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June 1973

SOURCES OF ERROR IN NAVAL PERSONNEL SURVEYS:

AN INVESTIGATION

LAURIE A. BROEDLING
E. SUE MOHR

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13. ABSTRACT

Two types of errors present in mail surveys of naval personnel were studied in this investigation. One was the errors in the responses given to survey items on factual characteristics (e.g., pay grade, marital status, etc.). The other was the errors present in information in the Navy's automated personnel records which are used for survey sample selection and data analysis.

Response errors were assessed by obtaining two sets of responses to the factual survey items from the same group of people and also by comparing questionnaire responses to information in the personnel jackets. Errors in the automated records were assessed by comparing their information to the personnel jacket information.

The results showed a wide variance across items in the average amount of response error. Items inquiring about present and/or stable characteristics had high consistency of response, while items pertaining to past characteristics or ones subject to change generally had substantially lower consistency. Tests of statistical significance showed no differences in response consistency on the basis of sex or time interval between questionnaires but showed non-Caucasians to be less consistent that Caucasians and enlisted personnel to be less consistent than officers. More inaccurate information and more missing data was found in the automated records than in either the personnel jackets or questionnaire responses.

The implications of these results for survey research were discussed.

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Laurie A. Broedling
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FOREWORD

The authors would like to gratefully acknowledge the assistance of Mr. Robin Tsai in the completion of many of the statistical analyses associated with this study. Additional acknowledgement goes to Mr. Thomas Jabine, Mr. John Forsythe and Dr. B. D. Causey of the Statistical Division of the Bureau of the Census, Mr. Jabine for proffering the assistance of the Statistical Division and Mr. Forsythe and Dr. Causey for their suggestions regarding data analysis. Dr. Beatrice Farr also is to be thanked for her aid in securing information from personnel jackets.

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SUMMARY

Problem

The Naval Personnel Research and Development Laboratory (NAVPERSRANDLAB) conducts surveys to determine attitudes and opinions of active duty naval personnel regarding numerous topics. Assessment of response errors is a critical issue for survey researchers in general. Quantification and identification of indirect sources of error which contribute to inaccurate results is another area of concern to survey researchers. One potential source of these errors is in the information contained in the Navy's automated personnel records (MFT).

Purpose

The purpose of this study was twofold. The first objective was to investigate the magnitude and direction of response errors to factual questionnaire items in Navy surveys. The second objective was to estimate the magnitude and direction of errors present in the MFT.

Approach

a. Reliability

A retest questionnaire comprised of identical factual items appearing on the Navy Sample Survey (NSS) 72-2 questionnaire was mailed at two different time intervals to a random sample of individuals responding to NSS 72-2. Reliability, or measurement error variance, was assessed by comparing the consistency of responses to each item.

b. Accuracy

Information from personnel jackets was compared to information contained in the MFT, as well as questionnaire response data, to determine the accuracy of this material. These comparisons were made on various random subsamples of the Navy population: those responding to NSS 72-2, those responding to the retest questionnaire, those not responding to NSS 72-2 and those not responding to the retest.

Results

An analysis of the amount of inconsistency in the responses for the corresponding items on the NSS 72-2 and retest questionnaire showed

a wide variation among items in the amount of response inconsistency. The lowest percentage of inconsistent responses for all respondents to the stable items was 1.7% (sex), and the highest was 47.7% (recreational activity participated in most often before joining the Navy). The median percentage response inconsistency for stable items dealing with present characteristics was 4.5%, the median for the change items, all of which dealt with present characteristics, was 11.9%, and the median for the stable items dealing with past characteristics was 21.7%. These results indicated that (1) there is more inconsistency associated with "past" items than with "present" items; (2) there is more inconsistency associated with stable items than with change items; (3) the factor of "past-present" is more related to response inconsistency than the factor of stable-change.

In investigating the differences in response inconsistency on the basis of selected demographic characteristics, it was found for the stable items that enlisted personnel were significantly more inconsistent than officers and that non-Caucasians were significantly more inconsistent than Caucasians. No significant differences in response inconsistency were found between males and females. No conclusions could be drawn from the results of the change items in this regard.

The results of both the change and stable items demonstrated no differences in response inconsistency on the basis of time between survey administration (6 weeks vs. 12 weeks).

The accuracy of the MFT information was analyzed both with respect to percentages of discrepancies when matched against personnel jackets and amount of missing data. An item was counted as missing when it was absent from either the MFT, the personnel jacket, or both. For officers, for most of the variables studied, agreement rates were 80% or above. Only two variables had missing information, educational level (4%) and number of primary dependents (70%). For enlisted personnel, nine out of the 13 variables were in agreement more than 80% of the time. The items most often missing were GCT, ARI, MECH and CLER scores (27% missing). An analysis by race showed differences on several items in the number of inconsistencies and the amount of missing information between Caucasians and non-Caucasians, but no discernable pattern emerged from these results. An analysis by sex showed females having generally higher agreement rates than males; differences for amount of missing data were found in both directions.

The accuracy of the questionnaire responses was analyzed by comparing responses on the retest questionnaire to the comparable personnel jacket information. For officers, four of the seven variables had agreement rates of over 90%. For enlisted personnel, three of the seven variables had agreement rates of over 90%, and two were over 80%. As far as missing data is concerned, little was encountered for either officer or enlisted personnel. An analysis by race showed differences in both directions on amount of inconsistency and amount of missing data. An analysis by sex showed females to have generally higher agreement rates and less missing data.

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I. INTRODUCTION

A. Problem

In any empirical study in which measurements are made, accuracy of the findings depends on the nature and extent of the errors made in the measuring process. While no such process is completely error-free, the utility of the results is contingent, at least partially, on knowing the magnitude and direction of errors present.

Surveys, as measurement processes, include the same fundamental problems that all such processes share. Errors in these processes are conceptually classified into two types: constant errors and random errors. In attitude and opinion surveys, the extent to which the constant and/or random error is present in the responses to the survey questions is often not assessed. Yet such information is critical for the proper interpretation of survey results. The Naval Personnel Research and Development Laboratory conducts surveys to determine attitudes and opinions of active duty naval personnel regarding numerous issues. Assessment of response errors is a critical issue for the NPRDL in particular, and for survey researchers in general.

The identification and quantification of indirect sources of error which contribute to inaccurate results is another major problem associated with measurement in general and with survey research in particular. One possible source of error in naval surveys is present in the information contained in the Navy's automated personnel records. This error source can also be conceptualized as being comprised of two error components, constant and random. The Navy stores factual information about each person on active duty on master file tapes (MFT) in a computerized system. The degree of accuracy of the information on the MFT is pertinent to sample selection and data analysis, and ultimately, to the accuracy of the survey estimates. If the magnitude and direction of the errors in the MFT were known, it would be possible to make appropriate adjustments to reduce the inaccuracy which these errors would otherwise introduce into the survey results.

B. Purpose

The purpose of this study was twofold. The first objective was to investigate the magnitude and direction of response errors to factual items in the NPRDL's surveys. The second objective was to estimate the magnitude and direction of errors present in the MFT.

There were two reasons why the focus of this study was directed only at response errors in factual items. Other types of items, such as attitudinal questions, are cumbersome to study due to the difficulty in

ascertaining whether a change in a response over time is indicative of a true change in attitude or whether it is a response error. Second, the factual items studied are included in many of the A&MRD's questionnaires; the results of this study are therefore widely applicable. On the other hand, most attitudinal items are used only once and are of more limited interest.

C. Background

The NPRDL conducts two types of mail sample surveys. One type, the Navy Sample Survey series (NSS), consists of general surveys covering a wide variety of topics of concern to naval personnel managers. These surveys are distributed three times a year to a representative random sample. The other type is the special interest surveys which are more limited in content-area, more in-depth, and generally directed at a specific population within the Navy. The measurement procedures used in these surveys are common to most survey research, particularly research using mail questionnaires. The questions are self-explanatory, multiple-choice items. While they are carefully developed and pretested to be as straightforward and as comprehensible as possible, a determination has never been made regarding the degree of response error associated with the items.

The NPRDL typically selects stratified samples from the MFT according to predetermined criteria, such as pay grade. The importance of having accurate data on these tapes, or at least being able to estimate the amount of error, is apparent. If the information used to stratify the sample is inaccurate, the intended stratification will not result. For instance, it is known that pay grade information on the MFT is consistently two to three months behind the true situation. Nevertheless, stratified samples are selected as if the MFT information were accurate.

The problem of inaccuracies on the MFT is also relevant when the responses are analyzed. If the results are subdivided on the basis of demographic information contained on the MFT, the analysis will be inaccurate. Therefore, it has become routine to include a number of factual items in each questionnaire which cover the same information as that on the MFT. It is assumed that the questionnaire responses are accurate, and this information is used to analyze the data according to demographic characteristics of the respondents. However, it has never been documented whether or not questionnaire information is in fact more accurate than MFT data. Likewise, if responses are more accurate, it has not been determined whether the increased accuracy justifies this redundancy in the information gathering process. In other words, it may be more efficient, all things considered, to rely on the MFT information which is already available (particularly if appropriate corrections can be made to the information on the sample members) than it would be to add these same items to the questionnaire.

D. Research Hypotheses

Since the purpose of this study was to address a number of questions relating to the nature of response errors and tape errors, the following research hypotheses were formulated:

1. There are differential amounts of response error and tape error associated with various factual items. Items that require the respondent to recall a past event will have more response error associated with them than those that require the respondent to report on present events. Items which pertain to characteristics subject to change, such as pay grade, more often will be in error on the MFT than variables which do not change, such as race.

2. There are differential amounts of response error and tape error associated with various types of respondents. Specifically, response error and tape error is expected to be a function of pay grade, race and sex of the respondents.

3. There are differential amounts of response error associated with the time interval between responses, i.e., the longer the interval, the more response error there will be due to the fact that the respondents are less likely to remember their original answers.

In addition to these basic hypotheses, it was postulated that there may be interactions among the variables described above. For instance, officers might have fewer response error than enlisted personnel for a one month time interval but might have more errors over a two month time interval. While interactions of this type might occur, due to the lack of any theoretical basis on which to form such predictions, no specific hypotheses were advanced.

E. Theoretical Rationale

A critical phase in the process of empirical inquiry is that of measurement. Measurement entails the systematic assignment of classifications to events. The scientific method imposes the criterion that data be objective and reproducible. For the social sciences in general, and for psychology in particular, measurement has proven to be the most difficult phase of the scientific process. "Indeed, the history of psychology as a science has been the development of procedural and instrumental aids that gradually eliminate or correct for biases and distortions in making observations. (Hyman, 1964, p. 37)." The social sciences have more perverse measurement problems than the biological or physical sciences. These center around the object being measured, namely, the human being. While there are a number of unique problems associated with obtaining measurements on people, the major one of relevance to survey research concerns self-reports. An approach commonly employed in obtaining factual information is to ask the individual to report on the characteristics of

interest. The difficulty is that people do not always give accurate information in response to such inquiries. There are numerous reasons for these inaccuracies, including carelessness, distractions, desire to seem socially acceptable, desire to make onself look good, etc.

Errors in the measurement process are classified into constant errors and random errors. Constant errors, or biases, occur more often in one direction than in others, i.e., the distribution of these errors is skewed in relation to the true score. Random errors, termed measurement errors, occur equally in all directions, i.e. they are evenly distributed around the true score. Madow (1965) used the term response bias to refer to constant response errors, response variance to refer to random response errors, and response error to refer to the total of both errors.

Reliability is an index of the amount of measurement error variance, i.e., response variance. While the term reliability is frequently used among survey researchers to denote precision or sampling error, it will be used in this report only in its conventional psychometric sense denoting measurement error.

1. Response Bias

There has been very little theoretical or empirical work done on response biases. One reason is that an empirical study of response bias necessitates knowing the true value of the item(s) under study. It is only then that the direction and magnitude of the response errors can be calculated. Another reason for this neglect is that the theoretical foundation used in the study of response errors is grounded in classical psychometrics, which ignores the contribution of biases in the hope that their effects will be controlled with the establishment of test norms (Gulliksen, 1950).

However, response biases reduce the accuracy of survey results. The accuracy of a sample estimate is measured by the mean square of the error (MSE), which represents the expected value of the square of the error of the estimate. Since the size of the error of the estimate is unknown for a given sample, it is measured as the square root of the MSE, which is the square root of the average total variance taken over all possible independently selected samples. To the extent that the expected value of the estimate is not the same as the population parameter, the estimate is baised. In this case, the MSE of the estimate is equal to the sum of the sampling variance plus the square of the bias:

$$\text{MSE} = \sigma_{es}^2 + (\text{bias})^2. \qquad (1)$$

In most surveys, the total variance (MSE) is assumed to be equal to the sampling error; bias is assumed not to exist. To the extent that this assumption is not true, the reported sample estimate and its variance will be in error.

2. Response Variance

Reliability is the index of response, or measurement, variance. Within psychometric theory, a variety of definitions of reliability have been espoused. Common synonums are consistency, stability and dependability (Anastasi, 1966; Guilford, 1954). Reliability has been viewed as the extent to which the measured values may be predicted over repeated measurements, and, in this sense, it is ultimately related to the predictive goodness of the values obtained (Hays, 1967). Reliability has also been defined as the degree of intersubject variation of scores that is due to inconsistencies in measurement. This definition can be viewed as reflecting the degree of response stability to the same instrument, or response equivalence to different instruments designed to measure the same thing (Selltiz, Jahoda, Deutsch, & Cook, 1967).

