differentiate themselves to such an extent as to be dysfunctional. Hence, one can hypothesize that less Service differentiation occurs with more Joint advertising.

Generating Goodwill

Collaborative advertising was reported as contributing to goodwill within an industry. Seeing advantageous advertising makes industry members "feel good" about the industry. For example, CWA members, reading their bargaining positions in local newspapers, felt more confident about their requests.

Similarly, Joint advertising may have substantial goodwill effects for the Department of Defense. It may be hypothesized to differentially encourage recruiters (one of the most influential factors in recruiting) to improve their effort. Furthermore, Joint advertising may help stimulate reenlistment, build reserves, and smooth the budgetary process.

The effectiveness of Joint advertising versus Service-specific advertising will depend upon differential response of military personnel and the external audience to collaborative and individual advertising. While Service-specific advertising may produce these goodwill effects, Joint advertising may achieve them more effectively.

SUMMARY AND CONCLUSION

Hypotheses for evaluating Joint versus Service-specific advertising can be developed based on the five motivations for collaborative advertising identified in the industry survey. Table 3.2 presents a schematic representation of survey responses.

Table 3.2
REPORTED MOTIVATIONS FOR COLLABORATIVE ADVERTISING

	Economic Factors		Marketing Factors		
Association #	Achieve Economies of Scale	Eliminating Free Riders	Enhance Credibility	Address New Group	Feel Good
1	x	x			x
2	x	x	x		x
3	x	x			x
4	x				
5	x				x
6	x				
7	x				
8			x		x
9			x	x	x
10			x	x	
11	x				
12	x		x	x	
13			x	x	
14	x		x	x	x
15	x		x	x	x
16	x		x	x	
17			x	x	
18	x				
19	x	—	x	x	—
Total	14	3	11	9	8

Of the 19 organizations interviewed, 14 indicated multiple motives for collaborative advertising.

The five objectives identified have been categorized into economic factors (efficiency related) and marketing factors (effectiveness related). Table 3.3 presents a summary of this categorization.

The weightings for economic (efficiency) and marketing (effectiveness) objectives implied for the sample of respondents were equal. In summary, although this research effort is very exploratory in nature and not amenable to rigorous statistical testing or inferences, at least the two dimensions of economic efficiency and marketing effectiveness are indicated as potential criteria by which to evaluate the Joint advertising components of the Advertisng Mix Test. These dimensions are comparable to and consistent with objectives for brand- or firm-specific advertising.

Table 3.3
CATEGORIES OF OBJECTIVES FOR COLLABORATIVE ADVERTISING

Reported Motivation	Number of Respondents
Economic Motives Only	5
Marketing Motives Only	5
Both Economic and Marketing Motives	9
Total with Some Economic Motives	14
Total with Some Marketing Motives	14
Total Respondents	9

CHAPTER 4
CONCEPTUAL MODELS OF MILITARY RECRUITING ADVERTISING BUDGETS

This chapter presents models and observations reported by Ambar G. Rao in "A Model for Joint and Service Advertising Budgets" (October 1983) and by Hau L. Lee in "A Generalized Model for Joint and Individual Service Advertising on Enlistment for the Armed Forces" (November 1983).

Conceptual models of advertising contributions to the enlistment process were developed to gain insights about advertising's role in that environment as contrasted to the product sales processes treated in the literature. Although these models were not intended for estimation, several important concepts derived from the exercise are reflected in the evaluation criterion and candidate evaluation measures:

- Repeat purchases, an important aspect of product sales, is a negligible feature of the enlistment process.

- Service quotas and quality standards promote "brand switching" among the Services.

- The primary target group is narrow and highly transitory.

- The importance of the enlistment decision can encourage discussions with influencers who may therefore constitute an important advertising target.

- Military enlistment has a strictly sequential buying cycle.

- An intermediate purchase intention can be hypothesized to precede actual enlistment and may be useful for predicting subsequent behavior.

Generally speaking, the models hypothesize two kinds of contributions from military recruiting advertising: a direct contribution to closing enlistment contracts and indirect contributions in improved attitudes toward military service among youths of prime enlistable age (18-20 years), youths approaching enlistable age (15-17 years) and influencers of these populations (parents, guidance counselors, etc.). The models minimize the sum of Service-specific and Joint advertising expenditures while assuring that each Service meets its enlistment contract requirements across time.

RAO'S ONE PERIOD MODEL

Rao advances a simple one period advertising model under the following hypotheses.

H1 - Advertising Makes Both Short-Term and Long-Term Contributions

Advertising improves the attitude toward military service of 18-20-year-old youths. Improved attitudes among this group increases the size of the pool of enlistable youths who are favorably disposed to military service. Advertising improves the attitude toward military service of 15-17-year-old youths and of their influencers. Improved attitudes among these groups increases the size of future pools of high-quality, 18-20-year-old youths who are favorably disposed to military service.

H2 - Enlistment Contracts to a Given Service Arise from Three Sources

Enlistment contracts may come from the pool of favorably disposed youths. These contracts are denoted "pool contracts."

Enlistment contracts may arise from "targets of opportunity" outside the pool of favorably disposed youths because of circumstances such as unemployment. These contracts are denoted "opportunity contracts."

Enlistment contracts may arise from surplus applications to others Services. These overflow contracts may be either self-directed or guided by the system.

H3 - Enlistment Requirements for All Services Are to be Met at the Smallest Overall Advertising Cost

Since, in his one-period model, Rao does not distinguish between pool contracts and opportunity contracts, he represents the enlistment demand constraints as

$$r_s(A^s) + g(A^J)K_s(A^s) + \sum_{s' \neq s} E_{s'} h_{s',s} \geq R_s$$

if the Service obtains less than its requirements from its own applicants.

$$r_s(A^s) + g(A^J)K_s(A^s) - E_s = R_s$$

if a Service enjoys a surplus of applicants.

where $s \in \{A,N,F,M\}$ denotes Service (Army, Navy, USAF, USMC, respectively).

- R_s is the enlistment requirement of Service s.
- A^s is the advertising budget of Service s.
- A^J is the budget for Joint advertising.
- $r_s(A^s)$ is the enlistment contribution of Service-specific advertising. Advertising contributions to closing contracts and to improving attitudes are aggregated in this factor. $r_s(0) > 0$; i.e., even in the absence of any Service-specific advertising, some contracts would be realized.

$g(A^J)$ is the aggregate enlistment contribution of Joint advertising.

$K_s(A^s)$ is the share of $g(A^J)$ which accrues to Service s. K is represented as a function of the advertising budget for Service s. $K_s(0) > 0$; i.e., even in the absence of any Service-specific advertising, some contracts would be realized as a result of Joint advertising.

$E_{s'}$ is the surplus of applicants to Service s'.

$h_{s',s}$ is the proportion of $E_{s'}$ that switches to Service s. h is also taken to be a function of the advertising budget for Service s.

Considering only two Services, the Army and the Air Force, and an environment where the Air Force is enjoying a surplus of applicants as opposed to an inadequate supply for the Army, Rao's simple one period model becomes:

$$\text{minimize} \quad A^A + A^F + A^J$$

subject to:

$$r_A(A^A) + g(A^J)K_A(A^A) + E_F\, h_{F,A} \geq R_A$$

$$r_F(A^F) + g(A^J)K_F(A^F) - E_F = R_F$$

From this structure, Rao sees a justification for heavy Air Force advertising if applicants can be efficiently converted to Army contracts (i.e., if $h_{F,A}$ is large) or for heavy Army-specific advertising if not.

RAO'S MULTI-PERIOD MODEL

After observing that an operational model should consider 4-6 periods and all four Services, Rao advances an illustrative model for two Services and two time periods.

$$\text{minimize} \quad A^A{}_t + A^F{}_t + A^J{}_t + A^A{}_{t+1} + A^F{}_{t+1} + A^J{}_{t+1}$$

subject to:

$$P_t r_A(A_t{}^A) + P_t\, g(A^J{}_t)\, K_A\, (A^A{}_t) + E_{F,t} \cdot h_{F,A,t} \geq R_{A,t}$$

$$P_t r_F(A^F{}_t) + P_t\, g(A^J{}_t) K_F(A^F{}_t) - E_F = R_{F,t}$$

$$P_{t+1} - b_t m(A^J, A^A, A^F) = 0$$

where $s \in \{A,N,F,M\}$ denotes Service (Army, Navy, USAF, USMC, respectively).

$R_{s,t}$ is the enlistment requirement of Service s in period t.

$A^s{}_t$ is the advertising budget of Service s in period t.

$A^J{}_t$ is the budget for joint-Services advertising in period t.

$r_s(A^s{}_t)$ is the enlistment contribution of Service-specific advertising in period t. Except for the time dimension, r is interpreted as in the single period model.

$g(A^J_t)$ is the aggregate enlistment contribution of Joint advertising in period t.

$K_s(A^s_t)$ is the share of $g(A^J_t)$ which accrues to Service s in period t. K is interpreted as in the single period model.

$E_{s',t}$ is the surplus of applicants to Service s' in period t.

$h_{s',s,t}$ is the proportion of $E_{s',t}$ that switches to Service s in period t. Except for the time dimension, h is interpreted as in the single period model.

P_t is the pool of 18-20-year-olds who are favorably disposed to military service in the year t (indexed to a base year).

b_t is the pool of 15-17-year-olds who are favorably disposed to military service in the year t (indexed to the same base year as p_t).

$P_{t+1} =$ $b_t m(A^J, A^A, A^F)$: i.e., to pool of favorably disposed 18-20-year-olds depends upon advertising previously absorbed by 15-17-year-olds.

P_t scales the advertising response function. If the pool of favorably disposed 18-20-year-olds were to remain constant, the scaling factor would be unity. As the pool increases or decreases, the scaling factor varies accordingly.

From this formulation, Rao concludes that if Service-specific and Joint advertising expenditures increase P_t, then they must have positive values. In particular, if $m(A^J, A^A, A^F)$ is approximated by $m(A^J)$, then there is a rationale for Joint advertising regardless of its direct impact on contracts. Support for Service-specific advertising also exists when it increases the fraction of the target population including a Service having unmet enlistment requirements in their set of job alternatives.

LEE'S EXTENSIONS OF THE RAO MODELS

Lee reviewed and developed extensions to the Rao models in "A Generalized Model for Joint and Individual Service Advertising on Enlistment Contracts for the Armed Forces" (November 1983). Extensions advanced by Lee include:

- A full specification of the models for all Services.
- Relaxation of Rao's assumption that Air Force applicants are in surplus and can be accommodated by unmet Army requirements.
- Differentiation between "pool" and "opportunity" contracts.
- Refinement of the aging progression.
- Differentiation between the advertising responses of populations which are favorably disposed and those which are not.

Besides these refinements, Lee's treatment of the youth population differs slightly from that of the Rao models. Lee considers 17-21-year-olds to be the prime enlistable population and 14-16-year-olds to be the population approaching enlistment age.

LEE'S ONE PERIOD MODEL

Since Lee distinguishes between "pool" and "opportunity" contracts and assumes no direction for the flow of surplus applicants, his demand constraints take the following form:

$$p^f[r^f_s(A^s) + g^f_s(A^J)] + p^a[r^a_s(A^s) + g^a_s(A^J)] + \sum_{s' \neq s} h_{s',s}(\tilde{A})E^{s'} - E^s = R^s, \text{ for all } s$$

where p^f is the population of 17-21-year-olds who are favorably disposed toward military service.

p_a is the population of 17-21-year-olds who are not favorably disposed toward military service.