The foregoing definitions reduce to being assessments of measurement error variance. The mathematical equation for reliability serves to bring together the common elements in all these definitions. To understand this equation, it is first necessary to present the first postulate underlying classical psychometric theory (Gulliksen, 1950). It is that a persons' observed score (X_i) is equal to the sum of his true score (T_i) and the amount of random measurement error which occurred when the measurement was taken (E_i).

$$X_i = T_i + E_i \tag{2}$$

To estimate measurement error variance, two or more scores on the same characteristic must be obtained. Assuming that these scores were obtained independently and their distribution is normal, the sum of the scores will also be normally distributed. The total variance is the sum of the variances of the two components. Therefore, the variance of the observed scores is equal to the sum of the variances of the true scores plus the variance of the error scores,

$$\sigma x = \sigma t + \sigma e^2. \tag{3}$$

where σe^2 represents the measurement error variance. Reliability is the proportion of the total variation in scores which is due to variation in the true scores (Gulliksen, 1950). In other words, it is the ratio of the variance of the true scores to the total, observed variance,

$$r_{xx} = \frac{\sigma_t^2}{\sigma_e^2} = \frac{\sigma_x^2 - \sigma_e^2}{\sigma_x^2} \quad (4)$$

This definition is strictly theoretical, in which reliability is a parameter. It cannot be used in calculations because it is impossible to determine the exact true score variance or error variance.

Solving equation (4) for σ_e,

$$\sigma_e = \sigma_x\sqrt{1-r_{xx}} \; . \quad (5)$$

σe, the standard error of measurement, represents the standard deviation of the measurement errors. To make practical use of this quantity, it is necessary to assume that it is normally distributed. If this assumption can be made, confidence intervals can be constructed around the true score. The standard error is multiplied by the appropriate value from the z distribution to determine this interval. For instance, when σ_e is 5 points, and the true value is 40, 95% of an individual's observed scores will fall between approximately 30 and 50 ($5 \times \pm 1.96$).

In recent years, there has been a reconceptualization of some of the traditional ways of defining and computing reliability. In the classical approach, the true score and the error score are differentially defined according to the situation. Gleser, Cronback and Rajartnam (1965) have proposed a reinterpretation of reliability which is based on generalizability theory. This theory is concerned with the extent to which a population score can be inferred from a set of observations. Modern psychometric theory, as presented by Lord and Novick (1968), introduced a number of fundamental changes from classical psychometric theory. The one most relevant to the concept of reliability is that the true score is defined as an expected value rather than as a constant. Thus, while expressed with the same symbols, the mathematical equation for reliability has a different connotation. Hansen, Hurwitz, and Bershad (1961) developed a general "response error model," which is particularly applicable to surveys involving personal interviews. This model mathematically partitions the total variance of a sample estimate into the contributions made by response variance, sampling variance, and interviewer variance.[1] An alternative to the index of reliability, index of inconsistency, has been developed by the Bureau of the Census (1973). This index is defined as follows:

$$I = \frac{g/2}{s^2} \quad (6)$$

---

[1]This basic model has been expanded by theoreticians at the Research Triangle Institute. In a series of reports, the model has been extended to apply to complex sampling designs and complex estimators.

where S^2 is an estimate of the population variance, and g, the gross difference rate, is the total number of discrepancies divided by the total number of cases. The index of inconsistency represents the proportion of total variation due to response variation. Since this index accounts for the relationship between response variance and sampling variance, it has a certain advantage over the reliability coefficient, which is only an index of response variance.

Traditionally, all measurement error was subsumed under the term reliability, but over the years it has been recognized that there are various types of measurement errors, and different estimates of reliability reflect different types of these errors (Dunnette, 1966). Measurement error results from: (1) inadequate sampling of content; (2) chance response tendencies; (3) changes in testing environment; (4) fluctuations in the person being measured; and (5) differences in the method used for measurement.

It is important to be aware of the distinction between reliability as it is theoretically defined and as it is empirically measured (Guilford, 1954). There are a variety of methods to estimate reliability. Depending upon the particular method which is used, each of the verbal definitions above has particular relevance. Estimates of reliability ordinarily fall into three categories. The first type is the test-retest estimate. In this method, the same instrument is administered two or more times with an intervening time interval. It reflects the stability of the scores, that is, measurement errors due to changes in the person and changes in the testing environment. To the extent that there is a memory effect, this estimate may be inflated. The second type of estimate is known as equivalent forms. Such forms, also known as parallel tests, are designed differently to measure the same characteristic. When parallel tests are administered at the same time, reliability reflects content sampling errors, chance response tendencies, and differences in the measurement method. It is a measure of equivalence of scores. The third type is the internal comparison estimate. When the measuring instrument contains several homogeneous items designed to measure the same characteristic, the responses to the items should be highly intercorrelated. This type of extimate of consistency, reflects content sampling errors and chance response tendencies.

Regardless of which definition or combination of definitions is used, most empirical estimates of reliability take the form of correlation coefficients with values from zero to one. When expressed as a percentage, the reliability coefficient represents the estimated proportion of observed variance attributable to true variance.[2] Thus, the value produced is an

---

[2]It should be noted that the coefficient of reliability is the only correlation coefficient which can be thus interpreted. Other correlation coefficient must first be squared before they can be interpreted as the percentage of true variance. The reliability coefficient is the square of the index of reliability and thus already represents a squared coefficient. The index of reliability, σ_{xt}, is the correlation between the observed scores and true scores.

estimate of reliability as it is theoretically defined. By computing confidence intervals around this statistic, it can be used to estimate the true reliability of the instrument.

F. Review of Past Research

1. Response Error

Most of the research on the problem of response error has been conducted with the implicit assumption that these errors are random. However, some work has been directed toward the identification of response bias alone, while some has investigated both response bias and response variance. There are a number of instances in which research has been done using a model which includes both random and constant error. Eckler and Hurwitz (1957) compared the results of the 1950 Census and the 1950 Post-enumeration Survey, the latter of which was used as the standard of comparison because it was a better controlled survey. For certain items, such as age, occupation, and number of rooms in the respondent's residence, the response variance and bias was very low, while for other items, such as income, employment status and labor force status, the response variance and bias was higher. In addition, it was found that interviewer variability was fairly substantial. The Bureau of the Census has continued with this type of evaluation, both in the Current Population Survey (Bureau of the Census, 1968) and in the 1960 Census (Bureau of the Census, 1973; Bailar, 1968). Ferber (1965), in an investigation of consumer financial surveys, found that response errors contributed substantially to inaccuracies in the means, standard deviations, and possibly, the confidence intervals of the estimates. He also found that both respondent characteristics and questionnaire approach were related to response error. Lansing, Ginsburg, and Braaten (1961), in an extensive study of response error in surveys of consumer financial behavior, found that random and constant errors were associated with a wide variety of respondent characteristics. Among the demographic variables studied, age and sex were unrelated to the accuracy of responses, but response accuracy was positively related to education level.

Scott (1961) attempted to evaluate all published research on mail survey methodology. He concluded that on the subject of item reliability, evidence was "meagre in quantity and poor in quality (p. 186)." Available results indicated that responses to mail surveys and interviews seemed to be equally accurate. Socially unacceptable answers and answers to sensitive issues were more likely to be given on mail questionnaires. However, complex questions in a mail survey elicited more unclassifiable answers than did interviews.

a. Response Bias. Borus (1966), in a study directed exclusively at the identification of systematic biases in responses to a factual survey item, compared reported earnings information of 342 respondents to the employers' unemployment compensation records. The latter information

was used as the baseline. The difference between the two figures was the response bias; two sets of regression equations were calculated to predict this bias. The results indicated that the following characteristics were significantly related to response error: sex, age, education, training status, magnitude of reported earnings, the number of hours employed, and the interviewer's familiarity with the questionnaire.

b. Response Variance. In general, inadequate attention has been given to the empirical assessment of reliability (response or measurement variance) by sampling theorists and survey researchers. One reason for this is that the term reliability has been used to denote a number of different mathematical concepts, including precision (i.e., sampling variance; Hansen, Hurwitz and Madow, Vol. 1, 1953; Sukhatme, 1954), the level of confidence set on the interval around the sample estimate, e.g., 95% level of confidence (Yamane, 1967), and representativeness of the sample (Gallup, 1944). Moreover, most sampling theory texts make no point of introducing the psychometric concept of reliability and therefore do not call attention to the need to assess measurement variance, in addition to sampling variance. Frequently, accuracy of responses is not assessed in attitude and opinion surveys. It is assumed that the items are reasonably unbiased and reliable, and effort is therefore expended on reducing sampling variance. However, in the light of the research that has been done, these assumptions seem unwarranted.

Research on response variance for factual items indicates that responses are more inconsistent than one might expect for these kinds of questions. Vaughn and Reynolds (1951) surveyed groups of people in two different locations with regard to their age, education, and socioeconomic status at a 3-4 month interval. Product moment correlations between the responses to the original and repeat interviews were, for the two locations, .85 and .80 for age, .82 and .67 for educational status, and .61 and .42 for socioeconomic status. While all these correlations were significantly different from zero, they were also significantly different from each other (at the .01 level). The authors reported that despite methodological differences, these results were consistent with those reported by the Office of Public Opinion Research. Campbell (1948) found reliability coefficients to be higher for age than for educational status and socioeconomic status. To the extent that socioeconomic status is related to income, Withey (1954) has shown evidence to support Vaughn and Reynold's findings on the unreliability of responses to socioeconomic questions. By using an interview-reinterview interval of one year, Withey found that a respondent's recall of his previous income was generally unreliable and that these errors were correlated with the direction of income change. Wood (1939) found that when occupations were broken down into nine major categories, 21.7% of 4,500 workers surveyed reported answers inconsistent with employer records. When the occupations were further divided into 233 categories, the discrepancies between verbal report and employer records increased to 35.5%.

Some studies on this subject have employed relatively short test-retest intervals. In surveying radio listening habits, Curtis (1939) found a high degree of reliability when a second check-list was immediately mailed following the return of the initial one. Jenkins (1938) tested response reliability on consumer surveys at a 48 hour interval and also found a very high degree of reliability. On the other hand, when Palmer (1943) re-surveyed 5,000 people in 8-10 days, 10% of the respondents reported ages that were different by one year or more.

Cuber and Gerberich (1946) sampled college students using factual, attitudinal and evaluative types of questions. Factual items showed the lowest consistency when the subjects were tested at three two-week intervals. Bain (1931) and Gerberich (1947), using test-retest methods, obtained similar results.

Hochstim and Renne (1971) mailed two identical self-administered questionnaires to a socio-medical population in order to evaluate reliability over intervals short enough (maximum of four weeks) to preclude real changes. They found that 36% of the sample was highly consistent between administrations (95-100% consistent), 38% was moderately consistent (90-94% consistent) and only 26% displayed low reliability (70-89% consistent). Overall, reliability was higher for factual questions than it was for either evaluative or attitudinal questions. Reliability was positively related to income and education level and inversely related to age and length of test-retest interval.

Using time lapses which varied from three to six months, Bailar (1968) found that item reliability was inversely related to the length of the time interval for occupational mobility and income. No relationship was found for other demographic variables, such as number and age of children, and school enrollment.

It is difficult to draw any conclusions from this research regarding the nature of reliability of survey responses. Not only is data on this topic sparse and fragmented, but the various methodologies employed preclude interstudy comparisons. Considering the potentially detrimental effects which response errors could have on the accuracy of survey results, it is surprising how little systematic attention has been paid to this topic.

2. Tape Error

Precision of baseline data is seldom examined in surveys, even though this information is used when the accuracy of results is assessed. Inaccuracies in this data could produce biases in final survey results especially if the initial sample is not a true representation of the population. The possibility of a biased sample is especially acute when stratified sampling techniques are employed using specified demographic variables.

TABLE 1

Selected Officer Data Items Which Did Not Meet
The Navy's Acceptable Data Validation Rate
(From GAO, 1970)

Item	Navy's Acceptable Error Rate (%)*	GAO's Computed Error Rate (%)*
Name	0	2
Active Duty Base Date	4	7
Previous Highest Rate/Grade	2	10
Primary Dependents	3	5
Formal Education Level	1	5
Present Duty Station Date Reported	0	13
Present Duty Station Activity Name	0	4

*All numbers are rounded to the nearest whole number

TABLE 2

Selected Enlisted Data Items Which Did Not Meet
The Navy's Acceptable Validation Rate
(From GAO, 1970)

Item	Navy's Acceptable Error Rate (%)*	GAO's Computed Error Rate (%)*
Name	0	2
Years Education	3	10
Basic Battery Test Scores	2	5
Active Duty Base Date	1	4
Primary Dependents	4	10
Activity Title	0	0

*All numbers are rounded to the nearest whole number

TABLE 3

Number of Questionnaire Responses Which Match
Tape Record in NPS 68-1
(From Fuller, et. al., 1973)

Characteristic	Total Number of Responses	Number of Matching Responses	Proportion of Responses Which Match
Military status: Regular/Reserve	4502	4436	.99
Designator	4457	4357	.98
Marital Status	4495	4364	.97
Age	4499	4242	.94
Source of Procurement	4305	3956	.92
Pay grade	4523	4046	.89
AFMS	4973	3178	.64

TABLE 4

Percent of Agreement Between Master Tape and Questionnaire Responses in NPS 69-1

Paygrade	n	% Agreement
E1	1	100
E2	662	42
E3	1491	61
E4	3322	83
E5	3427	92
E6	2615	96
E7	1523	96
E8	372	94
E9	122	99

TABLE 5

Number of Changes Per Address Label Item
in NSS 72-2

	Male Officer	Female Officer	Male Enlisted	Female Enlisted	Total
Pay grade	44	3	46	31	124
Name	2	5	1	12	20
Social Security Number	1	0	1	1	3

In 1970, the General Accounting Office (GAO) investigated the degree of inaccuracy contained in the Navy's automated manpower and personnel management information system (i.e., the MFT) by comparing information contained in this system with data contained in individual personnel jackets. This study found that at least 83% of the records of officers and 79% of the records of enlisted personnel contained one or more errors. Tables 1 and 2 present GAO findings regarding error levels compared to acceptable standards for officer and enlisted personnel, respectively. Since these error levels were higher than the acceptable standards adopted by the Navy, GAO suggested that the Navy take further actions to reduce these errors. These suggestions included strengthening error detection and correction procedures, establishing appropriate accuracy standards for all data, and requesting that the Navy Auditor General make an independent assessment of the validity of system data.