$s \in \{A,N,F,M\}$ denotes Service (Army, Navy, USAF, USMC, respectively).

A^s is the advertising expenditure for Service s.

A^J is the advertising expenditure for joint-Services advertising.

$\tilde{A} = (A^A, A^N, A^F, A^M)$

$r^f_s(A^s)$ is the advertising response rate of p^f for Service s: i.e., $r^f_s(A^s)$ is the proportion of the favorably disposed population who join as a result of A^s.

$r^a_s(A^s)$ is the advertising reponse rate of p^a for Service s.

$g^f_s(A^J)$ is the advertising response rate of p^f for Joint advertising.

$g^a_s(A^J)$ is the advertising response rate of p^a for Joint Services.

$h_{s',s}(\tilde{A})$ is the overflow rate as a proportion of would-be enlistees to Service s who will enlist in Service s' if $\tilde{A}$ are the Service-specific advertising expenditures.

$E^{s'}$ is the overflow from Service s'.

R^s is the enlistment requirement for Service s.

The following constraints are required to prevent the model generating more enlistments than persons in the enlistable population:

$$g^f_s(A^J) + \sum_S r^f_s(A^s) \leq 1, \text{ and}$$

$$g^a_s(A^J) + \sum_S r^a_s(A^s) \leq 1.$$

Also, to prevent distributing more overflow enlistments than persons in the overflow populations, the following constraint is imposed for every Service s:

$$\sum_{s'} h_{s',s} \leq 1.$$

Lee's one period model is simply,

minimize $A^J + A^A + A^N + A^F + A^M$

subject to the foregoing constraints.

LEE'S MULTI-PERIOD MODEL

A major consideration in multi-period models is the transition between age categories. In an annual model, not all the 14-16-year-olds will transition to the 17-21-year-old category. Lee recognizes this difficulty and after observing that census projections might resolve the matter more exactly, elects to assume a uniform yearly age distribution within the age categories. Consequently, one-fifth of the 17-21-year-old pool ages out of consideration each (annual) period. These individuals are replaced by one-third of the individuals in the 14-16-year-old pool. The 14-16-year-old pool is replenished by an influx of individuals just aging into consideration.

Lee's view of the transitions of 14-16-year-olds is depicted in Figure 4.1. In his multi-period model, an individual may transition to being favorably disposed to military service, but not the reverse: i.e., once favorably disposed, always favorably disposed. For time periods t and t+1, Figure 4.1 can be expressed algebraically as follows:

$$B^f_{t+1} = N^f_{t+1} + (2/3)\,[B^f_t + g(\tilde{A}_t, A^J_t, B^a_t] \text{ and}$$

$$B^a_{t+1} = N^a_{t+1} + (2/3)\,[B^a_t - g(\tilde{A}_t, A^J_t)]$$

where advertising expenditures are now subscripted for time,

B^f_t and B^a_t are, respectively, the pools of 14-16-year-olds who are favorably disposed to military service and those who are not.

N^f_t and N^a_t are new additions to those pools of 14-16-year-olds.

$g(\tilde{A}_t, A^J_t)$ is the conversion rate to the pool of individuals who are favorably disposed toward military service from the pool of 14-16-year-old individuals who are not.

Transitions for 17-21-year-olds are shown in Figure 4.2. The transition equations implied by that figure are as follows:

$$P^f_{t+1} = (1/3)\,[B^f_t + g(\tilde{A}_t, A^J_t) B^a_t] + (4/5) P^f_t + m(\tilde{A}_t, A^J_t) P^a_t] \text{ and}$$

$$P^a_t{+}1 = (1/3) B^a_t\,[1 - g(\tilde{A}_t, A^J_t)] + (4/5) P^a_t\,[1 - m(\tilde{A}_t, A^J_t)]$$

Figure 4.1

Transitions of Age Group (14–16)

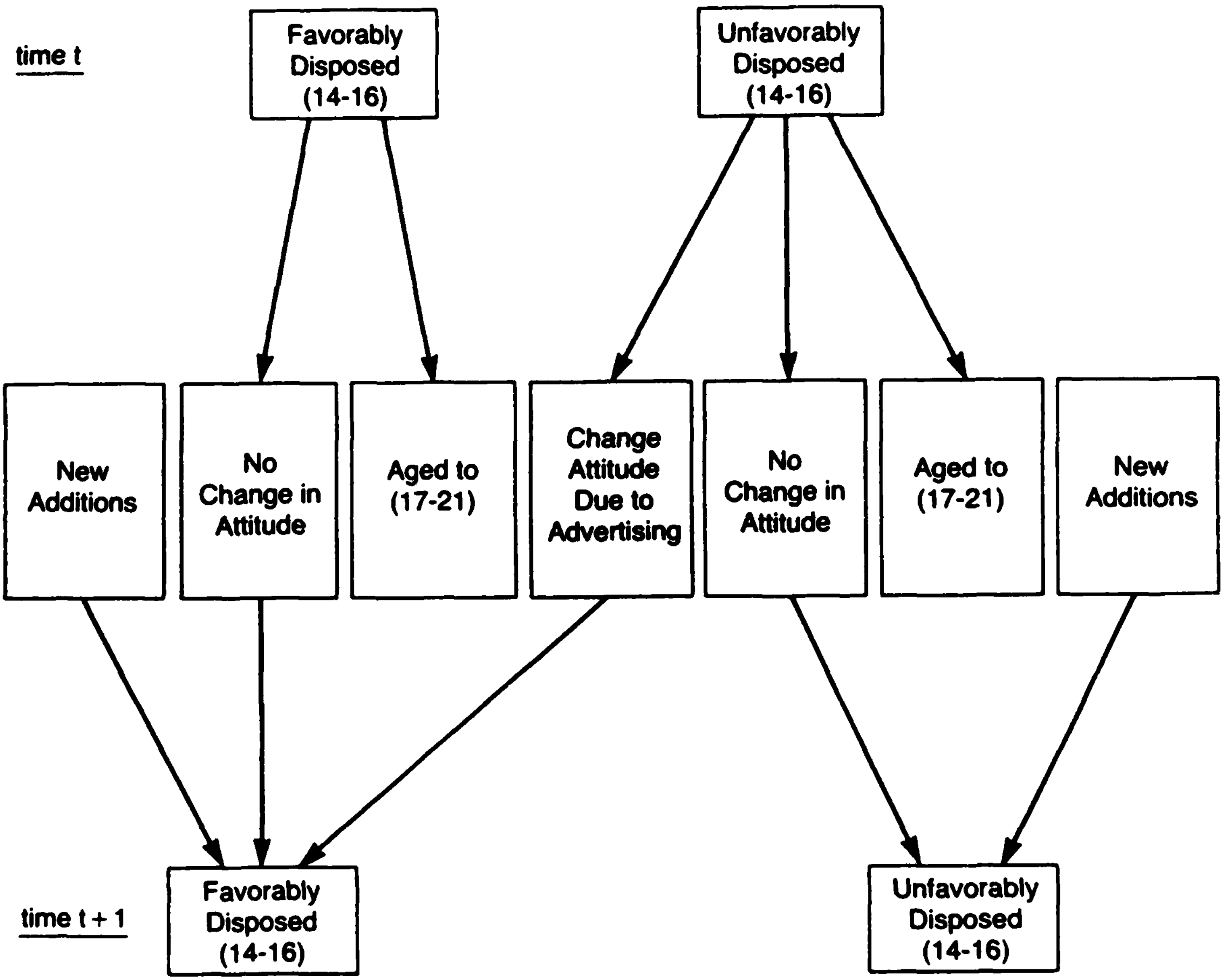
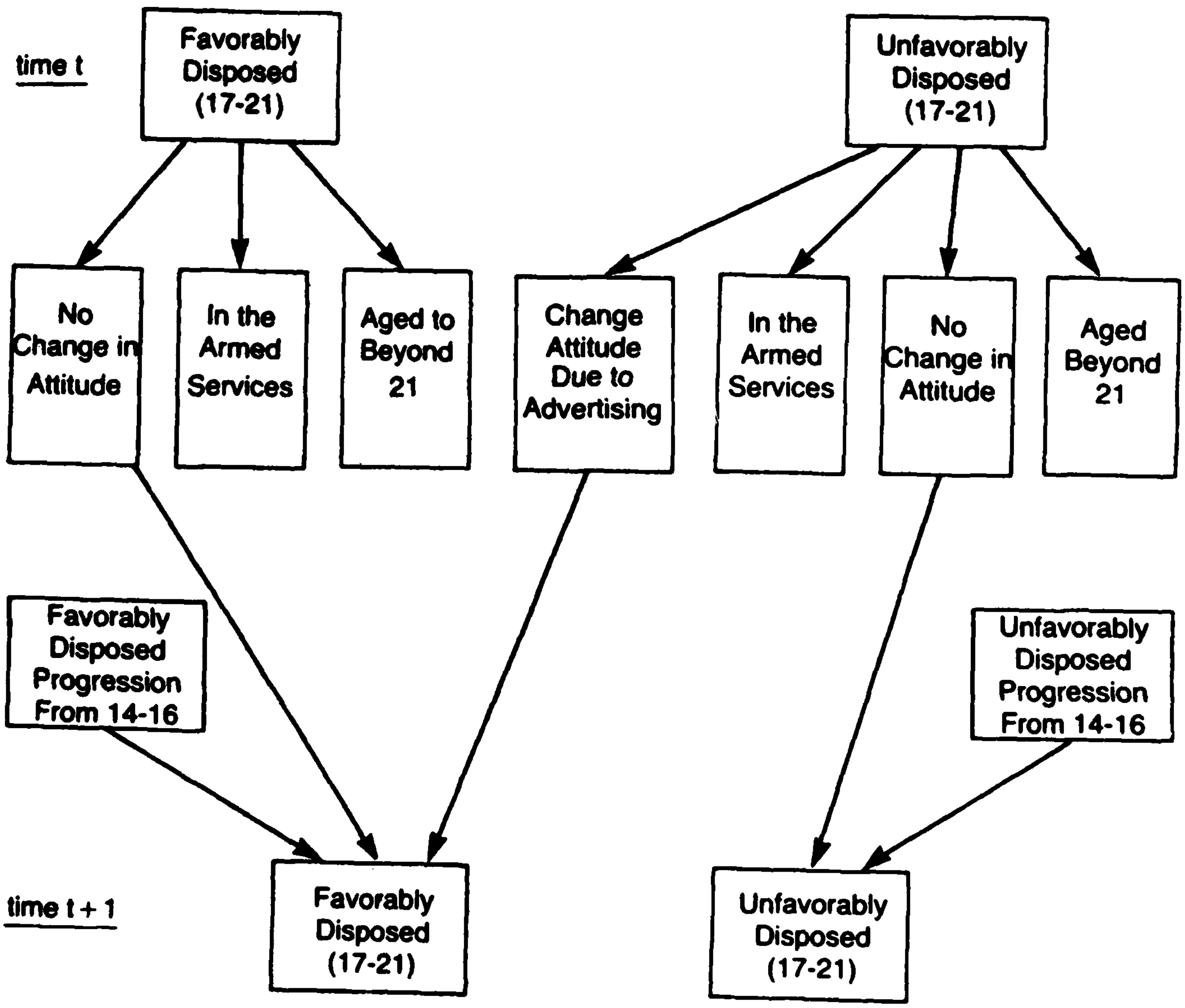


Figure 4.2

Transitions of Age Group (17–21)



where P^f_t and P^a_t are, respectively, the pools of 17-21-year-olds who are favorably disposed to military service and those who are not.