Fuller, Dow and Stumpf (1973) compared responses to questions from a 1968 survey (Navy Personnel Survey 68-1) with information drawn from the Active Officer on Board Tapes for the same personnel. They found generally high rates of agreement between the two data sources. Table 3 presents these data. As can be seen, the proportions of matching responses from both sources for five of the seven variables studied was higher than 90%. Rate of agreement between questionnaire responses and tape information for pay grade was 89%, while this rate for number of years of active military service was only 69%. Of special interest is the agreement rate for pay grade, a variable often used in stratifying the Navy population for initial sampling purposes.

When rate of agreement between questionnaire responses from a 1969 survey (Navy Personnel Survey 69-1) and enlisted master file tapes were compared regarding pay grade, six of the nine pay grades were in agreement at least 90% of the time. Table 4 presents these agreement rates. Pay grade E-2 had the lowest rate of agreement at 42%, E-3 had 61% agreement and E-4 had 83% agreement. Except for pay grade E-1, which had 100% agreement, there was a linear relationship between pay grade and agreement rate.

Included in NSS 72-2 was a form in which the respondent could indicate inaccuracies in mailing labels, which included such information as social security numbers, rate/rank, name, and address. Since mailing labels are produced from MFT data, this information is of interest here. Table 5 presents these data. The findings reported by Fuller, et. al., (1973) regarding agreement rates for pay grade, was further substantiated by the changes the respondents made in the NSS 72-2 mailing labels. The majority of address label changes pertained to pay grade and/or rate or rank designations.

In other pilot work done by the present authors, a random sample of officers and men was selected in order to examine how much and what

type of information was missing from MFT. Of the variables examined, test scores for both officers and enlisted men were the items missing with the greatest frequency. Female officers had more missing data on their records than did male officers. This relationship between sex and amount of missing data, however, did not hold for enlisted personnel. It must be remembered that while little information was missing, this does not reflect the accuracy of information present.

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II. APPROACH

A. Research Design

There were three aspects of this study, one involving reliability or consistency of responses, one involving accuracy of responses, and one involving accuracy of tape information. Consequently, three approaches were employed.

1. Reliability of Responses

The reliability of the responses was estimated using a test-retest paradigm. Two questionnaires, each containing a subset of identical factual items, were administered to the same set of people. The sample was subdivided into two comparable groups. Group 1 was mailed the second questionnaire six weeks after the cut-off date on returns for the first questionnaire, and Group 2 was mailed the second questionnaire twelve weeks after this cut-off date.

2. Accuracy of Responses

To determine whether or not a given response represented the correct answer, it was necessary to know the individual's true score for each item. Data recorded in the personnel jackets were used as true scores because a GAO study (1970) indicated that, in general, this information was correct. Questionnaire responses were matched against data in the personnel jackets to determine the degree of response accuracy. These comparisons indicated the absolute direction and magnitude of response errors.

Agreement rates could only be calculated for those items for which comparable information was available from both sources. Some questions (such as the most important reason for joining the Navy) could not be studied in this manner.

3. Accuracy of Tape Information

To estimate the accuracy of tape information, MFT data was matched with the comparable personnel jacket data. These comparisons constituted measures of the absolute magnitude and direction of the tape errors.

B. Description of Questionnaires

Both questionnaires used in this study were self-administered mail questionnaires containing multiple choice items. Responses were recorded on a separate optical scan answer sheet. The first questionnaire was the

Navy Sample Survey (NSS) 72-2. NSS 72-2, a general attitude survey of naval personnel, collected data on a variety of Navy-related topics (Basic Statistical Report, 1973). Nothing in the instructions differentiated it from other NSS questionnaires. That is, subjects were not told that they might receive a second survey if they responded to NSS 72-2.

The second questionnaire, the Reliability and Accuracy of Factual Survey Items (RAFSI), was specifically designed for this study. It was explained to the subjects that they were being asked to participate because they had responded to NSS 72-2. They were also told that the purpose of this study was to improve these survey questions. Copies of both questionnaires can be found in Appendix A.

The RAFSI questionnaire consisted of factual items which were included in NSS 72-2. Conceptually, these items were of two types, those for characteristics which could not change over time (termed stable items) and those for characteristics which could change over time (termed change items.). For change items, a different response could indicate either a true change or a response error. Therefore, for each change item, control questions asking the respondent to report whether there was an actual change on the characteristic in question between the time he completed NSS 72-2 and the present were included. For instance, immediately following the item, "Where are you now serving?" was the question, "Have you changed duty stations between the time you filled out the Navy Sample Survey (NSS 72-2) and now?"

C. Data Collection

The first questionnaire was administered using a command mailing method. This technique has been employed by the A&MRD because it reduces the amount of voluntary nonresponse to a survey and allows for statistical control of most cases in the original sample. In this method, the sample selectees are grouped by activity and the survey materials and instructions for administration are sent to the command. It is the command's responsibility to distribute the questionnaires, collect them (in sealed envelopes to ensure confidentiality of the responses), account for each selectee not available for surveying, return all materials to the A&MRD. The individual is allowed the option of not answering the questions; he is only required to fill in his social security number on the answer sheet so he can be accounted for.

The RAFSI questionnaires were administered using an individual mailing method. Questionnaires were sent directly to each selectee at his duty station address. A stamped, return envelope addressed to the A&MRD was provided. For both the NSS 72-2 survey and the RAFSI survey, the most up to date addresses available at the time the mailing labels were produced were used.

D. Description of Sample

The sample for the analyses of consistency and accuracy of responses was selected from all respondents to NSS 72-2 who accurately filled in their Social Security Number on the answer sheet. The original NSS 72-2 disproportionate sample was stratified on the basis of pay grade, race and sex. Relative to their actual representation in the Navy, a disproportionately large number of women, minority group members and higher pay grades were selected. This was done to allow for separate analyses of the responses of these groups.

The sampling design for this study also called for stratification on the basis of pay grade, race and sex.The sample was selected proportionately to the returns of NSS 72-2. After the basic sample was selected, each cell was randomly divided in half to form two subsamples. The first subsample was sent the retest six weeks after the NSS 72-2 cut-off, and the second subsample was sent the retest twelve weeks after cut-off. The purpose of this sample selection strategy was to obtain a sample representative of the types of people who ordinarily are selected for and respond to naval personnel surveys since the purpose of the first two phases of this study was to investigate responses to survey items; therefore, the target population was those people who respond to naval personnel surveys.

Table 6 illustrates the sampling design for the analysis of response reliability. All the returns from RAFSI questionnaires were used in this analysis. For each major variable studied (i.e., sex, race, and pay grade), and for each time interval (i.e., 6 weeks or 12 weeks after the NSS 72-2 cut-off), the number of questionnaires mailed and received are indicated. A grand total of 759 retest questionnaires were mailed and 493 were received.

For the analysis of the accuracy of questionnaire responses, a random sample (N=120) of officer and enlisted personnel who responded to both questionnaires were selected for comparison of responses to personnel jacket information.

For the analysis of the accuracy of the MFT information, a random sample (N=144) of officer and enlisted personnel were selected from those who responded to both questionnaires, those who did not respond to the second questionnaire, and those who did not respond to NSS 72-2. From this sample, a comparison was made between the MFT information and the jacket data. The purpose of this sample selection strategy was to obtain a sample representative of the entire Navy population. Since the purpose of this phase of the study was to study the accuracy of MFT information to determine the effects of errors in this information on sample selection in Navy surveys, and since all naval personnel are eligible for sample selection in most surveys, the target population for this phase of the study was the entire Navy population.

TABLE 6

Samples Mailed Out and Received Back in the RAFSI Survey

	FEMALES								MALES							
	6 WKS AFTER CUT-OFF				12 WKS AFTER CUT OFF				6 WKS AFTER CUT-OFF				12 WKS AFTER CUT OFF			
	MINORITY		NON MIN		MINORITY		NON MIN		MINORITY		NON MIN		MINORITY		NON MIN	
	MAILED	REC	MAILED	REC	MAILED	REC	MAILED	REC.	MAILED	REC	MAILED	REC	MAILED	REC	MAILED	REC
1st Enlist	15	4	45	26	15	7	45	34	20	7	20	8	20	5	20	7
E2-E6 other than 1st Enlist	4	1	14	7	3	1	14	8	33	22	21	16	33	12	21	14
E7-E9	0	0	3	3	0	0	3	1	11	7	21	21	11	8	15	15
LDO/WO	0	0	1	0	0	0	2	2	12	11	21	20	11	9	21	18
01-03	1	1	41	28	2	0	43	28	24	18	20	17	25	15	20	13
04-06	1	0	20	15	2	2	20	15	13	9	20	15	12	8	20	15

III. RESULTS

A. Reliability of Responses

1. Response reliability for individual items

Table 7 summarizes the information on the inconsistency of responses to the stable questions over all respondents and for Groups 1 and 2 combined. The percentage inconsistency for each item was computed by dividing the number of individuals who gave different responses to that item by the number of individuals who responded to that item on both questionnaires. These results show a wide variation across items in the amount of inconsistency. Part of Hypothesis 1 states that items requiring a respondent to remember a past event or characteristic will have more response errors associated with them than items requiring him to report on a present event or characteristic. An inspection of Table 7 with this distinction in mind lends strong support for this aspect of Hypothesis 1. There are six items requiring the respondent to report on a past event, namely items 6, 13, 14, 15, 16 and 33, while there are nine items pertaining to present events, namely items 4, 7, 8, 19, 22, 23, 24, 25, 28. The inconsistency percentages for the first set of items from highest to lowest were 47.7%, 39.1%, 24.3%, 19.2%, 7.8%, 7.5%, and for the second set of items were 15.3%, 12.5%, 11.2%, 10.6%, 4.5%, 3.7%, 2.7%, 2.6%, 1.7%. Thus, for the particular items investigated in this study, inconsistency is clearly lower on the average for the stable "present" items than for the "past" items.

For the change items, the control item for each was used in conjunction with the responses to the change items themselves in the analysis of the results. There were two types of response inconsistencies possible for the change items. In a Type 1 error, a person might say on the control item that there was no change in the characteristic and yet give an inconsistent set of responses to the item of interest. For example, someone might have indicated that he had not been promoted during the time between the first and second questionnaires and at the same time have said he was an E-7 on the first questionnaire and an E-8 on the second questionnaire. A Type 2 error occurs when an individual reports on the control item that there was a change in the characteristic and yet gives a consistent set of responses to the item of interest. For instance, someone might have indicated on the control item that his enlistment status had changed during the interval between the first and second questionnaires and at the same time have said on both the NSS and RAFSI questionnaires that he was in his second enlistment.

TABLE 7

Inconsistency of Responses to Stable Factual Survey Items

Item #	Item Description	Type of Respondent	Percentage of Inconsistent Responses
4	Initial Obligation	Officer	11.2%
6	Program Obtained Commission	Officer	7.5
7	Designator	Officer	2.6
8-10[1]	Rating	Enlisted	4.5
13	Program entered Navy	Enlisted	19.2
14	Recreational activity before Navy	Officer & Enlisted	47.7
15	First joined Navy	Officer & Enlisted	7.8
16	Influence of draft	Enlisted	24.3
19	Date elegible for retirement	Officer & Enlisted	15.3
22	Age	Officer & Enlisted	10.6
23	Sex	Officer & Enlisted	1.7
24	Race	Officer & Enlisted	2.7
25	Marital status	Officer & Enlisted	3.7
28[2]	Educational level	Officer & Enlisted	12.5
33	Reason joined Navy	Officer & Enlisted	39.1

[1]The percentage of inconsistency is the average inconsistency for items 8-10 combined, all of which pertained to rating.

[2]Educational level was treated as a stable item by applying the following correction factor: If the respondent indicated in the control item for this question (#29, "Have you advanced your educational level significantly...between the time you completed NSS 72-2 and now?) that he had changed his educational level, and if his response to Item 28 represented an increase of one level over his response to the education level item in NSS 72-2, then this combination was counted as a consistency. All other differences were counted as inconsistencies.

Table 8 displays the results for the numbers and percentages of the two types of inconsistencies for the eight change items. The results are computed from the responses of the entire group of respondents. Seven of the change items were to be answered by both officer and enlisted personnel, while Item #11 (Enlistment status) was answered only by enlisted personnel.

There are several aspects to these results. First, it can be seen, by comparing the numbers of people who gave the same response to each item to the numbers of people who gave different responses to each item (Column 1 vs. Column 5), that comparatively few people gave different responses to the items. However, of those who did give different responses, very high proportions exhibited Type 1 inconsistencies (Column 2), that is, relatively few of those individuals who gave different responses indicated on the control item that there had in fact been a change on that particular characteristic. Compare these results to the Type 2 inconsistencies. In absolute numbers, there are more Type 2 inconsistencies than there are Type 1 inconsistencies. However, when considering the proportion of Type 1 inconsistencies out of the total possible for each item, the percentage of Type 2 inconsistencies is much lower than Type 1 inconsistencies for all items (Column 7 vs. Column 4).

The total percentage of inconsistency for the total of both types of errors was computed for each item (Column 9). These results can be used to compare the amount of inconsistency on stable items vs. change items and also to further investigate the differences between "past" and "present" items postulated in Hypothesis 1.

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The total percentage of inconsistency for both types of errors combined was computed for each item (Column 9). These results can be used to compare the amount of inconsistency on stable items vs. change items and also to further investigate the differences

TABLE 8

Numbers and Percentages of Type 1 and Type 2 Inconsistencies for all Respondents for Change Items

Item No.	Item Description	No. Giving Different Responses to Item (1)	No. of Type 1 Inconsistencies (2)	% of Type 1 Inconsistencies Out of those Giving Different Responses (3)	% of Type 1 Inconsistencies for all Responses (4)	Number Giving Same Response to Item (5)	No. of Type 2 Inconsistencies (6)	% of Type 2 Inconsistencies Out of those Giving Same Responses (7)	% of Type 2 Inconsistencies for all Respondents (8)	% of Both Types of Inconsistencies for all Respondents (9)
1	Pay grade	58	34	58.6%	7.0%	430	17	4.0%	3.5%	10.5%
3	Naval district	29	15	51.7	3.0	463	61	13.2	12.4	15.4
11[1]	Enlistment status	19	13	68.4	5.4	222	12	5.4	5.0	10.4
17	Current service plans	75	43	57.3	8.5	428	38	8.9	7.6	16.1
20	Where serving	30	18	60.0	3.5	480	55	11.5	10.8	14.3
26	Number of dependents	25	18	72.0	3.5	484	50	10.3	9.8	13.4
30	Type activity to which assigned	27	21	77.8	4.4	449	19	4.2	4.0	8.4
31	Smoking habits	34	17	50.0	3.4	467	23	4.9	4.6	8.0

[1]Only enlisted personnel responded to this item.

between "past" and "present" items postulated in Hypothesis 1. All change items were "present" items, that is, they required the respondent to report on current characteristics. The median percentage inconsistency for the change items was 11.9%, while the median percentage inconsistency for the "present" stable items was 4.5%. Thus it is evident that generally the inconsistency for the change items was higher than for the comparable stable items. However, the median for the change items of 11.9% was sizably lower than the mean for the stable "past" items which was 21.7%.

Reliability indexes in the form of Pearson correlation coefficients were produced for all items whose alternatives could be treated reasonably as comprising equal interval scales. For Item 16 (Influence of draft) the alternative "Was not subject to the draft" was counted as the equivalent of "Definitely would have entered even if no draft". For those which were change items, only those respondents who said in the control item that there was no change on the characteristic in question were included in the computations. These reliability coefficients are displayed in Table 9 for officer and enlisted personnel. These results show some variation across items, but in general the reliabilities are quite high. The lowest coefficients, for Item 19 (Date eligible for retirement), were around .81, and the highest coefficients, for Item 26 (Number of dependents) were 98.

2. Response reliability for different types of respondents

Hypothesis 2 states, in part, that reliability of response is expected to be a function of pay grade, race and sex. To investigate this hypothesis, first the results of the stable items common to both officer and enlisted were examined. An average inconsistency index for these items was computed for each individual. Then the subjects were broken down into three sets of two groups: Officers and enlisted personnel; Caucasians and Non-Caucasians; males and females. The mean inconsistency and its variance was computed for each of these six groups, and a t-test was done on the differences between the means for each of the three comparisons.

Table 10 displays these data and the t values which were computed from these values on the difference between means. Since no hypotheses had been advanced regarding the directionality of any of these differences, two tailed tests were employed. The results of these tests showed that the officers were significantly more consistent than the enlisted personnel and that the Caucasians were significantly more consistent than the non-Caucasians. On the other hand, no significant differences were found between male and female personnel.

Table 9 in Section A.1. above displayed reliability coefficients for certain items for officer and enlisted personnel. These results show very small differences in these coefficients

TABLE 9

Reliability Coefficients for Officer and Enlisted Personnel

RAFSI Item #	Item Description	Officer Reliability Coefficient	Enlisted Reliability Coefficient
1	Pay grade	.914	.954
11	Enlistment status		.979
15	First joined Navy	.972	.988
16	Influence of draft	.881	.851
17	Current service plans	.899	.937
19	Date eligible for retirement	.819	.807
26	Number of dependents	.987	.981
28	Educational level	.953	.854

TABLE 10

Differences in Mean Response Inconsistency
on the Basis of Selected Demographic Characteristics

Characteristic	X	s^2	n	t
Officer	.1594	.01156	269	- 2.248*
Enlisted	.1831	.01690	241	
Caucasian	.1614	.01425	360	- 3.306**
Non-Caucasian	.2035	.01433	117	
Male	.1763	.01351	321	1.409
Female	.1609	.01528	189	

* Statistically significant at the $p > .001$ level; two-tailed test.
** Statistically significant at the $p > .05$ level; two-tailed test.

by officer/enlisted category with one exception. For educational level, the reliability index was 10 points lower for enlisted personnel than for officers.

The change items were also analyzed to determine if there were differences in inconsistency of responses on the basis of demographic characteristics. The results are given in Table 11. The average percentage for Type 1 inconsistencies was computed as follows: For each item, a proportion was determined by adding the number of Type 1 inconsistencies by the number of people who gave different responses to that item. The proportions for all items were then added and divided by the number of items to produce the average inconsistency. Similarly, the average percentage of Type 2 inconsistencies was computed by dividing the number of Type 2 inconsistencies for each item by the number of people who gave the same response to the item, adding up these proportions for all items, and dividing by the total number of items.

These results show that for Type 1 inconsistencies, officers were higher than enlisted personnel, Caucasians were higher than non-Caucasians, and females were higher than males. On the other hand, for Type 2 inconsistencies, enlisted personnel were higher than officers, non-Caucasians were higher than Caucasians, and males were higher than females. None of the latter differences, however, were particularly large. While at first these findings may seem contradictory, it is important to note that the average percentage of Type 1 inconsistencies should be interpreted with some caution. The total number of people who gave different responses was much smaller than the total number who gave the same responses to each item (See Table 8). Therefore, the percentages for Type 1 inconsistencies are based on a smaller number of people and therefore have less stability as statistics than the Type 2 percentages.

TABLE 11

Mean Percentage of Inconsistencies for Change Items by Type of Respondent

Category of Respondent	Average % of Type 1 Inconsistency out of those giving different Responses	Average % of Type 2 Inconsistency out of those giving Same Responses
Officer	60.1%	6.2%
Enlisted	53.9	9.2
Caucasian	61.6	7.8
Non-Caucasian	49.4	10.9
Male	51.5	8.5
Female	67.2	7.2

3. Response reliability for different time intervals between questionnaire administrations

Hypothesis 3 stated that there would be fewer response errors, the shorter the time interval between test-retest administration. Table 12 displays the percentage inconsistency for each item for Group 1 (six weeks between administrations) and Group 2 (twelve weeks between administrations). Items #4, 6 and 7 were for officers only, while items 8, 9, 10 and 13 were for enlisted personnel only. All remaining items were to be answered by both officer and enlisted personnel. These results show little overall difference between Groups 1 and 2 in the amount of inconsistency for these items, and, in fact, for some items, Group 2's responses were more consistent than those of Group 1. To ascertain whether the overall response inconsistency was higher for Group 2 than Group 1 (Hypothesis 3), the mean inconsistency and the variance of the inconsistency across all items was computed and a one tailed t-test on the differences was performed. These results are displayed in Table 13. The results show that there is a difference in the mean inconsistency in the predicted direction ($X_1 < X_2$), but this difference is not significant ($p > .05$).

TABLE 13

Difference in Mean Response Inconsistency on the Basis of Time between Questionnaire Administrations

Group	X	s^2	n	t
1 (Six weeks between administrations)	.1692	.01397	260	
				-.266
2 (Twelve weeks between administrations)	.1720	.01448	250	

The results of the change items were also analyzed to see if there were any differences between groups. Table 14 displays the average percentages of the two types of inconsistencies for each group. These averages were computed from only those items which were answered by both officer and enlisted personnel. The average percentage for Type 1 inconsistencies was computed as follows: For each item, the number of Type 1 inconsistencies was divided by the number who gave different responses to that item to create a proportion. The proportions for all items were then added up and divided by the number of items to produce the average inconsistency. Similarly, the average percentage of Type 2 inconsistency was computed by dividing the number of Type 2 inconsistencies for each item by the number of people who gave the same response to the

TABLE 12

Inconsistency of Responses to Stable Factual Survey Items by Time Interval Between Administration

RAFSI Item#	Item Description	% of Inconsistent Responses-Group 1 (Six week interval)	%of Inconsistent Responses-Group 2 (12 week interval)
4	Initial obligation	12.9%	9.4%
6	Program obtained commission	7.2	7.9
7	Designator	2.2	3.2
8-10[1]	Rating	4.6	4.4
13	Program entered Navy	16.9	21.5
14	Recreational activity before Navy	47.9	47.6
15	First joined Navy	8.1	7.6
16	Influence of draft	24.6	24.1
19	Date eligible for retirement	14.1	17.2
22	Age	11.2	10.1
23	Sex	2.3	1.2
24	Race	3.5	2.0
25	Marital status	1.9	5.6
28[2]	Educational level	11.9	13.2
33	Reason joined Navy	40.2	38.2

[1]The percentage of inconsistency is the average inconsistency for items 8-10 combined, all of which pertained to rating.

[2]Educational level was treated as a stable item by applying the following correction factor: If the respondent indicated in the control item for this question (#29, "Have you advanced your educational level significantly ...between the time you completed NSS 72-2 and now?") that he had changed his educational level, and if his response to Item 28 represented an increase of one level over his response to the education level item in NSS 72-2, then this combination was counted as a consistency. All other differences were counted as inconsistencies.

item, adding up these proportions for all items, and dividing by the total number of items.

These results show almost no differences between the two groups for either type of inconsistency. These findings are consonant with the findings for the stable items.

TABLE 14

Mean Percentage of Inconsistencies for Change Items by Time Interval between Questionnaire Administration

Time Interval	Average % of Type 1 Inconsistency out of those giving Different Responses	Average % of Type 2 Inconsistency out of those giving Same Responses
Group 1 (Six weeks between administrations)	57.3%	7.5%
Group 2 (Twelve weeks between administrations)	57.2	7.9

B. Accuracy

1. Accuracy of MFT Information

To investigate Hypothesis 1, which stated in part that differential amounts of tape error were associated with different items, various specified items for which information was available from both the MFT and personnel jackets were compared.

Information contained on the MFT was compared with comparable information in the personnel jackets for eight items of officer information. Table 15 presents this officer information for the variables studied. In this comparison, race and birth date were in agreement 100% of the time and sex was in agreement 98% of the time. Designator and pay grade had agreement rates of 83% and 80%, respectively; the number of primary dependents agreed 69% of the time, while the level of education agreed in only 65% of the cases. No significant differences were found ($p. < 05$) between the two data sources for pay grade, number of primary dependents and educational level.

TABLE 15

MFT vs. Comparable Personnel Jacket Information for Officers

Variable	Number of Inconsistencies	Rate of Agreement	n
Race	0	100 %	54
Birth Date	0	100	54
A.D.B.D.	0	100	52
Sex	1	98	54
Designator	9	83	54
Pay grade	11	80	54
Primary Dependents	5	69	16
Education	18	65	52

The proportion of missing data for each variable studied was calculated by dividing the number of blanks from either of the two data sources by the total number of cases. A blank was counted when either the MFT, or the personnel jackets, or both, had information missing for that specific variable. Table 16 presents these results for those variables where missing data was encountered when the MFT and personnel jackets were compared item by item for officers and enlisted personnel. For officers, the number of primary dependents was absent from 70% of the cases, while the educational level was missing in 4%.

Table 17 presents the agreement rates between the MFT and personnel jackets for 13 variables studied for enlisted personnel. Four of these variables (sex, race and CLER and GCT scores) had agreement rates of 90% or above, while five variables (race, number of primary dependents, years of education, and ARI and MECH scores) had agreement rates between 80-90%. Pay grade had an agreement rate of 76%, and the number of enlistments agreed in 73% of the cases. Birth date agreed 66% of the time, while active duty base date agreed in only 58% of the cases. T-tests revealed no significant differences ($p. < 05$) between these two data sources, for pay grade, number of enlistments, number of primary dependents and years of education.

Table 16 presents the percent of missing data for enlisted personnel for comparisons between the MFT and the personnel jackets. For enlisted personnel GCT, ARI, MECH and CLER scores were missing from 27% of the cases. The number of enlistments was missing from 10%, and the A.D.B.D. and race was missing from 2% of the cases. For all other variables, no data was missing.

Hypothesis 2 stated that the amount of tape error may be differentially associated with the various sub-group of respondents. To test this hypothesis, rate of agreement was examined separately for enlisted and officer personnel, each group of which was broken down by race and sex.

Table 18 presents rates of agreement for officers between the MFT and personnel jackets, analyzed by race. Of the seven variables examined, Caucasians had higher rates of agreement for three (pay grade, number of primary dependents and educational level), equal rates of agreement for one (A.D.B.D.) and lower rates for two (sex, and designator) compared to non-Caucasians.

The percent of missing data for officers, analyzed by race, is presented in Table 19. Only those variables are presented for which missing data was encountered. Caucasian officers had a greater amount of missing data for two variables (number of primary dependents and A.D.B.D.), while non-Caucasians had more missing data for one (educational level). None of the remaining four variables had any missing data for either group.

TABLE 16

Missing Information from the MFT vs. Personnel Jackets for Officer and Enlisted Personnel

Variable	Percent of Missing Data
ENLISTED	
GCT Scores	27%
ARI Scores	27
MECH Scores	27
CLER Scores	27
A.D.B.D.	2
Number of enlistments	10
Race	2
OFFICER	
Number of primary dependents	70%
Educational level	4

TABLE 17

MFT vs. Comparable Personnel Jacket Information for Enlisted Personnel

Variable	Number of Inconsistencies	Rate of Agreement	n
Sex	0	100%	41
CLER (Clerical)	0	100	30
Race	2	95	40
GCT (General Classification Test)	1	92	30
Rate	5	88	41
Primary Dependents	5	88	41
Years of Education	7	83	41
ARI (Arithmetic)	2	83	30
MECH (Mechanical)	2	83	30
Pay grade	10	76	41
Number of Enlistments	10	73	37
Birth Date	14	66	41
A.D.B.D.	17	58	40

TABLE 18

MFT vs. Personnel Jacket
Rate of Agreement for Officers Analyzed by Race

Variable	Caucasian Rate of Agreement	n	Non-Caucasian Rate of Agreement	n
Sex	98%	43	100%	11
Pay grade	84	43	64	11
Number of primary dependents	67	12	25	4
Educational level	67	42	40	10
Designator	82	43	91	11
A.D.B.D.	100	41	100	11
Date of birth	87	43	100	11

TABLE
MFT vs. Personnel Jacket
Per Cent of Missing Data for Officers Analyzed by Race

Variable	Caucasian	Non-Caucasian
Number of primary dependents	72%	63%
Educational level	2	9
A.D.B.D.	4	0

When the officer tape errors were analyzed between the MFT and personnel jacket by sex, as presented in Table 20, females had higher agreement rates for four variables (pay grade, number of primary dependents, educational level, and designator), males had higher rates of agreement for one (date of birth), and rates of agreement for two variables (A.D.B.D. and race) were the same for females and males.