$m(\tilde{A}_t, A^J_t)$ is the conversion rate for 17-21-year-olds analagous to $g(\tilde{A}_t, A^J_t)$ for 14-16-year-olds.

All that remains to complete the constraint set for the multi-period model is the enlistment demand constraints. These constraints are similar to those for the single period model and for each Service s and time period t can be expressed as follows:

$$P^f_t[r^f_s(A^s_t) + g^f_s(A^J_t)] + P^a_t[r^a_s(A^s_t) + g^a_s(A^J_t)] + \sum_{s' \neq s} h_{s',s}(\tilde{A}_t)E^{s'}_t - E^s_t = R^s_t$$

where response rates r and g are as defined for the one period model.

Lee's multi-period model can be expressed in simplified form as

$$\text{minimize} \sum_t (A^J_t + A^A_t + A^N_t + A^F_t + A^M_t)$$

subject to: the enlistment demand constraint in every period, 14-16-year-old population transition constraints, 17-21-year-old population transition contraints, non-negativity of advertising expenditures.

CHAPTER 5
CONCLUSIONS

The research reported here has focused on developing a criterion by which one advertising treatment of the FY 1984 Advertising Mix Test can be compared with another. This criterion provides the basis to compare level of advertising expenditures and the mix of the expenditures between collaborative (Joint) advertising and individual Service advertising.

A review of the relevant literature, interviews with commercial collaborative advertisers, and the process of developing conceptual models of military enlistment advertising effects have strongly supported use of economic efficiency and program effectiveness criteria.

These criteria can be applied both to firm- or brand-level advertising and to collaborative advertising. Accordingly, evaluation of the FY 1984 Advertising Mix Test will use a compound criterion: **The advertising policy of choice will be one providing the necessary short-term and long-term contributions to the attainment of the Services' enlistment requirements and having the lowest total advertising budget.**

Although a treatment of measures of effectiveness and analytical methods will be provided in a subsequent report, some preliminary measures of effectiveness and methodologies are previewed in the following sections.

A WORD ABOUT MEASURES

A number of measures for evaluating the experimental results will be derived from data collected as part of the experiment. Measures under consideration are either aggregate sales response measures or aggregated intermediate measures with demonstrated reliability and predictive validity. The measures are based on observed behavior, on reported behavior, and on attitudes. Measures of observed behavior include observation of applicants and contracts by Service and by educational/test attainment. Measures of reported behavior include reported recruiter contacts and reported conversations regarding enlistment. Attitudinal measures include statements of intention to join the military or a specific Service. These measures focus on different phases of the strictly sequential enlistment cycle. This large variety of measures is appropriate because each individual measure has potential limitations which may be substantially alleviated if the measures are used together in a consensus form of policy evaluation.

A WORD ABOUT METHODOLOGY

The observed enlistment behavior measures of contracts and applicants will be analyzed using actual monthly observations of advertising and the observed behavior of contracts and applicants for each market. Regression-based analysis techniques are appropriate for these measures and will allow the investigation of lags in advertising response and of effects of recruiting phenomena such as the number of recruiters in a given market, the size of the Delayed Entry Program, and recruiting missions.

The reported behaviors and attitudinal measures are derived from questions in the Youth Attitude Tracking Study. Since this study is administered in the fall of each year, only two observations will be available for each market or treatment cell. For these measures, cross-sectional analysis of variance comparisons of the measures and their rates of change across treatment conditions are appropriate.

Each advertising strategy (treatment condition) will be evaluated using the same measures. These evalutions will be compared for consistency and every effort will be made to explain and reconcile any conflicting indications. Recommendations regarding the level and mix of DoD advertising will be based on a consensus across evaluations.

APPENDIX 1

INDUSTRY ADVERTISING TOPIC GUIDE

We are undertaking a research project concerned with the impact of industry advertising. As part of the project, we are examining the practices used in developing, executing and evaluating industry-oriented advertising as differentiated from brand or company-oriented advertising campaigns. Your association has been selected for participation in the study because of its industry promotion strategy. Accordingly, we would like to ask you a few questions about this program and how it was developed and evaluated.

1. When was the campaign first initiated? What prompted the development of an industry campaign? What were its initial objectives? What is the target population (i.e., customers, workers in the industry, regulators)?

2. How has the campaign developed over time? How has it grown? Why?

3. What are the current goals and objectives of the campaign? How is this strategy different from that used by companies within the industry? What are the tradeoffs and conflicts between industry campaigns and company specific campaigns (e.g., coordination, conflict over strategies, etc.)?

4. Who determines the budget? How?

5. What are the current elements of the campaign strategy and how large/important is each element?

   - public relations activity (e.g., news articles, news)
   - speeches
   - media and advertising (break out budget by proportion)
     - — newspaper
     - — magazines
     - — TV
     - — radio
     - — direct mail
     - — telemarketing
     - — other

6. How is media mix determined?

7. How many people are involved in planning and executing the strategy? Who are they? Which member companies are involved? What are their roles and what are they trying to get out of it?

8. Who decides on creative strategy?

9. Are there any constraints placed on the campaign ads by the member firms? Are there any constraints placed on member company ads by the industry?

10. Is there an advertising agency involved? Who handles agency relations? Would you mind if we contacted the agency? Could you provide us with a point of contact?

11. How is advertising success/effectiveness measured? Who determines whether the campaign is successful or needs revision (e.g., the association, member companies)? Is there regular feedback on the campaign from member companies?

12. Is there a program of market research carried out in conjunction with the program? How is the research used? What questions does it answer? What criteria are used to assess the impact of the campaign? How large is the budget?

13. What have been the major benefits and achievements of the strategy? What have been the major problems?

14. Has the campaign been particularly useful or particularly detrimental to one set of member companies or customers? Why?

15. For the future--will the strategy be enhanced, kept the same, decreased? Why?

16. If you were to set the advertising budget, would you increase it, decrease it, or keep it at the same level? Why?

17. How would you define industry advertising?

ADVERTISING AGENCY TOPIC GUIDE

We are undertaking a research project concerned with the impact of industry advertising. As part of the project, we are examining the practices used in developing, executing and evaluating industry-oriented advertising as differentiated from brand or company-oriented advertising campaigns. Your agency has been selected for participation in the study because of its industry promotion strategy. We have been referred to you by ____________________. We would like to ask you a few questions about industry advertising programs conducted by the agency and how they have been developed and evaluated.

1. How many industry-oriented campaigns has the agency undertaken in the last three to five years? For what kinds of organizations? Have you handled campaigns for member companies as well as for the industry in question?

2. What have been the goals and objectives of these campaigns (develop examples)? What is the audience--customers, regulators, the industry itself? What prompted these campaigns to be undertaken?

2a. Are there tradeoffs and conflicts between industry campaigns and company specific campaigns? What are the key areas of tradeoff and conflict?

3. Who is involved in decision-making regarding the campaigns? In associations and industry trade groups? In government agencies?

4. How are budgets set for the campaigns by the various clients? How large are the budgets relative to product-specific or company-specific campaigns?

5. What media mix is used (give rough proportional breakouts, if possible) for 3/4 major campaigns?

   - TV
   - radio
   - newspaper
   - magazines
   - direct mail
   - telemarketing
   - other

6. How (i.e., on what basis) is the media mix determined?

7. Are the media schedules used differently from those used for product- specific advertising?

8. How is creative strategy developed and implemented? Is it different from product or company-specific advertising? How?

8a. Do member companies get involved in any of the above?

9. How are the accounts managed? How is it different from the management of product-specific accounts?

9a. Are there any restrictions placed on campaign ads by member firms or on member company ads by the industry?

10. How do the goals of the industry campaign overlap or diverge from the goals of company-specific campaigns?

11. How is advertising effectiveness/campaign success measured? How is this different from that used for product-specific campaigns?

11a. Do you perceive any industry campaign to have been particularly useful or particularly detrimental to any subset of member companies or subset of customers?

12. Is marketing research carried out in conjunction with these campaigns? What questions does the research address? What criteria are used to assess impact?

13. If you were to set the optimal advertising level for the industry campaigns you have named, would you increase/decrease or keep it the same? Why? What would you do with additional funds?

APPENDIX F

TESTING FOR SIGNIFICANCE: A "DIFFERENCE OF DIFFERENCES" ESTIMATOR

APPENDIX F

TESTING FOR SIGNIFICANCE: A "DIFFERENCE OF DIFFERENCES" ESTIMATOR

Within each test cell (Yellow, Blue, Green, and Red), we observe responses to the YATS questionnaire at two points in time, 1983 and 1984. The proportion of respondents in cell i answering "yes" to a particular survey question in year t is defined as $p_{i,t}$.

Since $p_{i,84}$ and $p_{i,83}$ are the result of responses to the same survey question measured at two points in time, the measure $d_i = p_{i,84} - p_{i,83}$ is interpreted as an estimator of the change in the (true) population proportion answering "yes" across time.

Since it represents an estimator of the difference between two population proportions, d_i is distributed as Student's t. Since the individual $p_{i,t}$ are binomially distributed, the variance of their difference is given by

$$\mathrm{Var}\,(d_i) = \mathrm{Var}\,(p_{i,84} - p_{i,83}) \quad = \quad \frac{(p_{i,83})(1 - p_{i,83})}{N_{i,83}} \quad + \quad \frac{(p_{i,84})\,(1 - p_{i,84})}{N_{i,84}}$$

where $N_{i,t}$ is the size of the sample in cell i in year t. Typically, the above expression would include a term involving the covariance between $p_{i,84}$ and $p_{i,83}$, but since the $p_{i,t}$ are the results of independent YATS samples taken in successive years, they are statistically independent and a covariance term does not appear in the above expression.

We now proceed to compute whether the difference between any pair of differences d_i and d_j is itself significantly different from zero. For example, the difference in the 1983 to 1984 time-difference between cells i and j is denoted by D_{ij} and is given by

$$D_{ij} = d_i - d_j$$

In our analysis, we are particularly interested in this measure where i is one of the treatment cells Blue, Green, or Red, and j represents the Yellow, or control, cell. The variance of D_{ij} is, as above, the sum of the variances of d_i and d_j:

$$\mathrm{Var}\,(D_{ij}) = \mathrm{Var}\,(d_i) + \mathrm{Var}\,(d_j) = \frac{(p_{i,83})(1 - p_{i,83})}{N_{i,83}} + \frac{(p_{i,84})(1 - p_{i,84})}{N_{i,84}} + \frac{(p_{j,83})(1 - p_{j,83})}{N_{j,83}} + \frac{(p_{j,84})(1 - p_{j,84})}{N_{j,84}}$$

Since the cells represent independent, nonoverlapping populations, the covariance between d_i and d_j is zero, and the above expression contains no covariance term.