Table 21 presents the proportion of missing data from the above analysis. Again, only variables for which data was missing are presented. Female officers had more missing data than did the males for three variables (number of primary dependents, educational level and A.D.B.D.). For the remaining four variables, there was no missing data for either males or females.

Tape errors were analyzed for enlisted personnel in the same manner as for officers. Again, data on the MFT was compared with corresponding information from personnel jackets. Table 22 presents the rate of agreement when this analysis was based on race. Of 12 variables examined, Caucasians had higher agreement rates than non-Caucasians for four variables (rate, number of enlistments, birth date, and number of primary dependents), equal rates for two variables (sex and CLER scores), and lower rates of agreement for the remaining variables.

The corresponding percent of missing data from this analysis is presented in Table 23. Only variables which had greater than zero amount of missing data are presented. Caucasians had more missing data from two variables (A.D.B.D. and number of enlistments), and a lower amount of missing data for four variables (GCT, ARI, MECH and CLER scores). For all other variables, there was no missing data.

Tape errors were analyzed by sex for enlisted men and the rates of agreement presented in Table 24. Females had higher rates of agreement for seven variables (GCT, ARI and MECH scores, A.D.B.D., date of birth, number of primary dependents and years of education), equal rates for one (CLER scores) and lower rates for the remaining variables than males.

The amount of missing data from this analysis is presented in Table 25. Females had less missing data than males for six variables (GCT, ARI, MECH and CLEP scores, A.D.B.D. and number of enlistments), and more missing data from only one variable (race). There was no missing data for the remaining variables, and these, as usual, are not presented.

2. Accuracy of Questionnaire Responses

Again, to determine whether Hypothesis 1 was relevant to specified items, certain items were compared between RAFSI and the personnel jackets. Seven officer demographic variables were

MFT vs. Personnel Jacket
Rate of Agreement for Officers Analyzed by Sex

Variable	Female Rate of Agreement	n	Male Rate of Agreement	n
Pay grade	89%	36	62%	36
Number of primary dependents	100	1	67	15
Educational level	68	34	62	18
Designator	98	36	56	18
A.D.B.D.	100	34	100	18
Race	100	36	100	18
Date of birth	87	36	95	18

TABLE 21

MFT vs. Personnel Jacket
Per Cent of Missing Data for Officers Analyzed by Sex

Variable	Female	Male
Number of primary dependents	97%	16%
Educational level	5	0
A.D.B.D.	5	0

TABLE 22

MFT vs. Personnel Jacket
Rate of Agreement for Enlisted Personnel Analyzed by Race

Variable	Caucasian Rate of Agreement	n	Non-Caucasian Rate of Agreement	n
Sex	100%	15	100%	26
Rate	100	15	81	26
Pay grade	67	15	81	26
GCT Scores	93	13	100	17
ARI Scores	93	13	95	17
MECH Scores	93	13	95	17
CLER Scores	100	13	100	17
A.D.B.D.	50	14	62	26
Number of enlistments	77	13	71	24
Date of birth	67	15	66	26
Number of primary dependents	100	15	81	26
Years of education	67	15	93	26

TABLE 23

MFT vs. Personnel Jacket
Per Cent of Missing Data for Enlisted Personnel Analyzed by Race

Variable	Caucasian	Non-Caucasian
GCT Scores	13%	34%
ARI Scores	13	34
MECH Scores	13	34
CLER Scores	13	34
A.D.B.D.	6	0
Number of enlistments	13	7

TABLE 24

MFT vs. Personnel Jacket
Rate of Agreement for Enlisted Personnel Analyzed by Sex

Variable	Female Rate of Agreement	n	Male Rate of Agreement	n
Rate	77%	21	100%	20
Pay grade	72	21	80	20
GCT Scores	100	16	93	14
ARI Scores	94	16	93	14
MECH Scores	94	16	93	14
CLER Scores	100	16	100	14
A.D.B.D.	77	21	37	19
Number of enlistments	60	20	77	17
Date of birth	72	21	60	20
Race	90	20	100	20
Number of primary dependents	96	21	80	20
Years of education	96	21	70	20

TABLE 25

MFT vs. Personnel Jacket
Per Cent of Missing Data for Enlisted Personnel Analyzed by Sex

Variables	Females	Males
GCT Scores	23%	30%
ARI Scores	23	30
MECH Scores	23	30
CLER Scores	23	30
A.D.B.D.	0	5
Number of enlistments	4	15
Race	4	0

compared between the retest questionnaire (RAFSI) and the corresponding personnel jacket information. Table 26 presents the results of these comparisons. Rate of agreement was calculated simply as the proportion of matching cases out of the total number of cases for which there was information. Four of the seven variables (social security number, sex, race, and pay grade) had an agreement rate of over 90%. The remaining three characteristics (designator, number of primary dependents and education level) varied from 88% to 63%.

Table 27 presents agreement rates between the RAFSI questionnaire and personnel jackets for enlisted personnel on eight variables. Social security number, race and sex were the only variables which had agreement rates of 90% or greater, Enlisted pay grade agreed 89% of the time, and the number of enlistments agreed in 88% of the cases. Years of education and number of primary dependents had rates of agreement of 76% and 75%, respectively.

Test for the differences between these two sources of information were all insignificant ($p. < 05$). For officers, t-tests were run for pay grade, number of primary dependents and educational level. For enlisted personnel, tests were run on pay grade, number of enlistments, years of education and number of primary dependents.

When information from the retest questionnaire was compared to the personnel jackets, little missing data was encountered. These results for officers and enlisted personnel are presented in Table 28. Comparing the amount of missing data for variables corresponding to the MFT - personnel jacket analysis (Table 16) with the RAFSI - personnel jacket analysis (i.e., number of enlistments and race for enlisted personnel and number of primary dependents for officers) the most significant finding was that the number of primary dependents was missing with a high frequency from the MFT, while the number of enlistments for enlisted personnel was frequently missing from personnel jackets.

Again, to investagate whether Hypothesis 2 was relevant to response accuracy (Hypothesis 2 stated, in part, that differential amounts of response error may be associated with various sub-groups), rates of agreement and missing data between RAFSI and personnel jacket information for officers and enlisted personnel were analyzed according to race and sex.

Table 29 presents the rate of agreement, analyzed by race, from comparing specified officer variables between RAFSI and the personnel jackets. Three variables (pay grade, designator, and number of primary dependents) had higher rates of agreement for Caucasians than for non-Caucasians, while rates of agreement for sex and educational level were higher for non-Caucasians.

TABLE 26

RAFSI Questionnaire Responses vs.
Comparable Personnel Jacket Information for Officers

Variable	Number of Inconsistencies	Rate of Agreement	n
Social Security Number	0	100%	86
Sex	1	99	86
Race	3	96	83
Pay grade	5	94	86
Designator	10	88	83
Primary Dependents	16	81	84
Education	33	63	84

TABLE 27

RAFSI Questionnaire Responses vs. Comparable Personnel Jacket Information for Enlisted Personnel

Variable	Number of Inconsistencies	Rate of Agreement	n
Social Security Number	0	100%	74
Race	3	96	73
Sex	4	95	74
Pay grade	8	89	73
Number of Enlistments	8	88	68
Years of Education	17	76	72
Primary Dependents	18	75	73

TABLE 28

Missing Information from the RAFSI Questionnaire vs. Personnel Jackets for Officer and Enlisted Personnel

Variable	Percent of Missing Data
ENLISTED	
Pay grade	1%
Number of enlistments	8
Race	1
Number of primary dependents	1
Years of education	3
OFFICER	
Designator	3%
Race	6
Number of primary dependents	2
Educational level	2

TABLE 29

RAFSI vs. Personnel Jacket
Rate of Agreement for Officers Analyzed by Race

Variable	Caucasian Rate of Agreement	n	Non-Caucasian Rate of Agreement	n
Pay grade	95%	60	93%	26
Designator	92	58	80	25
Sex	99	60	100	26
Number of primary dependents	97	60	67	24
Educational level	56	59	72	25

TABLE 30

RAFSI vs. Personnel Jacket
Per Cent of Missing Data for Officers Analyzed by Race

Variable	Caucasian	Non-Caucasian
Designator	3%	3%
Number of primary dependents	0	7
Educational level	1	3

The amount of missing data was calculated for the same variables for which rate of agreement was determined. Table 30 presents the data for officers analyzed by race. The clearest differences were in the number of primary dependents and educational level. Non-Caucasians had more missing data than did Caucasians for these two variables. The same amount of data was missing for each group for designator. No other missing data was encountered in the remaining variables studied, and are, therefore, not presented.

Table 31 presents the rate of agreement, examined by sex, for five officer variables, again from comparisons between the RAFSI responses and personnel jacket data. Female officers had higher rates of agreement for four of these variables (pay grade, designator, race, and number of primary dependents), while male officers had higher rates of agreement for educational level.

Table 32 presents the percent of missing data for officers, analyzed by sex. Males had more missing data for designator, race and number of primary dependents than did females. Both males and females had an equal amount of missing data for educational level. Again, variables for which no missing data was encountered are not presented.

Accuracy of information for enlisted personnel was examined in the same manner. Table 33 presents rate of agreement for enlisted personnel analyzed by race, for the RAFSI vs. personnel jacket comparison. For the five variables matched between the personnel jackets and the responses to RAFSI, Caucasians had higher rates of agreement for three (pay grade, number of enlistments, and years of education) of the five variables and lower rates of agreement for the other two (sex and number of primary dependents).

Table 34 presents the proportion of missing data for enlisted personnel broken down by race for the five variables which had percentage missing data greater than zero. These proportions were calculated by adding the number of blanks, from either the personnel jackets, the questionnaire, or both, by the total possible number of cases. Caucasians had substantially less total missing information. The percent missing data was lower for all five variables for this group than for non-Caucasians.

When rates of agreement are examined by sex (Table 35), it is seen that males had higher rates than females for two variables (race and years of education), and lower for three (pay grade, number of enlistments and number of primary dependents).

Table 36 presents the proportion of missing data for enlisted personnel analyzed by sex, again for only those variables having a greater than zero percentage of missing data. Females had

TABLE 31

RAFSI vs. Personnel Jacket
Rate of Agreement for Officers Analyzed by Sex

Variable	Female Rate of Agreement	n	Male Rate of Agreement	n
Pay grade	98%	40	92%	46
Designator	95	39	82	44
Race	98	40	86	43
Number of primary dependents	88	40	75	44
Educational level	54	39	67	45

TABLE 32

RAFSI vs. Personnel Jacket
Per Cent of Missing Data for Officers Analyzed by Sex

Variable	Female	Male
Designator	2%	4%
Race	0	6
Number of primary dependents	0	4
Educational level	2	2

TABLE 33

RAFSI vs. Personnel Jacket
Rate of Agreement for Enlisted Personnel Analyzed by Race

Variable	Caucasian Rate of Agreement	n	Non-Caucasian Rate of Agreement	n
Pay grade	95%	49	88%	24
Number of enlistments	90	46	87	22
Sex	94	49	96	25
Number of primary dependents	72	49	84	24
Years of education	88	48	55	24

TABLE 34

RAFSI vs. Personnel Jacket
Per Cent of Missing Data for Enlisted Personnel Analyzed by Race

Variable	Caucasian % of Missing Data	Non-Caucasian % of Missing Data
Pay grade	0%	4%
Number of enlistments	6	12
Number of primary dependents	0	4
Years of education	2	4

TABLE 35

RAFSI vs. Personnel Jacket
Rate of Agreement for Enlisted Personnel Analyzed by Sex

Variable	Female Rate of Agreement	n	Male Rate of Agreement	n
Pay grade	92%	35	87%	38
Number of enlistments	91	32	87	36
Race	95	35	98	38
Number of primary dependents	81	36	71	37
Years of education	62	34	90	38

TABLE 36

RAFSI vs. Personnel Jacket
Per Cent of Missing Data for Enlisted Personnel Analyzed by Sex

Variable	Females	Males
Pay grade	0%	2%
Number of enlistments	5	11
Race	0	2
Number of primary dependents	2	0
Years of education	0	5

less missing data for four variables (pay grade, number of enlistments, race and years of education) than did the males, who had less missing data for only one variable (number of primary dependents).

3. Accuracy between Officers and Enlisted Personnel

In administrative processing within the Navy, information for officers and enlisted personnel are kept separate at all times, from the originating documents in the personnel jackets to the MFT. For this reason, it was hypothesized that differences in accuracy as a function of gross pay grade, i.e., officer and enlisted, may result. Therefore, two-tailed analyses were run on rates of agreement between officers and enlisted personnel for those variables which were comparable. Table 37 presents the results of comparing data in the MFT with personnel jackets between officers and enlisted men. Only two variables proved to be significantly different from each other, birth date and A.D.B.D. Table 38 presents the analysis comparing rates of agreement between RAFSI and the personnel jacket for officers and enlisted personnel. Only one variable, education, proved to be significant. Both of these analyses indicated that, overall, rates of agreement for these three variables were higher for enlisted personnel than for officers.