Since the d_i are themselves distributed as Student's t, their difference D_{ij} is also t-distributed and a test of the null hypothesis that the true difference $D_{ij} = 0$ is performed by evaluating the test statistic:

$$t = D_{ij} / \sqrt{Var(D_{ij})}$$

If the absolute value of t exceeds the two-tailed critical value (based on the significance level of the test being performed), we conclude that D_{ij} is significantly different from zero. Where this is so, the change across time is significantly greater in one cell than another, a phenomenon that is attributed to the effects of advertising in the particular cells.

APPENDIX G

STATISTICAL MODELS USED TO TEST THE RELATIONSHIP BETWEEN ENLISTMENT BEHAVIOR AND ADVERTISING

APPENDIX G

Statistical Models Used to Test the Relationship between Enlistment Behavior and Advertising

The discussion in Chapter 7 noted that the analyses undertaken found no statistically significant relationship between enlistment behavior and either the level of total advertising or the proportion allocated to Joint advertising.

Table 1 summarizes the findings of ten cross-sectional regression models developed to explore this relationship. In general, the analyses revealed no consistent pattern in the relationship between advertising and various categories of applicants. The regression analyses did, however, uncover two numerically small but still statistically significant relationships between high school graduate and senior applicant rates in general and in the upper three test categories specifically, and the proportion of total advertising allocated to the Joint program.

Nevertheless, it appears that the most plausible explanation for advertising's effect on enlistment behavior (i.e., applicant rates) is to assume an interaction effect exists between the level of total advertising and the proportion allocated to the Joint program. That is, for any given level of total spending, there is a proportion allocated to Joint representing the optimum combination that yields the maximum enlistment response. (Refer to Chapter 7 for a further discussion of this.)

Design of the Models

As mentioned earlier, the models used to test these relationships were formulated using cross-sectional regression methods. More specifically the generalized model can be described as:

$$
\begin{aligned}
\text{Log}\,(\text{Applicants}_{ij}/\text{Population}_i) &= b_{1i}\,\text{Log}\,(\text{PJOINT}_i) \\
&+ b_{2i}\,\text{Log}\,(\text{TOTADV}_i) \\
&+ b_{3i}\,\text{Log}\,(\text{UNEMP}_i) \\
&+ b_{4i}\,\text{Log}\,(\text{URBAN}_i) \\
&+ b_{5i}\,\text{Log}\,(\text{RACE}_i) \\
&+ b_{6i}\,\text{Log}\,(\text{RECR}_i)
\end{aligned}
$$

Since the log form of the models has been used, the coefficients for the respective predictor variables can be interpreted directly as elasticities. The full models employed all 72 ADI markets, while the reduced models excluded those 13 ADI markets that composed cell Blue. This was done in order to determine whether cell Blue introduced any anomalous effects in the model. The results in Table 1 showed that cell Blue's behavior was similar to the pattern observed for all cells in the full model.

TABLE 1

Coefficients (Elasticities) of Predictor Variables for Various Categories of Applicants (Dependent Variable) for Enlistment

Dependent Variables	Predictor Variables												$\bar{R}^2$	
Applicants	PJOINT		TOTADV		UNEMP		URBAN		RACE		RECR			
Test Cells:	All	w/o B	All	w/o B	All	w/o B	All	w/o B	All	w/o B	All	w/o B	All	w/o B
Total NPS Males	.046	.034	-.11	.055	.31**	.35**	.011*	.003	.043	.049	.59**	.54**	.49	.49
HS Graduates & Seniors	.050*	.042*	-.11	.065*	.30**	.36**	.011*	.011	.048*	.055*	.62**	.61**	.53	.55
NHS Graduates	.019	-.004	-.14	.018	.31*	.32*	.012	.014	.009	.003	.19	.13	.04	.02
HSDGs & Seniors, I-IIIA	.005	.007	-.10	.064	.14	.15	.021**	.009	-.063*	-.045	.78**	.79**	.46	.47
HSDGs & Seniors, I-III	.097*	.073*	-.13	.064	.48**	.62**	.006	-.003	.17**	.16**	.52**	.48**	.47	.48

* Significant at 5 percent level
** Significant at 1 percent level

Test Cells: All 72 ADI Markets
w/o B (Cell Blue) 59 ADI Markets

$Applicants_{ij}/Population_i$	*Enlistment applicants of education/aptitude type (j) per 17-21-year-old males in ADI market (i)*
$PJOINT_i$	*Percentage of total advertising allocated to Joint in each ADI Market (i)*
$TOTADV_i$	*Joint plus Service specific advertising media expenditures per 17-21-year-old males in each ADI Market (i)*
$UNEMP_i$	*The unemployment rate in each ADI Market (i)*
$URBAN_i$	*The degree of urbanization in each ADI Market (i)*
$RACE_i$	*The percentage of the population classified as non-white in each ADI Market (i)*
$RECR_i$	*The number of recruiter person-months per 1,000 population in the ADI market(s).*

Reading the Table: For total NPS male applicants, if unemployment (UNEMP) increases by 100 percent, then this applicant category will increase by 31 percent (full model, all cells).

APPENDIX H

REGRESSION ANALYSIS
GRAPHS OF DUMMY VARIABLES

APPENDIX H

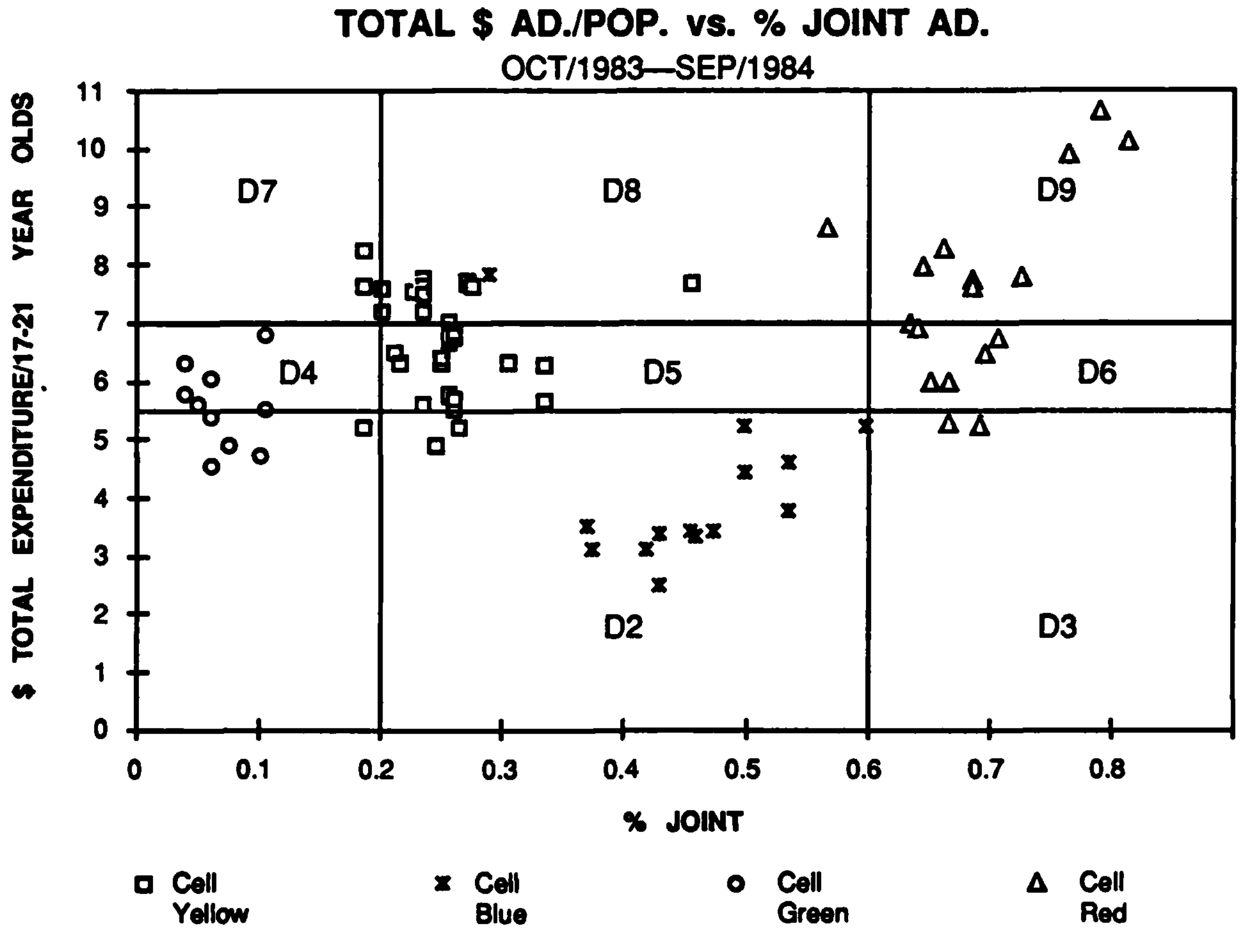
This appendix provides details of the regression analysis supporting the conclusion that an advertising mix with a higher proportion of joint advertising and a relatively lower absolute total dollar expenditure per capita on Joint and Service-specific advertising is the most optimal.

A two dimensional chart of total advertising per capita and percentage joint advertising for the 72 markets in the advertising experiment is constructed. An example of such a chart is shown overleaf. The chart is then subdivided into cells defined according to the levels of total per capita advertising and percentage joint advertising. This chart is divided into nine cells and six cells as shown.

To demonstrate that the conclusions are not sensitive to the demarcation of cells, two nine cell sub-divisions and two six cell sub-divisions are constructed as shown. To each cell a corresponding dummy variable is assigned such that it takes a value equal to one if a market belongs to the cell and zero otherwise. There are eight dummies for the nine cell sub-division and five dummies for the six cell sub-division since the effect of one cell is included in the regression constant term.

The regression analysis was conducted with applicants and contracts (by quality level) as the dependent variable and the dummies in addition to the standard covariates recruiters per capita, unemployment and racial composition. It is observed that the dummy variables corresponding to cells with low total advertising and higher percentage joint advertising are significant. In some cases the dummy variables corresponding to cells with high total advertising and high percentage joint advertising are significantly negative, implying that such an advertising mix might be counterproductive.

SET #1A



Dummy Variable Definitions:

T = Total Expenditure; J = % Joint Expenditure

All Dummy Variables D2 to D9 are set to zero initially. Each dummy is set to 1 when:

D2 = 1	(T below $5.5) and (J between 20% and 60%)
D3 = 1	(T below $5.5) and (J between 60% and 100%)
D4 = 1	(T between $5.5 and $7.0) and (J below 20%)
D5 = 1	(T between $5.5 and $7.0) and (J between 20% and 60%)
D6 = 1	(T between $5.5 and $7.0) and (J above 60%)
D7 = 1	(T above $7.0 and (J below 20%)
D8 = 1	(T above $7.0) and (J between 20% and 60%)
D9 = 1	(T above $7.0) and (J above 60%)

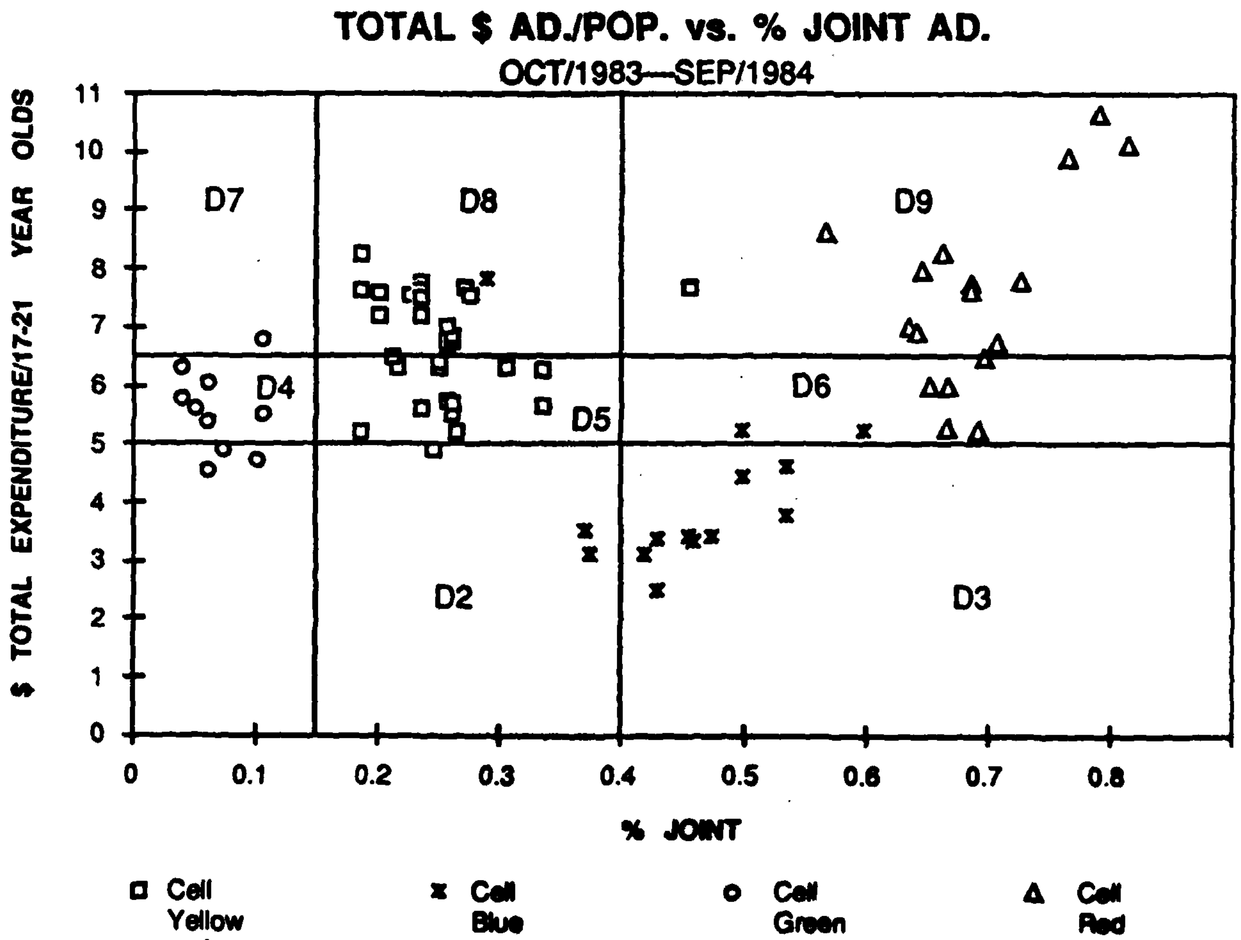
REGRESSION - SET 1A

Dependent Variable: Log of (per capita rate)	Constant	Log of Recruiters Per Capita	Log of Unemployment	Log of Racial Composition	D2	D3	D4	D5	D6	D7	D8	D9
					Dummy Variables as Defined							
APPLICANTS PER CAPITA												
Total	-0.88	0.53**	0.31**	0.05**	0.14*	0.22*	-0.02	0.11	0.07	0.13	0.01	0.04
High School Graduates	0.02	0.57**	0.30**	0.07**	0.14*	0.19	-0.03	0.10	0.08	0.14	0.02	0.05
High School Non-Graduates	-3.64**	0.16	0.26*	0.01	0.16	0.36	0.05	0.15	0.02	0.07	-0.07	-0.08
Upper Mental Group	-0.80	0.66**	0.16	-0.03	0.05	0.08	-0.05	0.04	-0.04	0.06	0.007	-0.05
Lower Mental Group	-0.28	0.54**	0.47**	0.18**	0.26**	0.20	-0.03	0.20	0.22	0.27	0.05	0.15
CONTRACTS PER CAPITA												
Total	-0.32	0.61**	0.25**	0.03	0.12	0.15	-0.03	0.09	0.09	0.15	0.03	0.07
High School Graduates	-0.14	0.66**	0.26**	0.03	0.10	0.11	-0.07	0.08	0.08	0.13	0.007	0.06
High School Non-Graduates	-6.19**	-0.04	0.09	0.06	0.38**	0.62**	0.31	0.35	0.31	0.54*	0.36	0.27
Upper Mental Group	-0.78	0.72**	0.13	-0.02	0.06	0.007	-0.09	0.05	-0.007	0.05	-0.004	-0.03
Lower Mental Group	-0.69	0.62**	0.44**	0.13**	0.20*	0.23	-0.05	0.16	0.21	0.27	0.03	0.17

** Significant at 0.05 level

* Significant at 0.10 level

SET #1B



Dummy Variable Definitions:

T = Total Expenditure; J = % Joint Expenditure

All Dummy Variables D2 to D9 are set to zero initially. Each dummy is set to 1 when:

D2 = 1	(T below $5.0) and (J between 15% and 40%)
D3 = 1	(T below $5.0) and (J between 40% and 100%)
D4 = 1	(T between $5.0 and $7.0) and (J below 15%)
D5 = 1	(T between $5.0 and $7.0) and (J between 15% and 40%)
D6 = 1	(T between $5.0 and $7.0) and (J above 40%)
D7 = 1	(T above $6.5) and (J below 15%)
D8 = 1	(T above $6.5) and (J between 15% and 40%)
D9 = 1	(T above $6.5) and (J above 40%)

REGRESSION - SET 1B

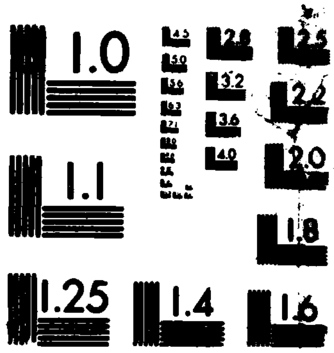
Dependent Variable Log of (per capita rate)	Constant	Log of Recruiters Per Capita	Log of Unemployment	Log of Racial Composition	D2	D3	D4	D5	D6	D7	D8	D9
					Dummy Variables							
APPLICANTS PER CAPITA												
Total	0.54	0.61**	0.29**	0.05*	1.35	1.72*	0.74	1.14	1.52	-1.36	0.85	-0.63
High School Graduates	0.76	0.66**	0.30**	0.06**	0.15	0.19	0.07	0.11	0.15	-0.30	0.08	0.0005
High School Non-Graduates	3.39**	0.29	0.25*	-0.008	0.28	0.20	0.16	0.16	0.31	0.34	0.10	-0.11
Upper Mental Group	0.23	0.89**	0.17*	-0.03	0.05	0.11	0.09	0.04	-0.04	0.75**	0.01	-0.13
Lower Mental Group	1.03	0.47**	0.46**	0.17**	0.38*	0.33**	0.09	0.26*	0.33*	0.23	0.21	0.19
CONTRACTS PER CAPITA												
Total	0.16	0.73**	0.26**	0.03	0.16	0.21*	0.12	0.12	0.14	-0.42**	0.09	0.05
High School Graduates	0.30	0.77**	0.27**	0.02	0.13	0.19*	0.09	0.10	0.11	-0.43**	0.07	0.03
High School Non-Graduates	4.89**	0.25	0.13	0.07**	0.61**	0.56	0.49*	0.39	0.50*	-0.73	0.48**	0.35
Upper Mental Group	0.14	0.93**	0.15*	-0.02	0.04	0.14	0.07	0.05	-0.03	-0.76**	0.007	-0.08
Lower Mental Group	-0.97	0.58**	0.45**	0.10**	0.33*	0.33**	0.15	0.24	0.33*	0.10	0.21	0.22

** Significant at 0.05 level

* Significant at 0.10 level

AD-A186 775 DOD (DEPARTMENT OF DEFENSE) ADVERTISING MIX TEST COMPARISON OF JOINT-SERV..(U) ASSISTANT SECRETARY OF DEFENSE (FORCE MANAGEMENT AND PERSONNE.. V P CARROLL

UNCLASSIFIED JUL 87 F/G 5/1 NL

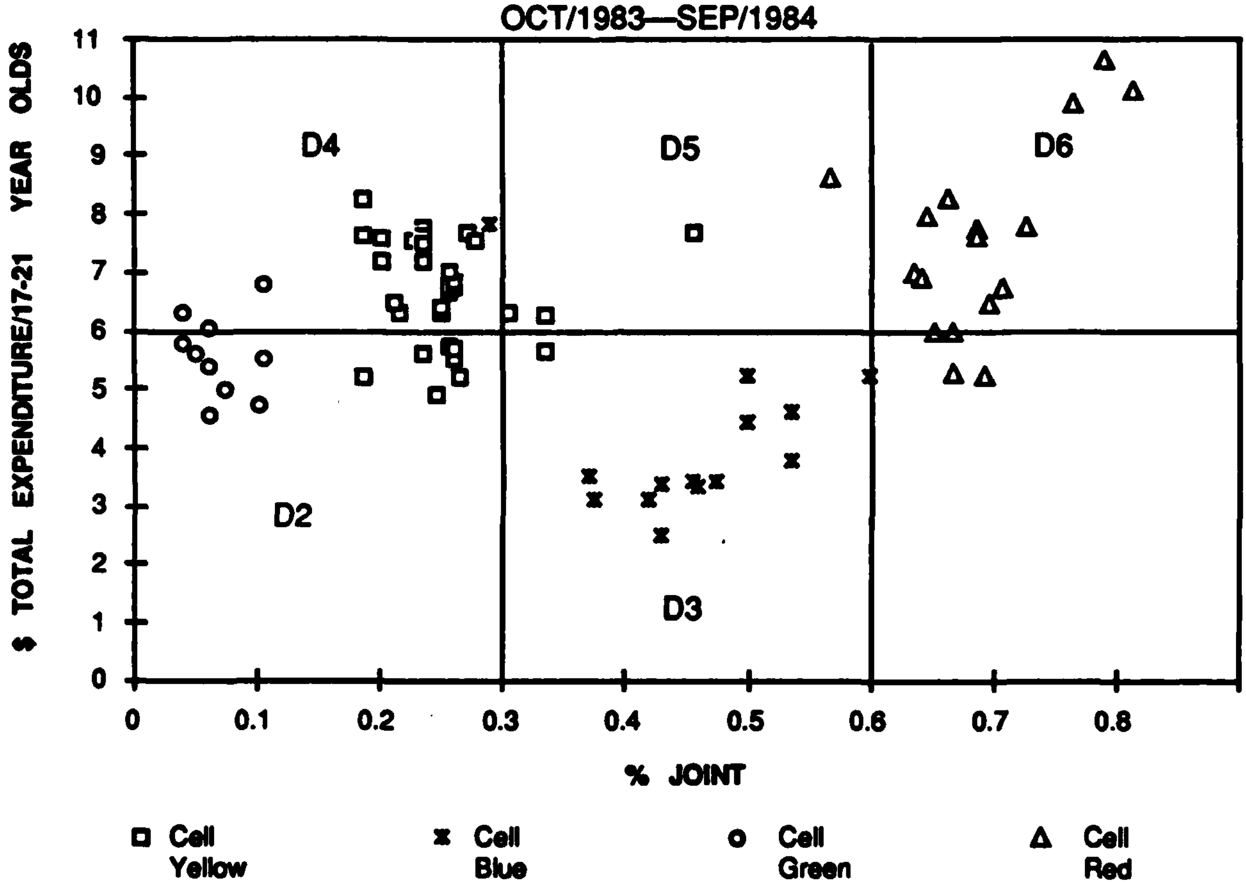


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SET #2A

TOTAL $ AD./POP. vs. % JOINT AD.