TABLE 37

MFT vs. Personnel Jacket
Rates of Agreement Analysis Between Officer and Enlisted Personnel

Variable	T - value for Differences in Rate of Agreement
Race	1.66
Sex	- .88
Birth date	4.65*
Number of primary dependents	- 1.70
Education	- 1.90
Pay grade	.47
A.D.B.D.	5.21*

* Significant at $p<.01$

TABLE 38

RAFSI vs. Personnel Jacket
Rates of Agreement Analysis Between Officer and Enlisted Personnel

Variable	T - value for Difference in Rates of Agreement
Pay grade	1.19
Sex	1.53
Race	.16
Number of primary dependents	.85
Education	4.12*

* Significant at $p<.01$

IV. DISCUSSION

It is important to keep one point in mind when considering the generalizability of these results. The RAFSI sample was selected from those who responded to NSS 72-2. Therefore, the results of the analyses on response consistency and accuracy, which were done using this sample, can be generalized only to the distribution of people who are selected for and tend to respond to naval personnel surveys. On the other hand, the sample selected to analyze the accuracy of MFT information was selected to be representative of the entire Navy population, but in the proportions in which they are ordinarily sampled for naval personnel surveys (e.g., disproportionately more females than occur in the population). Therefore, the results on the analysis of the MFT information can be generalized to the distribution of people who are ordinarily selected for naval personnel surveys.

The results of the analyses of response inconsistency by individual item shows a great deal of variation across items in this regard. For the stable items, the range of percentage inconsistency was from 1.7% (sex) to 47.7% (recreational activity before joined Navy). For the change items, the range was not as large, with a low percentage inconsistency of 8.0% (smoking habits) and a high of 16.1% (current service plans). The results strongly confirmed that part of Hypothesis 1 which stated that "past" items would have more inconsistent responses than "present" items. Also, when the change items, which were all "present" items, were compared to the comparable stable "present" items, the median percentage inconsistency for the change items was the higher of the two. This finding was expected; there are more chances to make errors in reporting on characteristics which are subject to change or which have changed than in reporting on characteristics which do not change. The three way comparison among the median percentage inconsistencies, for stable "present" items (4.5%), change "present" items (11.9%) and stable "past" items (21.7%) indicates that the factor of past-present is more related to response inconsistency than the factor of stable-change.

It is worthwhile to consider the absolute magnitude of the response inconsistency for a moment. As was mentioned above, for some items the consistency is very high. For the items for which reliability coefficients were calculated, the reliabilities were all more than .80. On the other hand, for certain items, response consistency was extraordinarily low. For instance, there was 47.7% inconsistency for the item on recreational activity in which participated most frequently before joined Navy and 39.1% inconsistency for the item on most important reason for joining the Navy. It is

important to note at this point that high response variance is not a cause for concern in and of itself. As long as the mean for all the respondents remains stable, the amount of response variance is not important. In other words, it does not matter if individuals change places within the distribution as long as the form of the distribution remains the same. The problem is that, with high response variance, breaking the distribution down into smaller groups (e.g., by officer-enlisted) becomes risky due to the reduced sample size in face of the measurement error variance.

A word about the conceptual differences between Type 1 and Type 2 errors on the change items is in order. A Type 1 inconsistency occurs when a person gives two different responses to the same item yet on the control item says there was no change. This type of inconsistency can fairly safely be interpreted as representing an error in one of the responses to the item of interest. If a person says there was no change on the control item, and if one can assume that the person is accurate in this response, then the inconsistency on the item of interest represents an error. A Type 2 inconsistency, on the other hand, occurs when a person give the same response on both items yet says on the control item that there was a change. In this case, it is likely that the error occurred in the response to the control item rather than in one of the two responses to the item of interest. The fact that the two responses to the item of interest are identical is not likely to have occurred by accident, except in the case of questions where only two response alternatives are present. Type 2 inconsistencies may not so much represent response variance as they do errors in answering the control items. Therefore, in judging the amount of response inconsistency as it pertains strictly to comparing responses to the same question, more attention should be given Type 1 inconsistencies.

The use of control items adds a new technique not previously employed in the control and assessment of true change. True change is a problem which must be contended with in any test-retest paradigm yet is often ignored. The use of control items is not foolproof by any means. For instance, a person could make a double error and come out as seeming consistent. Also, the results point to the fact that people make errors in the control items as well. However, the employment of such items does at least make some inroads into the difficulties associated with the assessment of true change.

As far as differences in response consistency according to demographic characteristics are concerned, two out of the three characteristics were found to make a difference for the stable items. Officers were more consistent than enlisted personnel, and Caucasians

were more consistent than non-Caucasians. No significant differences were found between male and female personnel. The results on the change items are difficult to interpret. It was mentioned above that Type 1 inconsistencies are more indicative of response variance (when defined as the discrepancy between two responses to the same item) than are Type 2 inconsistencies. On the other hand, it was explained in the Results chapter that Type 1 inconsistencies are more subject to sampling fluctuations due to the smaller number of people on which they are based than are Type 2 inconsistencies. Therefore, it is difficult to draw any conclusions about the differences on the change items between different types of naval personnel.

The fact that certain groups of respondents seem to exhibit more response variance than others has important implications. When the results are analyzed into subgroups, and one subgroup's responses are more reliable than the other, less condidence can be placed in the latter's results (i.e., wider confidence intervals). To compensate, it might be wise to increase the sample size of the subgroup that has the larger response variance.

The results on the differences in response consistency for the two time intervals between questionnaire administration were clearcut: No significant differences were found on this basis. It is interesting to speculate if this same finding would hold true if the first administration interval had been very short, say one week. Findings from learning theory plus some of the studies cited above (e.g., Curtis, 1939; Jenkins, 1938) indicate that there might be very high response consistency for very short test-retest intervals due to memory factors. The results of this study indicate that the memory factor was not operating to spuriously inflate response consistency. One might then tentatively conclude that response consistency would never be any lower, no matter how long the intervening time between administrations.

The results of the accuracy aspect of the present study suggest that the Navy's automated personnel record system, i.e., the MFT, contains more inaccurate information than either personnel jackets or questionnaire responses. Also, more data was absent from the MFT than from the personnel jackets.

Hypothesis 1 suggested that tape and response errors may be differentially distributed according to the specific item. While rates of agreement between the MFT and personnel jackets were not statistically significant there were discrepencies in absolute rates. For officers, rates of agreement seem to be related to the type of item. That is, for stable items, such as race, birth date, A.D.B.D.

and sex, agreement rates were high. Conversely, for those variables that could change over time, such as pay grade, primary dependents and educational level,agreement rates were lower. However, it is unclear why a variable like designator, which had only a moderate agreement rate, was so low in agreement as this does not tend to change much over time.

This relationship between type of item (i.e., stable vs. change) does not seem to hold for enlisted personnel. Dates, such as birth date and A.D.B.D., had the lowest rate of agreement for any enlisted variable studied, while items subject to change, such as number of primary dependents and years of education were moderatly high in agreement between the two sources. Agreement rates for enlisted pay grade were similar to those of the officer group.

It appears that agreement rates between the MFT and personnel jackets are not simply a function of time or the probability that an item can possibly change, at least for enlisted personnel. It is unclear, however, what factors contribute to inaccurrate data maintained in the MFT.

Hypothesis 1 was also investigated as it pertained to questionnaire response errors. Rates of agreement for comparisons between RAFSI responses and personnel jacket information was, in fact, related to whether or not an item could change over time. this was true both for officer and enlisted personnel.

Hypothesis 2 stated, in part, that tape errors would be differentially distributed among various sub-groups in the population. Results from the various analyses indicated that rather than as a function of characteristics, such as pay grade, race or sex, rates of agreement seemed to be functions of the data sources. That is, lower rates of agreement were not consistent between comparisons but dependent on what data sources were employed in the analyses.

One reason that this study was conducted was to determine the feasibility of obtaining stable demographic information from the MFT rather than include this type of question in naval personnel surveys. However, this idea does not seem practical considering, first, that such information is often incorrect and second, that such information is often absent. As Fuller, et. al., (1970) have pointed out, the effect of a given type of discrepency must be considered relative to the type of data analysis for which the information is to be used. Nevertheless, if the stable information on the MFT is to be used to stratify initial population or to stratify results for data analysis, the findings may be inaccurate. These inaccuracties in the final results may not be a simple linear function of incorrect information, depending, of course, on the analysis employed.

One approach which could be used to resolve the problem of questionnaire length without resorting to reference to the MFT would be to include demographic questions only directly relevant to planned analyses. That is, rather than ask numerable standard questions, only those most relevant to the planned analysis need be asked.

The problem of accurate information for initial stratification, however, remains to be resolved. Pay grade, a variable frequently used for this purpose, had relatively low agreement rates between the MFT and personnel jackets for both officer and enlisted personnel. Agreement rates between the personnel jackets and the retest questionnaire were higher, indicating that, at least for this variable, accurate information is obtainable from the questionnaire. In a report conducted in this laboratory, Tsai (1973) compared the variance of the estimate of the mean resulting from stratification with that from simple random sampling. Little reduction in the variance associated with common variables used to stratify populations was found. This indicates that the objectives of stratification are not being met and that, perhaps, it is unnecessary to stratify the Navy population for sampling, at least as long as disproportionate samples are not required for analyses of special sub-groups, such as minorities or females. If simple random sampling was conducted in future surveys, problems associated with inaccurate MFT data could be partially avoided, as well as reducing the cost of each survey.

As far as directions for new research are concerned, the most important need lies in the assessment of response consistency for attitudinal items in naval personnel surveys. While the problem of controlling for true change is even more critical in this instance, it is not insurmountable. The results of this study lead one to suspect that, for certain types of attitudinal items, response inconsistency might be very high. If this is the case, such items should be re-written or eliminated from use in naval personnel surveys.

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V. CONCLUSIONS AND RECOMMENDATIONS

The results of this study have definite implications for the conduct of naval personnel surveys. In the previous absence of any information on the psychometric reliability or accuracy of responses to survey items, it was impossible to make judgments regarding the degree of confidence one could place in the results of the survey items. In the previous absence of any information on the accuracy and completeness of the MFT information, it was impossible to make judgments regarding the degree to which the selected sample in fact was comprised of the types of people intended. The specific information obtained in this study can be usefully applied in the naval personnel survey situation to make improvements where they have been shown to be needed. Changes in both sample selection and questionnaire construction can usefully be implemented based on these results. On the general level, these results have added controlled findings to the body of knowledge which already exists regarding response accuracy and consistency in factual survey items. The use of control items introduces a new technique which, while not foolproof, gives a general method for controlling and assessing true change in a test-retest paradigm. The subject recommended for future investigation in this topic area is response consistency for attitudinal items in naval personnel surveys.

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APPENDIX A

Copy of Survey Questionnaires

INSTRUCTIONS

-- Fill in your Social Security Number in the space provided on your answer sheet. IT WILL BE USED FOR STATISTICAL CONTROL PURPOSES ONLY.

-- Use a pencil only. Number 2 pencil is best if it is available. DO NOT USE PEN OR MAGIC MARKER.

-- Blacken each answer block completely. If you want to change an answer, be sure to erase completely. Do not put down more than one answer to any one question.

-- Answer all questions on the special answer sheet provided. If you wish to make additional comments, use a separate sheet of paper. DO NOT WRITE ON THE ANSWER SHEET.

Here is an example of how to enter your answers.

IN WHAT SERVICE ARE YOU NOW SERVING?

A. Air Force
B. Marine Corps
C. Navy
D. Army

SAMPLE ANSWER SHEET

1. WHAT IS YOUR PRESENT PAY GRADE?

ENLISTED		OFFICERS	
A.	E-1	J.	WO
B.	E-2	K.	O-1
C.	E-3	L.	O-2
D.	E-4	M.	O-3
E.	E-5	N.	O-4
F.	E-6	O.	O-5
G.	E-7	P.	O-6
H.	E-8		
I.	E-9		

ENLISTED PERSONNEL, PLEASE SKIP QUESTIONS 2-4 AND GO ON TO Q-5.

THIS SECTION TO BE ANSWERED BY OFFICER PERSONNEL ONLY (Q2-Q4)

2. ARE YOU PRESENTLY SERVING WITHIN YOUR INITIAL SERVICE OBLIGATION AS A COMMISSIONED OFFICER? Initial service obligation here means the minimum active service required by your original source of commissioning (e.g., OCS, NROTC, etc.), plus any additional service obligation you may have acquired during this initial period as a result of submarine, nuclear power or flight training, etc. ALL LDOs AND WOs SHOULD SELECT CHOICE "A".

   A. Does not apply - I am a Limited Duty or Warrant Officer
   B. Yes
   C. No

3. THROUGH WHICH OF THE FOLLOWING OFFICER PROCUREMENT PROGRAMS DID YOU OBTAIN YOUR COMMISSION/ WARRANT?

   A. Naval Academy
   B. NROTC (Regular)
   C. NROTC (Contract)
   D. Integration
   E. Limited Duty Officer Program
   F. Officer Candidate School
   G. Aviation Officer Candidate
   H. Naval Aviation Cadet/V5
   I. Reserve Officer Candidate (ROC)
   J. Navy Enlisted Scientific Education Program (NESEP)
   K. Direct appointment from Merchant Marine
   L. Direct appointment from civilian status
   M. Warrant Officer Program
   N. Other

4. WHAT IS YOUR DESIGNATOR?

   A. 11XX Surface
   B. 112X Submarine
   C. 131X Aviation - Pilot
   D. 13XX Aviation - other than Pilot
   E. All Restricted Line Designators (14XX, 15XX, 16XX, 17XX, 18XX, 19XX)
   F. 210X Medical Corps
   G. 220X Dental Corps
   H. 230X Medical Service Corps
   I. 250X Judge Advocate General Corps
   J. 290X Nurse Corps
   K. 310X Supply Corps
   L. 410X Chaplain Corps
   M. 510X Civil Engineer Corps
   N. All Limited Duty Officer Designators
   O. All Warrant Officer Designators

OFFICERS, PLEASE SKIP QUESTIONS
5-23 AND GO ON TO QUESTION 24

THIS SECTION TO BE ANSWERED BY ENLISTED PERSONNEL ONLY (Q5-Q23)

IF YOU ARE A PETTY OFFICER OR AN OFFICIALLY DESIGNATED STRIKER (qualified to wear the striker rating badge) WHAT IS YOUR GENERAL RATING? (RATINGS ARE LISTED ALPHABETICALLY.) FOR EXAMPLE, IF YOUR GENERAL RATING IS "EM", ON LINE 6 ON THE ANSWER SHEET YOUR WOULD BLACKEN THE SPACE UNDER "H". YOUR RESPONSE ON LINE 5 WOULD BE "Z", AND YOUR RESPONSE ON LINE 7 WOULD BE "Y".

5. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "AB-CT", YOUR RESPONSE ON LINE 5 ON THE ANSWER SHEET SHOULD BE "Z".

A. Not rated/Not designated striker
B. AB
C. AC
D. AD
E. AE
F. AF
G. AG
H. AK
I. AM
J. AO
K. AQ
L. AS
M. AT
N. AV
O. AW
P. AX
Q. AZ
R. BM
S. BR
T. BT
U. BU
V. CE
W. CM
X. CS
Y. CT
Z. My Rating Is Not Included In This List

6. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "CYN-MN", YOUR RESPONSE ON LINE 6 ON THE ANSWER SHEET SHOULD BE "Z".

A. CYN
B. DK
C. DM
D. DP
E. DS
F. DT
G. EA
H. EM
I. EN
J. EO
K. EQ
L. ET
M. EW
N. FT
O. GM
P. HM
Q. HT
R. IC
S. IM
T. JO
U. LI
V. LN
W. ML
X. MM
Y. MN
Z. My Rating Is Not Included In This List

7. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "MR-YN", YOUR RESPONSE ON LINE 7 ON THE ANSWER SHEET SHOULD BE "Y".

A. MR
B. MT
C. MU
D. OM
E. OT
F. PC
G. PH
H. PM
I. PN
J. PR
K. PT
L. QM
M. RD
N. RM
O. SD
P. SH
Q. SK
R. SM
S. ST
T. SW
U. TD
V. TM
W. UT
X. YN
Y. My Rating Is Not Included In This List

THIS PAGE TO BE ANSWERED BY ENLISTED PERSONNEL ONLY

QUESTIONS 8 AND 9 CONCERN THE ADVANCEMENT MULTIPLE, THE SYSTEM USED BY THE NAVY TO DECIDE WHO GETS ADVANCED WITHIN A RATE. STARTING IN AUGUST 1972, SIX FACTORS WILL BE CONSIDERED IN THE ADVANCEMENT MULTIPLE. THE FACTORS TO BE CONSIDERED, AND THE AMOUNT OF WEIGHT TO BE GIVEN TO EACH OF THEM IS SHOWN BELOW.

FACTOR	WEIGHT
Exam Score	40%
Performance ratings	25%
Total active service	10%
Time in grade	10%
Awards	7.5%
PNA points	7.5%
	100.0%

8. WHAT IS YOUR OPINION OF THE WEIGHTS USED IN COMPUTING THE ADVANCEMENT MULTIPLE?

   A. Fair
   B. Unfair
   C. No opinion

9. STARTING IN AUGUST 1972, PNA POINTS WILL BE INCLUDED IN THE COMPILATION OF THE ADVANCEMENT MULTIPLE TO RECOGNIZE THE FACT THAT A PERSON MAY HAVE PASSED THE ADVANCEMENT-IN-RATE EXAM BUT NOT BEEN ADVANCED BECAUSE OF EXTERNALLY IMPOSED CEILINGS. DO YOU THINK THAT THIS IS A GOOD IDEA?

   A. Yes
   B. No

10. IN YOUR OPINION, ARE THE ADVANCEMENT-IN-RATE EXAMINATIONS WRITTEN FAIRLY?

   A. I have never taken an advancement-in-rate exam
   B. Yes
   C. No, because the material covered may be different from what a person in a given rate actually does
   D. No, because the wording of the questions may be too complex
   E. No, for some other reason

11. THE FIELD ADVANCEMENT PROGRAM WAS ESTABLISHED TO COMPENSATE NAVYMEN FOR THE RIGORS OF COMBAT CONDITIONS WHICH MAKE IT MORE DIFFICULT TO STUDY FOR AND PASS REGULAR EXAMS. DO YOU THINK THAT THE IDEA BEHIND THIS PROGRAM IS FAIR?

   A. Yes
   B. No

12. DO YOU THINK THAT THE FIELD ADVANCEMENT PROGRAM IS ADMINISTERED FAIRLY (ONLY PEOPLE WHO REALLY DESERVE TO BE ADVANCED ARE ADVANCED)?

   A. Yes
   B. No

13. DO YOU THINK THAT THE FIELD ADVANCEMENT PROGRAM SHOULD BE CONTINUED?

   A. Yes
   B. No

14. HAVE YOU BEEN ELIGIBLE TO BE ADVANCED UNDER THE FIELD ADVANCEMENT PROGRAM?

   A. Yes, and I have been advanced
   B. Yes, but I have not been advanced
   C. No

THIS PAGE TO BE ANSWERED BY ENLISTED PERSONNEL ONLY

15. DO YOU FEEL THAT THE REWARDS OF THE RATE ABOVE YOUR CURRENT ONE ARE WORTH THE EFFORT THAT HAS TO BE TAKEN TO REACH IT?

YES, primarily because I will achieve:

A. A meaningful increase in authority
B. A meaningful increase in pay
C. A meaningful increase in responsibility
D. A higher level of rights and privileges
E. Two or more of the above (A-D)
F. Something else

NO, primarily because:

G. The added responsibility is not worth the increase in authority
H. The added responsibility is not worth the increase in pay
I. The added responsibility is not worth the increase in rights and privileges
J. Two or more of the above (G-I)
K. Some other reason

16. ARE YOU SATISFIED WITH THE SELECTION BOARD PROCEDURE FOR SELECTING E8s/E9s FOR ADVANCEMENT?

A. Yes
B. No, would prefer selection by zone based on time in grade
C. No, would prefer selection by advancement multiple
D. No, but prefer the current E8/E9 Selection Board Procedure to alternatives B or C
E. No opinion

17. THE NAVY IS CONSIDERING SETTING UP A NEW E7 SELECTION BOARD WHICH WOULD OPERATE IN A SIMILAR MANNER TO THE E8/E9 BOARD. DO YOU THINK THAT THIS IS A GOOD IDEA?

A. Yes
B. No
C. No opinion

18. ACEY DUCEY CLUB PRIVILEGES HAVE RECENTLY BEEN EXTENDED TO E-4s. HOW DO YOU FEEL ABOUT THIS POLICY?

A. Very much in favor
B. Somewhat in favor
C. Indifferent
D. Somewhat opposed
E. Very much opposed

19. HOW WOULD YOU FEEL ABOUT EXTENDING CHIEF PETTY OFFICERS' MESS PRIVILEGES TO FIRST CLASS PETTY OFFICERS?

A. Very much in favor
B. Somewhat in favor
C. Indifferent
D. Somewhat opposed
E. Very much opposed

20. SELECT THE STATEMENT THAT BEST DESCRIBES YOUR USAGE OF THE NEW QUARTERLY PUBLICATION LINK, THE ENLISTED PERSONNEL DISTRIBUTION BULLETIN.

A. Have not heard of it
B. Have heard of it, but have not read it because it has not been readily available
C. Have not read it for some other reason
D. Read only my own rating section
E. Read most (or all) of it

THIS PAGE TO BE ANSWERED BY ENLISTED PERSONNEL ONLY

21. WHAT IS YOUR OPINION OF THE INFORMATION CONTAINED IN LINK?

A. Have not read LINK
B. Interesting and useful
C. Interesting, but not useful
D. Useful, but not interesting
E. Neither interesting nor useful

22. WHAT IS YOUR PRESENT ENLISTMENT AND/OR EXTENSION STATUS?

A. First enlistment
B. Extension of first enlistment
C. Second enlistment
D. Extension of second enlistment
E. Third or later enlistment or extension

23. THROUGH WHICH OF THE FOLLOWING PROGRAMS DID YOU ENTER THE NAVY?

A. 6 year Obligor program
B. 4 year Enlistment program
C. 3 year Seafarer or Airman program
D. 2 year (2x6) Reserve program
E. 4x10 Reserve program
F. Some other program

QUESTIONS 24 THROUGH 80 ARE TO BE ANSWERED BY OFFICER AND ENLISTED PERSONNEL

NAVY INFORMATION SOURCES

24. DO YOU GET THE WORD ABOUT NEW INFORMATION CONCERNING YOUR RATE, RATING, OR DESIGNATOR WITHIN A REASONABLE AMOUNT OF TIME AFTER IT IS PUT OUT BY BUPERS?

A. Almost always
B. Some of the time
C. Almost never

25. HOW MANY OF THE CNO SITREP FILMS HAVE YOU SEEN?

A. None
B. One
C. More than one

26. DID THE CNO SITREP FILM(S) YOU HAVE SEEN DEAL WITH ISSUES WHICH YOU CONSIDER IMPORTANT TO THE NAVY?

A. Have never seen a CNO SITREP film
B. Yes
C. Sometimes
D. No

27. DO YOU FEEL THAT YOU NOW HAVE A BETTER UNDERSTANDING OF THE CHANGES BEING INTRODUCED INTO THE NAVY AS A RESULT OF HAVING SEEN ONE OR MORE CNO SITREP FILM(S)?

A. Have never seen a CNO SITREP film
B. Yes
C. No

28. SOME COMMANDS HAVE AN "ACTION LINE" DESK OR TELEPHONE, THE PURPOSE OF WHICH IS TO ALLOW NAVY PERSONNEL TO AIR THEIR GRIPES AND GET QUICK ACTION FOR THEIR PROBLEMS. IF YOUR COMMAND DOES HAVE AN "ACTION LINE", HAVE YOU USED IT?

A. My command does not have an "Action Line"
B. Yes
C. No

29. REGARDLESS OF WHETHER OR NOT YOU HAVE USED YOUR COMMAND'S "ACTION LINE", DO YOU CONSIDER IT TO BE AN EFFECTIVE MEANS TO SOLVE A PROBLEM?

A. My command does not have an "Action Line"
B. Yes, almost all problems can be solved that way
C. Yes, but only for certain types of problems
D. No

30. DOES YOUR COMMANDING OFFICER HOLD A "CAPTAIN'S CALL" DURING WHICH HE TALKS WITH HIS MEN, HEARS GRIPES AND ANSWERS QUESTIONS?

A. Yes
B. No

31. IF YOU HAVE ATTENDED A CAPTAIN'S CALL, DID YOUR SKIPPER SHOW A GENUINE INTEREST IN YOUR CONCERNS?

A. My skipper does not hold a "Captain's Call"
B. My skipper holds a "Captain's Call", but I never attend
C. Yes
D. No

RECREATIONAL FACILITIES

32. WHICH ONE OF THE FOLLOWING STATEMENTS BEST DESCRIBES THE MOST IMPORTANT BENEFIT OF YOUR RECREATION ACTIVITIES?

A. Allows me to do something related to my civilian occupation
B. Provides a change of pace from the military environment
C. Gives me an opportunity to meet people with interests similar to my own
D. Helps me to keep physically fit
E. Provides an opportunity for self-expression and creativity
F. Gives me something familiar to do in an otherwise unfamiliar environment
G. Gives me something to do in my spare time
H. A benefit other than the above
I. No benefit

33. TO WHAT EXTENT DO YOU THINK YOUR RECREATION INFLUENCES YOUR PERFORMANCE OF DUTIES?

A. Very favorably
B. Somewhat favorably
C. No influence
D. Somewhat unfavorably
E. Very unfavorably

ITEMS 34 THROUGH 43 REFER TO RECREATIONAL ACTIVITIES AT U.S. MILITARY SHORE INSTALLATIONS (NAVY, USMC, ARMY, USAF). USE THE CHOICES BELOW (A-J) TO INDICATE YOUR PARTICIPATION OR REASON FOR NON-PARTICIPATION IN EACH TYPE OF ACTIVITY. READ THE ACCOMPANYING DESCRIPTIONS CAREFULLY BEFORE ATTEMPTING TO ANSWER THESE ITEMS.

A. Currently participating

NOT CURRENTLY PARTICIPATING BECAUSE:

B. Do not know what is available, or when offered
C. Activities offered do not interest me
D. Facilities not available
E. Facilities too difficult to get to
F. Facilities not open when I can use them
G. Activities too crowded
H. Not enough free time
I. Prefer other recreation organizations (private association, civilian community, etc.)
J. Other reason

34. LIVE ENTERTAINMENT (drama, acting, stage shows, rock and roll and variety shows, music, singing, playing musical instruments, listening to recorded or transcribed music, audience participation shows, etc.)

35. LIBRARY (reading, research, creative writing, etc.)

36. OUTDOOR RECREATION (hunting, fishing, camping, boating, horseback riding, shooting, hiking, nature activities, skating, sailing, etc.)

37. SPONTANEOUS PARTICIPATION ACTIVITIES (chess, checkers, ping pong, shooting pool, card games, etc.)

38. ORGANIZED SOCIAL ACTIVITIES (dances, card parties, etc.)

39. UNIT PARTIES AND PICNICS

40. SPORTS (softball, basketball, golf, track, swimming, tennis, bowling, etc.)

41. CRAFTS (auto repair, photography, woodwork, drawing, painting, model building, ceramics, sculpture, etc.)

42. TOURS AND TICKETS (sightseeing, educational, etc.)

43. VOLUNTEER SERVICE (officiating, youth service agencies, community action projects, etc.)

44. IN WHICH ONE OF THE FOLLOWING ACTIVITIES DO YOU PARTICIPATE MOST FREQUENTLY (active participant and/or spectator)?

A. Live entertainment
B. Library
C. Outdoor Recreation
D. Spontaneous participation activities
E. Organized social activities
F. Unit parties and picnics
G. Sports
H. Crafts
I. Tours
J. Volunteer Service
K. Other activity (not listed)

45. IN WHICH ONE OF THE FOLLOWING ACTIVITIES WOULD YOU PARTICIPATE MOST FREQUENTLY (active participant and/or spectator) IF YOU HAD THE OPPORTUNITY?