OCT/1983—SEP/1984



Dummy Variable Definitions:

T = Total Expenditure; J = % Joint Expenditure

All Dummy Variables D2 to D6 are set to zero initially. Each dummy is set to 1 when:

D2 = 1	(T below $6.0) and (J below 30%)
D3 = 1	(T below $6.0) and (J between 30% and 60%)
D4 = 1	(T at or above $6.0) and (J below 30%)
D5 = 1	(T at or above $6.0) and (J between 30% and 60%)
D6 = 1	(T at or above $6.0) and (J above 60%)

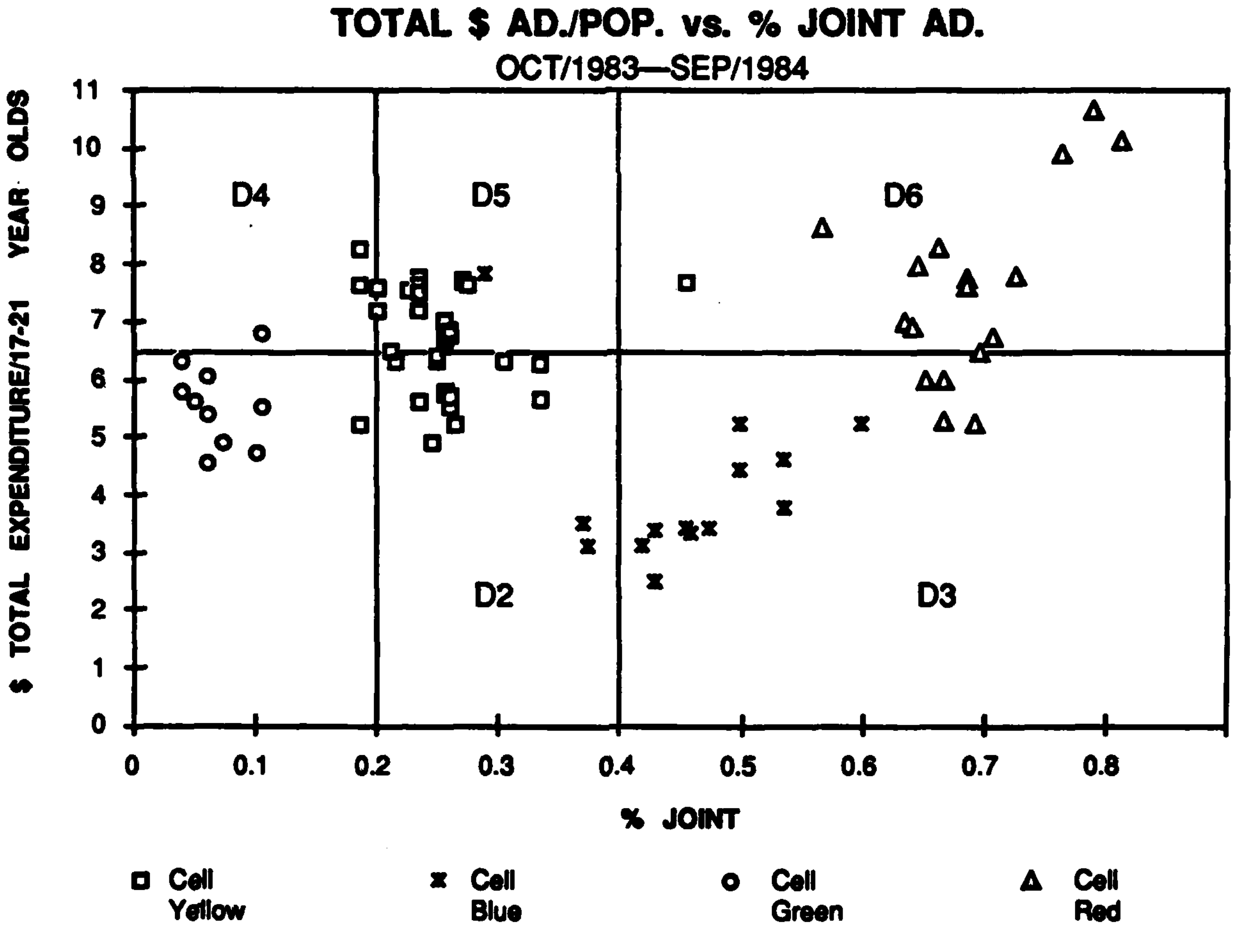
REGRESSION - SET 2A

Dependent Variable: Log of (per capita rate)	Constant	Log of Recruiters Per Capita	Log of Unemployment	Log of Racial Composition	Dummy Variables D2	D3	D4	D5	D6
APPLICANTS PER CAPITA									
Total	0.04	0.53**	0.31**	0.05**	0.11*	0.12	-0.002	-0.25**	-0.04
High School Graudates	0.11	0.58**	0.31**	0.05**	0.12*	0.13	-0.001	-0.22**	-0.03
High School Non-Graduates	-3.33**	0.18	0.32**	0.01	0.06	0.07	-0.02	-0.45**	-0.13
Upper Mental Group	-0.64	0.69**	0.17*	-0.04	0.05	0.01	-0.0003	-0.22*	-0.09
Lower Mental Group	-0.30	0.51**	0.48**	0.17**	0.19**	0.16	-0.003	-0.21	0.02
CONTRACTS PER CAPITA									
Total	-0.33	0.59**	0.26**	0.02	0.10	0.12	0.009	-0.11	0.01
High School Graduates	-0.18	0.65**	0.26**	0.02	0.09	0.11	-0.008	-0.13	-0.0006
High School Non-Graduates	-6.0**	-0.07	0.13	0.07	0.28*	0.19	0.22*	0.13	0.19
Upper Mental Group	-0.79	0.71**	0.15*	-0.03	0.07	0.007	-0.01	-0.11	-0.05
Lower Mental Group	-0.79	0.59**	0.45**	0.10**	0.13	0.21	0.0003	-0.16	0.05

** Significant at 0.05 level

* Significant at 0.10 level

SET #2B



Dummy Variable Definitions:

T = Total Expenditure; J = % Joint Expenditure

All Dummy Variables D2 to D6 are set to zero initially. Each dummy is set to 1 when:

D2 = 1	(T below $6.5) and (J below 20%)
D3 = 1	(T below $6.5) and (J between 20% and 40%)
D4 = 1	(T at or above $6.5) and (J below 20%)
D5 = 1	(T at or above $6.5) and (J between 20% and 40%)
D6 = 1	(T at or above $6.5) and (J above 40%)

REGRESSION - SET 2B

Dependent Variable: Log of (per capita rate)	Constant	Log of Recruiters Per Capita	Log of Unemployment	Log of Racial Composition	Dummy Variables as per Set 2B D2	D3	D4	D5	D6
APPLICANTS PER CAPITA									
Total	0.08	0.53**	0.29**	0.04*	0.11*	0.15**	-0.01	0.06	-0.03
High School Graudates	-0.02	0.56**	0.29**	0.05**	0.11*	0.15**	0.005	0.06	-0.005
High School Non-Graduates	-3.36**	0.21	0.28**	-0.007	0.08	0.14	0.13	-0.009	-0.20
Upper Mental Group	-0.57	0.72**	0.14*	-0.044	0.02	0.02	-0.19	-0.006	-0.13
Lower Mental Group	-0.76	0.46**	0.45**	0.16**	0.25**	0.28**	0.26	0.14	0.14
CONTRACTS PER CAPITA									
Total	-0.35	0.61**	0.24**	0.02	0.09	0.13*	-0.03	0.04	0.02
High School Graduates	-0.22	0.65**	0.25**	0.01	0.09	0.12*	-0.04	0.04	0.01
High School Non-Graduates	-5.71**	-0.01	0.14	0.06	0.11	0.21	-0.04	0.16	0.09
Upper Mental Group	-0.70	0.75**	0.11	-0.04	0.05	0.03	-0.18	-0.007	-0.07
Lower Mental Group	-1.08*	0.54**	0.45**	0.11	0.19**	0.25**	0.21	0.11	0.14

** Significant at 0.05 level

* Significant at 0.10 level

APPENDIX I

DoD ADVERTISING MIX EXPENDITURES BY ADI (FY 1984) ORIGINAL DESIGN

APPENDIX I

DOD ADVERTISING MIX EXPENDITURE BY ADI (FY 1984)

ORIGINAL DESIGN

(CELL YELLOW)

	ARMY			NAVY			AIR FORCE			MARINE			JOINT
ADI	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION
65	1194738	244511	1439249	143363	45097	188460	95797	50882	146679	273439	47687	321126	459882
67	449257	27327	476584	63372	15465	78837	49094	33701	82795	43244	15446	58690	181792
69	110134	27618	137752	7834	1131	8965	7591	3862	11453	9792	2196	11988	43224
89	69838	4344	74182	7075	1136	8211	5363	4736	10099	7655	2681	10336	34928
93	281983	39795	321778	59155	32126	91281	30899	38964	69863	79036	5090	84126	132385
111	348588	44703	393291	52436	29392	81828	28788	44544	73332	94161	19843	114004	159287
115	66465	9932	76397	20681	1704	22385	6804	2715	9519	8550	0	8550	35567
117	62242	7350	69592	13351	2209	15560	7384	5794	13178	8568	1755	10323	42151
135	281451	32779	314230	53878	32510	86388	25371	27016	52387	87617	13830	101447	111763
143	217026	22214	239240	24862	18226	43088	16398	22428	38826	21455	15202	36657	81239
157	294521	35907	330428	47940	17191	65131	28341	24031	52372	72483	17326	89809	122490
159	17390	2437	19827	1876	142	2018	1617	2327	3944	3512	150	3662	9589
177	153291	28735	182026	30739	6540	37279	12752	6033	18785	17678	6895	24573	60187
185	105760	12160	117920	11745	7451	19196	8514	8397	16911	8957	2936	11893	55045
187	106964	18716	125680	24797	3584	28381	11823	1203	13026	21758	2279	24037	59378
197	468707	61390	530097	56679	38038	94717	50178	38167	88345	151656	14075	165731	254151
201	755113	43222	798335	131524	21007	152531	50413	50826	101239	210165	14677	224842	328727
211	108539	12204	120743	25557	6742	32299	11540	9831	21371	20100	4366	24466	51045
277	123156	8891	132047	20093	10973	31066	14199	15133	29332	15766	4826	20592	55804
279	263261	30318	293579	33197	7166	40363	18546	9825	28371	64579	18124	82703	140196
295	43084	3816	46900	4092	4242	8334	3972	5317	9289	4249	153	4402	15376
313	59044	7377	66421	12393	2552	14945	6281	5379	11660	15886	2444	18330	30912
339	78515	9080	87595	8246	1647	9893	6858	5814	12672	7404	960	8364	39243
351	210504	25838	236342	46813	13128	59941	27735	10111	37846	88808	5595	94403	113617
379	33074	3653	36727	3769	1597	5366	3318	3177	6495	5270	649	5919	21336
389	88611	14870	103481	8488	3473	11961	7844	6332	14176	21124	2986	24110	53631
429	59569	8756	68325	7013	1394	8407	5929	1338	7267	6153	867	7020	26889
433	142418	21643	164061	6499	4818	11317	4964	5148	10112	5418	7319	12737	38799
467	24722	1690	26412	2622	317	2939	2270	1555	3825	6288	677	6965	15940
513	8015	3268	11283	2131	221	2352	805	765	1570	707	30	737	11850
SUM YELL	6225980	814544	7040524	932220	331219	1263439	551388	445351	996739	1381478	231064	1612542	2786423

DOD ADVERTISING MIX EXPENDITURE BY ADI (FY 1984)

ORIGINAL DESIGN

(CELL BLUE)

	ARMY			NAVY			AIR FORCE			MARINE			JOINT
ADI	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION
43	245602	21890	267492	35956	19836	55792	17624	15435	33059	18054	8646	26700	139017
57	250179	71537	321716	73581	66765	140346	65052	38986	104038	92865	35923	128788	364637
109	247110	33801	280911	47948	30377	78325	49268	50763	100031	62574	10500	73074	395673
205	43546	6664	50210	16907	3023	19930	10915	3144	14059	25089	5875	30964	54508
233	162259	15089	177348	31265	19728	50993	34930	16275	51205	30482	18774	49256	134940
235	30980	3092	34072	6690	3906	10596	7781	6139	13920	10232	4909	15141	35354
323	20304	2642	22946	2833	983	3816	3114	1315	4429	6161	362	6523	29134
335	54545	11834	66379	9072	2961	12033	12477	2656	15133	11029	2685	13714	80156
371	41105	13810	54915	20594	7821	28415	9170	9324	18494	9438	450	9888	40355
427	38763	16466	55229	14640	5855	20295	13279	5967	19246	12096	1516	13612	48466
441	15037	3504	18541	3089	1251	4340	3589	1394	4983	5114	2680	7794	28670
443	3900	4351	8251	960	66	1026	1153	930	2083	990	30	1020	11127
591	4260	484	4744	674	495	1169	1078	229	1307	795	139	934	8382
621	16370	2260	18630	19062	4789	23851	11210	9057	20267	10209	4367	14576	16540
SUM BLUE	1173960	207424	1381384	283271	167656	450927	240640	161614	402254	295128	96856	391984	1386959

DOD ADVERTISING MIX EXPENDITURE BY ADI (FY 1984)

ORIGINAL DESIGN

(CELL GREEN)

	ARMY			NAVY			AIR FORCE			MARINE			JOINT
ADI	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION
11	1240985	89163	1330148	190543	82716	273160	108359	170262	278621	261991	29021	291012	156856
83	362279	44362	406641	61182	32138	93320	28713	36606	65319	86664	16565	103229	46572
85	18774	2459	21233	13448	11393	24841	8471	11676	20147	11421	1486	12907	3090
105	492673	60937	553610	99692	42484	142176	49727	62140	111867	146550	27175	173725	65966
121	254386	54867	309253	58647	20915	79562	26520	32670	59160	45135	12841	57976	56033
126	12866	2892	15758	1411	1126	2537	1106	1693	2799	1102	216	1318	3327
127	518837	31523	550360	103217	41349	144566	32950	12076	45036	121130	3850	124980	58922
129	146957	9646	156603	13511	17971	31482	12386	5097	17483	18734	2374	21108	20527
269	153108	19819	172927	17837	11463	29300	14821	11744	26565	17261	2618	19879	28025
325	43722	7313	51035	9101	950	10051	3761	6615	10376	4629	2908	7537	11205
SUM GREEN	3244587	322981	3567568	568589	262406	830995	286824	350579	637403	714617	99054	[illegible]3671	450522

DOD ADVERTISING MIX EXPENDITURE BY ADI (FY 1984)

ORIGINAL DESIGN

(CELL RED)

	ARMY			NAVY			AIR FORCE			MARINE			JOINT
ADI	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION	LOCAL	TOTAL	NATION
31	42659	9278	51937	10671	12466	23137	9211	6869	16080	11634	5751	17385	150371
35	247214	52115	299329	54641	31197	85838	53075	28649	81724	54351	40622	94973	656623
107	365688	48117	413805	57823	49634	107457	59760	30913	90673	56312	27759	84071	651641
179	78044	24838	102882	14054	21389	35443	15776	26654	42430	16005	4612	20617	253605
183	6411	1814	8225	952	1043	1995	1128	1911	3039	1387	7826	9213	22896
207	46796	10372	57168	6351	5193	11544	7391	4607	11998	8363	6690	15053	119279
241	207196	31753	238949	47691	30515	78026	42812	16190	59002	42358	8350	50708	671122
245	119790	19057	138847	20620	10397	31017	22343	26489	48832	21486	6617	28103	352996
271	71642	68229	139871	40569	14017	54586	16966	23194	40160	22055	4468	26523	348520
273	3622	5095	8717	941	31	972	755	786	1541	819	23	842	40005
353	33816	11203	45019	6233	4295	10528	7373	697	8070	34409	2151	36560	115099
363	11937	1947	13884	1832	441	2273	2718	1936	4654	1993	150	2143	35807
395	17301	5065	22366	3471	230	3701	3099	677	3776	3402	220	3622	47927
431	8290	3222	11512	1526	903	2429	1769	1408	3177	2348	4	2352	34882
449	13870	2403	16273	3032	526	3558	2931	4835	7766	3469	2986	6455	27850
465	48987	1783	10770	1733	3083	4816	2287	1637	3924	1480	721	2201	47477
471	11964	2088	14052	1915	2538	4453	2395	528	2923	3219	274	3493	65574
473	14383	1916	16299	1739	2171	3910	2190	382	2572	2616	4307	6923	59992
SUM RED	1309610	300295	1609905	275794	190069	465863	253979	178362	432341	287706	123531	411237	3701666

ADI 1981-1982

TELEVISION MARKET CODE/NAME LIST
(numerical)

ADI CODE	ADI NAME
3	BOSTON
9	NEW YORK
11	PHILADELPHIA
13	LOS ANGELES
15	SAN DIEGO
17	SANTA BARBARA-SANTA MARIA-SA
19	WASHINGTON, DC
21	BALTIMORE
23	SALISBURY
25	HARTFORD-NEW HAVEN
29	PITTSBURGH
31	YOUNGSTOWN
33	JOHNSTOWN-ALTOONA
35	CLEVELAND
39	EL CENTRO-YUMA
43	HARRISBURG-YORK-LANCASTER-LE
45	SPRINGFIELD, MA
47	PROVIDENCE-NEW BEDFORD
51	CHICAGO
53	SOUTH BEND-ELKHART
55	TOLEDO
57	DETROIT
59	GRAND RAPIDS-KALAMAZOO-BATTL
61	LANSING
63	FLINT-SAGINAW-BAY CITY
65	SAN FRANCISCO
67	SACRAMENTO-STOCKTON
69	SALINAS-MONTEREY
71	FRESNO-VISALIA
73	BAKERSFIELD
75	ST. LOUIS
77	SPRINGFIELD-DECATUR-CHAMPAIG
83	INDIANAPOLIS
85	LAFAYETTE, IN
87	TERRE HAUTE
89	CHICO-REDDING
91	FT. WAYNE
93	CINCINNATI
95	DAYTON
101	LIMA
103	WHEELING-STEUBENVILLE
105	SEATTLE-TACOMA
107	MINNEAPOLIS-ST. PAUL
109	DALLAS-FT. WORTH
111	MILWAUKEE
113	MADISON
115	WAUSAU-RHINELANDER
117	LA CROSSE-EAU CLAIRE
119	ROCKFORD
121	COLUMBUS, OH
123	PORTLAND-POLAND SPRING
125	ZANESVILLE
127	MIAMI
129	WEST PALM BEACH-FT. PIERCE-V
131	TAMPA-ST. PETERSBURG
133	FT. MYERS-NAPLES

ADI CODE	ADI NAME
135	BUFFALO
139	ROCHESTER, NY
140	ELMIRA
141	SYRACUSE
143	WILKES BARRE-SCRANTON
145	BINGHAMTON
147	ERIE
149	ALBANY-SCHENECTADY-TROY
151	BURLINGTON-PLATTSBURGH
153	WATERTOWN-CARTHAGE
155	UTICA
157	KANSAS CITY
159	ST. JOSEPH
161	PRESQUE ISLE
165	ROCHESTER-MASON CITY-AUSTIN
173	CEDAR RAPIDS-WATERLOO-DUBUQU
175	PEORIA
177	DAVENPORT-ROCK ISLAND-MOLINE
179	MEMPHIS
181	NASHVILLE
183	JACKSON, TN
185	HUNTSVILLE-DECATUR-FLORENCE
187	PADUCAH-CAPE GIRARDEAU-HARRI
195	BOWLING GREEN
197	ATLANTA
199	CHATTANOOGA
201	HOUSTON
203	AUSTIN, TX
205	WACO-TEMPLE
207	EVANSVILLE
209	LOUISVILLE
211	LEXINGTON
213	GREENVILLE-SPARTANBURG-ASHEV
215	KNOXVILLE
217	BRISTOL-KINGSPORT-JOHNSON CI
219	MACON
221	BIRMINGHAM
225	SELMA
227	QUINCY-HANNIBAL
229	COLUMBIA-JEFFERSON CITY
231	TUSCALOOSA
233	PORTLAND, OR
235	EUGENE
237	MEDFORD
241	DENVER
243	COLORADO SPRINGS-PUEBLO
245	NEW ORLEANS
247	BEAUMONT-PORT ARTHUR
249	BATON ROUGE
251	LAKE CHARLES
253	LAFAYETTE, LA
255	ALEXANDRIA, LA
257	CHARLESTON-HUNTINGTON
259	PARKERSBURG
261	CLARKSBURG-WESTON
263	OKLAHOMA CITY

ADI 1981-1982

TELEVISION MARKET CODE/NAME LIST
(numerical)

ADI CODE	ADI NAME
265	ARDMORE-ADA
269	TULSA
271	SAN ANTONIO
273	LAREDO
275	PHOENIX
277	TUCSON
279	CHARLOTTE
281	GREENSBORO-WINSTON SALEM-HIG
283	NORFOLK-PORTSMOUTH-NEWPORT N
285	RICHMOND
287	HARRISONBURG
291	SALT LAKE CITY
293	TWIN FALLS
295	IDAHO FALLS-POCATELLO
297	HELENA
299	GREAT FALLS
301	OMAHA
303	DES MOINES
305	OTTUMWA-KIRKSVILLE
307	WICHITA-HUTCHINSON
313	TOPEKA
315	GREEN BAY
317	MARQUETTE
319	LITTLE ROCK
321	SHREVEPORT-TEXARKANA
323	TYLER
325	FT. SMITH
327	MONROE-EL DORADO
329	ORLANDO-DAYTONA BEACH-MELBOU
331	LINCOLN-HASTINGS-KEARNEY
335	JACKSONVILLE
337	SPOKANE
339	YAKIMA
342	MISSOULA
345	ROANOKE-LYNCHBURG
347	BLUEFIELD-BECKLEY-OAK HILL
351	RALEIGH-DURHAM
353	GREENVILLE-NEW BERN-WASHINGT
355	WILMINGTON
357	BANGOR
359	FLORENCE, SC
361	COLUMBIA, SC
363	BILOXI-GULFPORT-PASCAGOULA
367	ALBUQUERQUE
369	ROSWELL
371	EL PASO
373	JACKSON, MS
375	GREENWOOD-GREENVILLE
377	MERIDIAN
379	LAUREL-HATTIESBURG
381	DULUTH-SUPERIOR
383	MOBILE-PENSACOLA
385	NORTH PLATTE
389	SIOUX FALLS-MITCHELL
391	SIOUX CITY
393	FARGO

ADI CODE	ADI NAME
395	ALEXANDRIA, MN
403	AMARILLO
405	WICHITA FALLS-LAWTON
409	COLUMBUS, GA
411	MONTGOMERY
413	TALLAHASSEE-THOMASVILLE
415	DOTHAN
417	PANAMA CITY
419	ALBANY, GA
421	AUGUSTA
423	CHARLESTON, SC
425	SAVANNAH
427	SPRINGFIELD, MO
429	JOPLIN-PITTSBURG
431	JONESBORO
433	CORPUS CHRISTI
435	MCALLEN-BROWNSVILLE: LRGV
437	LUBBOCK
439	ODESSA-MIDLAND
441	ABILENE-SWEETWATER
443	SAN ANGELO
445	BOISE
448	COLUMBUS-TUPELO
449	MANKATO
451	TRAVERSE CITY-CADILLAC
455	LAS VEGAS
457	BILLINGS-HARDIN
459	RENO
460	GLENDIVE
462	MINOT-BISMARCK-DICKINSON
465	CHEYENNE
467	EUREKA
469	RAPID CITY
471	CASPER-RIVERTON
473	GRAND JUNCTION-DURANGO
513	VICTORIA
577	PALM SPRINGS
591	BEND
601	HAGERSTOWN
603	ANNISTON
613	BUTTE
621	GAINESVILLE
625	FLAGSTAFF
627	ALPENA
645	SARASOTA
651	CHARLOTTESVILLE

APPENDIX J

FY83 AND FY84 CELL MEANS
ORIGINAL AND MODIFIED

APPENDIX J

FY83 MEANS

(ORIGINAL* CELL MAPPING)

MEANS

	CELL YELLOW	CELL BLUE	CELL GREEN	CELL RED	TOTAL
EXOGENOUS EMPLOYMENT	0.1045	0.0879	0.0995	0.1100	0.1022
RECRUITERS	0.0146	0.0145	0.0152	0.0150	0.0147
APPLICANTS					
TOTAL	0.0582	0.0577	0.0571	0.0615	0.0588
HSG	0.0495	0.0487	0.0481	0.0515	0.0497
NON HSG	0.0087	0.0089	0.0090	0.0100	0.0091
I-IIIA	0.0282	0.0279	0.0270	0.0282	0.0280
IIIB-V	0.0204	0.0198	0.0201	0.0224	0.0207
CONTRACTS					
TOTAL	0.0311	0.0321	0.0313	0.0341	0.0320
HSG	0.0286	0.0291	0.0284	0.0312	0.0293
NON HSG	0.0025	0.0030	0.0029	0.0029	0.0028
I-IIIA	0.0189	0.0193	0.0188	0.0202	0.0193
IIIB-V	0.0096	0.0098	0.0096	0.0109	0.0100
ADVERTISING					
JOINT	1.3661	1.3117	1.5271	1.3726	1.3795
SERVICE-SPECIFIC	3.7577	3.8120	4.2209	4.3013	3.9685

* Original mappings include Harrisburg-York, Pennsylvania in Cell Blue, Grand Junction, Colorado in Cell Red

FY83 MEANS

(MODIFIED* CELL MAPPING)

MEANS

	CELL YELLOW	CELL BLUE	CELL GREEN	CELL RED	TOTAL
EXOGENOUS UNEMPLOYMENT	0.1043	0.0882	0.0987	0.1108	0.1022
RECRUITERS MONTHS PER 17-21 YEAR OLD MALE	0.0146	0.0143	0.0151	0.0148	0.0147
APPLICANTS PER 17-21 YEAR OLD MALE					
TOTAL	0.0587	0.0579	0.0555	0.0597	0.0588
HSG & SENIORS	0.0501	0.0487	0.0468	0.0502	0.0497
NON HSG	0.0086	0.0092	0.0088	0.0095	0.0091
HSG & SENIORS, I-IIIA	0.0286	0.0277	0.0265	0.0272	0.0280
HSG & SENIORS, IIIB-V	0.0205	0.0200	0.0194	0.0222	0.0207
CONTRACTS PER 17-21 YEAR OLD MALE					
TOTAL	0.0316	0.0318	0.0302	0.0331	0.0320
HSG	0.0291	0.0287	0.0273	0.0304	0.0293
NON HSG	0.0025	0.0030	0.0029	0.0027	0.0028
HSG & SENIORS, I-IIIA	0.0193	0.0190	0.0181	0.0195	0.0193
HSG & SENIORS, IIIB-V	0.0098	0.0097	0.0091	0.0109	0.0100
ADVERTISING					
JOINT ($ PER 17-21 MALE)	1.3823	1.2983	1.4793	1.3390	1.3795
SERVICE-SPECIFIC ($ PER 17-21 MALE)	3.8073	3.7281	4.1476	3.8809	3.9685

* Modified Cell Mappings include Harrisburg-York, Pennsylvania in Cell Yellow and exclude Grand Junction, Colorado. These modifications are made based on actual deliveries of advertising during the test year.

APPENDIX K

P.E.P. SYSTEMS, INC.
DOCUMENTATION OF MEDIA ALLOCATION METHODOLOGY

APPENDIX K

P.E.P. SYSTEMS INC.

June 16, 1986

Prof. Vincent Carroll
Wharton Center for Applied Research
3508 Market Street   Suite 100
Philadelphia, Pennsylvania . 19104

Dear Vinnie,

I am forwarding to you documentation that describes the allocation methodology used by P.E.P. Systems in the processing of data for the Joint Advertising Mix Test. This pertains to all National Advertising as submitted under Item 4 of the 1984 Data Call.

If there are any questions concerning the attached, please call. Otherwise, have a great summer!

Sincerely,

Phoebe Wiener

P.E.P. Systems Inc., 1270 Broadway, New York, N.Y. 10001 • (212) 564-0333

P.E.P.
SYSTEMS
INC.

Joint Services Advertising Mix Test

M E D I A   A L L O C A T I O N

GEOGRAPHIC UNIT OF ALLOCATION

Geographic market areas used for National distribution are the Arbitron defined markets known as the Areas of Dominant Influence or A.D.I. A.D.I.s cover the total continental United States contiguously and therefore incorporate all 3072 counties. The 1982 configuration is used as the base year for all distribution.

ALLOCATION PROCESS

By month, program, service/joint.

1.Network TV (including Syndicated programming):

Line-ups for each show - data by station eliminated for black-out adjustments. Station share (%) to allocate show dollars and impressions to each station for station allocation into A.D.I., (account for spill.)

2.Spot TV :

Station dollars and impressions for allocation into A.D.I.

3.Cable TV :

Dollars and impressions allocated based on Cable System Households/A.D.I.

P.E.P. Systems Inc., 1270 Broadway, New York, N.Y. 10001 • (212) 564-0333

4.Network Radio (Line, Syndicated,Rep.):

Line-ups for each network with elimination of black-out stations. Station share (%) to allocate network dollars and impressions into A.D.I.

5.Spot Radio:

Station dollars and impressions for allocation into A.D.I.

6.Magazines (National):

Dollars and impressions allocated by A.D.I. in proportion to circulation* distribution.

7.Magazines (Regional):

Dollars and impressions allocated into A.D.I. in proportion to local circulation*.

8.Newspapers:

Dollars and impressions allocated into A.D.I. in proportion to actual circulation.*

9.Outdoor:

Dollars and impressions allocated directly into A.D.I. of appearance.

10.Direct Mail:

Dollars allocated into A.D.I. in proportion to the circulation (impressions) distributed into A.D.I.

* Audit Bureau of Circulation

ELECTRONIC MEDIA ALLOCATION

DETAIL

Network Television (including Syndicated) - Dollars and Impressions (M 18-24 Yrs)

Show line-ups for each month.

A - Households per station within show line-up calculated so that each station has a proportional share (%) of the total network show households to be multiplied by show cost/impressions per month.

B - T V station dollars/impressions (M 18-24 Yrs) are then distributed by A.D.I. using Nielsen# average viewing hours by county per station.

Cable Television - Dollars and Impressions (M 18-24 Yrs)

Cable System line-ups for each month.

For each Cable Station, Household subscribers are recorded by ZIP code within a Cable System. ZIP coded Households are recoded into A.D.I. for distribution of each Cable System's dollars/impressions.

Spot T V - Dollars and Impressions (M 18-24 Yrs)

Dayparts for each Station per month.

A - T V station dollars/impressions (M 18-24 Yrs) are distributed by A.D.I. using Nielsen# average viewing hours by county per station.

Network Radio - Dollars and Impressions (M 18-24 Yrs)

Network line-ups (one or more) for each month by Program.

A - Males 18-24 Yrs impressions per station developed for each radio network line-up. All M 18-24 Yrs impressions are calculated so that each network radio station has a a proportional share (%) of the total radio network impressions, for distribution of line-up cost/total impressions for each month for station dollars/impressions.

B - Radio Station Dollars/Impressions (M 18-24 Yrs) are distributed by A.D.I. using Arbitron listening audience by county per station.

Spot Radio -Dollars and Impressions (M 18-24 Yrs)

Dayparts for each station per month.

A - Radio Station dollars/impressions (M 18-24 Yrs)
(See Network Radio Part B)

*A.C. Nielsen Company - N S I County/Coverage Study

Average over three cycles - Nov. 1983, Feb. 1984, & May 1984

MEASUREMENT & RATING SOURCES:

Television

Nielsen Network Programs by Designated Market Areas-
Metro Areas Totals - Station Totals

Nielsen Report on Syndicated Program Audiences

Nielsen Market Daypart Summaries

Nielsen National Television Ratings

Radio

Arbitron Radio Audience Estimate by Market

Arbitron Radio County Coverages

Magazines

MRI- Mediamark Research Inc. Magazine Audience
Estimates

Newspapers

National Simmons Reader/Copy (NAB)

Outdoor

National Association of Outdoor Advertisers

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