A. Live entertainment
B. Library
C. Outdoor Recreation
D. Spontaneous participation activities
E. Organized social activities
F. Unit parties and picnics
G. Sports
H. Crafts
I. Tours
J. Volunteer Service
K. Other activity (not listed)

46. AT THE SHORE INSTALLATION YOU ARE MOST LIKELY TO USE, WHICH ACTIVITY DO YOU THINK IS NEEDED MOST?

A. Live entertainment
B. Library
C. Outdoor Recreation
D. Spontaneous participation activities
E. Organized social activities
F. Unit parties and picnics
G. Sports
H. Crafts
I. Tours
J. Volunteer Service
K. Other activity (not listed)
L. No other activities are needed beyond those already available

47. IN WHICH OF THE FOLLOWING ACTIVITIES DID YOU PARTICIPATE MOST FREQUENTLY (active participant and/or spectator) BEFORE ENTERING THE NAVY?

A. Live entertainment
B. Library
C. Outdoor Recreation
D. Spontaneous participation activities
E. Organized social activities
F. Sports
G. Crafts
H. Tours
I. Volunteer Service
J. Other activity (not listed)

48. WHICH ONE OF THE FOLLOWING MOVIE TYPES DO YOU MOST PREFER TO SEE?

A. Western
B. Musical
C. Drama
D. Science Fiction
E. Comedy
F. Historical
G. Horror
H. Mystery/Suspense
I. War Movies
J. Other type (not listed)
K. No definite preference

49. DO YOU GENERALLY ENJOY THE SPORTS SHORTS CURRENTLY IN THE NAVY MOVIE PROGRAM?

A. Yes
B. No

50. WOULD YOU ENJOY SEEING AN OCCASIONAL FEATURE LENGTH DOCUMENTARY FILM INSTEAD OF A REGULAR FILM?

A. Yes
B. No

51. IF AN OCCASIONAL FEATURE LENGTH DOCUMENTARY FILM WERE TO BE BOOKED FOR SHOWING AT YOUR DUTY STATION (or nearby military installation), WHICH ONE OF THE FOLLOWING DOCUMENTARY CATEGORIES WOULD YOU MOST PREFER TO SEE?

A. Spectator Sports (football, basketball, baseball, etc.)
B. Hunting/Fishing
C. Surfing
D. Skiing
E. Auto/Motorcycle Racing
F. Adventure/Exploration
G. Historical
H. Other Category (not listed)

52. WOULD YOU ENJOY SEEING OLD FILM CLASSICS STARRING HUMPHREY BOGART, W. C. FIELDS, THE MARX BROTHERS, LAUREL AND HARDY, ETC.?

A. Yes
B. No

53. WOULD YOU ENJOY SEEING AN OCCASIONAL CARTOON SHORT BEFORE THE FEATURE FILM IS SHOWN?

A. Yes
B. No

CAREER ORIFNTATION AND BACKGROUND

54. WHEN DID YOU FIRST JOIN THE NAVY?

A. 1971-72
B. 1969-70
C. 1967-68
D. 1965-66
E. 1960-65
F. 1956-59
G. 1950-55
H. Prior to 1950

55. WHAT WAS THE SINGLE MOST IMPORTANT REASON WHY YOU INITIALLY JOINED THE NAVY?

A. Job opportunities looked better than in civilian life
B. For travel, adventure, new experience
C. To learn or develop leadership skills
D. Opportunity for advanced education or technical training
E. Wanted to fulfill my military obligation at the time and/or in the service of my choice rather than be drafted
F. Wanted to serve my country
G. To continue a family tradition of military service
H. Interest in the sea and/or shipboard life
I. Interest in flying or astronautics
J. For a secure job with promotions and favorable retirement benefits
K. Other reason

56. WHAT INFLUENCE DID THE DRAFT HAVE ON YOUR DECISION TO ENTER ACTIVE MILITARY SERVICE?

A. Was not subject to the draft
B. Definitely would not have entered if no draft
C. Probably would not have entered if no draft
D. Do not know what I would have done if no draft
E. Probably would have entered even if no draft
F. Definitely would have entered even if no draft

57. WHAT ARE YOUR CURRENT SERVICE PLANS?

A. Plan to remain on active duty until I retire
B. I am undecided about my service plans
C. Plan to get out as soon as possible

58. WHEN WILL YOU BE ELIGIBLE FOR RETIREMENT?

A. FY 1973 (1 July 1972 - 30 June 1973)
B. FY 1974 (1 July 1973 - 30 June 1974)
C. FY 1975 (1 July 1974 - 30 June 1975)
D. FY 1976 (1 July 1975 - 30 June 1976)
E. After FY 1976 (After 1 July 1976)

59. WHAT IS THE HIGHEST LEVEL OF EDUCATION YOU HAVE COMPLETED?

A. Less than high school graduate
B. High school graduate or GED equivalency
C. Some college or formal technical training beyond high school
D. Associate level degree
E. Bachelor's level degree
F. Graduate hours but no graduate degree
G. Master's or Doctoral level degree

60. HOW OLD ARE YOU?

A. Under 21
B. 21-25
C. 26-35
D. Over 35

61. WHAT IS YOUR SEX?

A. Male
B. Female

62. WHICH OF THE FOLLOWING BEST DESCRIBES YOU?

A. American Indian
B. Caucasian
C. Black
D. Malayan
E. Oriental

63. WHAT IS YOUR MARITAL STATUS?

A. Never been married
B. Married
C. Divorced and not remarried
D. Legally separated
E. Widow/widower

64. HOW MANY DEPENDENTS DO YOU HAVE?

A. None
B. One
C. Two
D. Three
E. Four
F. Five
G. Six or more

65. IF YOU WERE GOING TO BE DEPLOYED FOR SIX OR MORE MONTHS, WOULD YOU VOLUNTEER FOR DUTY ON BOARD A SHIP HOMEPORTED OVERSEAS?

A. Yes, regardless of the homeport assigned
B. Yes, but only for certain homeport locations
C. No, although I would not mind being assigned to such duty
D. No, I would prefer not to receive assignment to such duty

66. WHERE ARE YOU NOW SERVING?

A. Atlantic Fleet
B. Pacific Fleet
C. Ashore in the U. S. (Including Alaska and Hawaii)
D. Ashore in Europe
E. Ashore in the Far East
F. Other

67. IF YOU ARE SERVING AT SEA, INDICATE THE TYPE OF ACTIVITY TO WHICH YOU ARE ASSIGNED.

A. Not serving at sea
B. Carrier based A/C Squadron or Detachment
C. Aircraft carrier type ship
D. Service Force ship
E. Amphibious ship/craft
F. Destroyer type ship
G. Minecraft
H. Cruiser
I. Submarine, Diesel
J. Submarine, Nuclear
K. Afloat staff
L. Tender
M. Other sea duty

68. IF YOU ARE SERVING ASHORE IN THE U. S., TO WHICH NAVAL DISTRICT ARE YOU ATTACHED?

A. Not serving ashore in the U. S.
B. Naval District Washington
C. First
D. Third
E. Fourth
F. Fifth
G. Sixth
H. Eighth
I. Ninth
J. Tenth
K. Eleventh
L. Twelfth
M. Thirteenth
N. Fourteenth
O. Fifteenth
P. Do not know

69. HOW LONG HAVE YOU BEEN ON BOARD FOR DUTY AT YOUR PRESENT ACTIVITY?

A. Not on board for duty
B. Less than half a year
C. Half a year to a year
D. One year to a year and a half
E. A year and a half to two years
F. Two years or more

70. HAVE YOU EVER HEARD OF THE NAVAL SEA CADET CORPS (NSCC), THE CIVILIAN YOUTH ORGANIZATION SPONSORED BY THE NAVY LEAGUE OF THE UNITED STATES?

A. Yes
B. No → If No, answer A to questions 71 through 74 and then go on to question 75

71. HAVE YOU EVER BEEN ATTACHED TO AN ACTIVITY WHICH SUPPORTED A SEA CADET UNIT?

A. Never heard of NSCC
B. Yes, and I personally participated as an NSCC instructor or officer
C. Yes, although I did not personally participate
D. Not sure
E. No

72. ARE YOU A FORMER SEA CADET?

A. Never heard of NSCC
B. Yes, and I entered the Navy at an advanced pay grade because of NSCC experience
C. Yes, but did not enter Navy at an advanced pay grade on the basis of NSCC experience
D. No → If Not, answer A to questions 73 and 74 and then go on to question 75

73. DID YOUR SEA CADET EXPERIENCE IN ANY WAY MAKE IT EASIER FOR YOU TO ADJUST TO MILITARY LIFE?

A. Never heard of NSCC/Not former Sea Cadet
B. Yes
C. Not sure
D. No

74. DID YOUR SEA CADET EXPERIENCE HELP YOU IN ANY WAY TO PERFORM YOUR NAVY DUTIES IMMEDIATELY UPON COMPLETION OF RECRUIT/PRE-COMMISSIONING TRAINING?

A. Never heard of NSCC/Not former Sea Cadet
B. Yes
C. Not sure
D. No

75. IF YOU ARE CURRENTLY ACTIVE IN SCOUTING, IS THE TROOP YOU ARE INVOLVED WITH SPONSORED BY A MILITARY OR BY A CIVILIAN ORGANIZATION?

A. Not currently active in Scouting
B. Military
C. Civilian

76. IF YOU ARE A FORMER SCOUT, WHAT RANK DID YOU ACHIEVE?

A. Not a former Scout → If NOT, answer A to questions 77 and 78 and then go on to question 79

Boy Scouts	Girl Scouts
B. Tenderfoot 2nd Class	G. Brownies (grades 2-3)
C. Tenderfoot 1st Class	H. Junior (grades 4-6)
D. Star	I. Cadet (grades 7-9)
E. Life	J. Senior (grades 10-12)
F. Eagle	

77. DID YOUR SCOUTING EXPERIENCE IN ANY WAY MAKE IT EASIER FOR YOU TO ADJUST TO MILITARY LIFE?

A. Not a former scout
B. Yes
C. Not sure
D. No

78. DID YOUR SCOUTING EXPERIENCE HELP YOU IN ANY WAY TO PERFORM YOUR NAVY DUTIES IMMEDIATELY UPON COMPLETION OF RECRUIT/PRE-COMMISSIONING TRAINING?

A. Not a former scout
B. Yes
C. Not sure
D. No

79. WOULD YOU BE IN FAVOR OF ESTABLISHING SPECIAL SMOKING AREAS ABOARD SHIP WHERE SMOKING WOULD BE PERMITTED AT ALL TIMES AND PROHIBITING SMOKING IN ALL OTHER AREAS?

A. Yes
B. No
C. No opinion

80. DO YOU CURRENTLY SMOKE?

A. Yes, primarily cigarettes
B. Yes, primarily cigars
C. Yes, primarily pipes
D. No (gave it up)
E. No (never did)

IF ANY OF THE INFORMATION ON THE LABEL ON YOUR ENVELOPE IS INCORRECT, PLEASE CORRECT IT IN THE SPACE PROVIDED ON THE ENVELOPE.

THANK YOU FOR YOUR COOPERATION

DEPARTMENT OF THE NAVY
NAVAL PERSONNEL RESEARCH AND DEVELOPMENT LABORATORY
WASHINGTON NAVY YARD
WASHINGTON, D. C. 20390

MEMORANDUM FROM COMMANDING OFFICER, NAVAL PERSONNEL RESEARCH AND DEVELOPMENT LABORATORY

Subj: Navy Questionnaire Improvement Study

Encl: (1) Subject questionnaire
(2) Answer sheet
(3) Return envelope

1. The Navy is continuously working to improve the living and working conditions for all its personnel. To do this, sample surveys are frequently conducted. The Navy is currently engaged in trying to determine whether or not the questions developed for these surveys are a good means of obtaining desired information. This study is an attempt to increase the usefulness of the final questionnaires as well as the information provided on them.

2. You have been selected to participate in this study because you responded to the latest Navy Sample Survey (NSS 72-2). It is extremely important that you be willing to cooperate further by again answering the enclosed, shortened questionnaire as sincerely and as accurately as possible. Please answer all questions as of your present status, regardless of whether or not it has changed since NSS 72-2. Again, social security numbers are used for statistical control purposes only. If our records are in error and you did not in fact return an NSS 72-2 questionnaire, please fill in your social security number and darken in block Z in item 1.

3. It is requested that you complete and return your answer sheet in the envelope provided as soon as possible.

4. Thank you for your cooperation.

A. L. Blanks

A. L. BLANKS

INSTRUCTIONS

-- Fill in your Social Security Number in the space provided on your answer sheet. IT WILL BE USED FOR STATISTICAL CONTROL PURPOSES ONLY.

-- Use a pencil only. Number 2 pencil is best if it is available. DO NOT USE PEN OR MAGIC MARKER.

-- Blacken each answer block completely, If you want to change an answer, be sure to erase completely. Do not put down more than one answer to any one question.

-- Answer all questions on the special answer sheet provided. If you wish to make additional comments, use a separate sheet of paper. DO NOT WRITE ON THE ANSWER SHEET.

-- If you have any questions regarding this questionnaire, please call 433-3559 or autovon 288-3559.

Here is an example of how to enter your answers.

IN WHAT SERVICE ARE YOU NOW SERVING?

A. Air Force
B. Marine Corps
C. Navy
D. Army

SAMPLE ANSWER SHEET

1. WHAT IS YOUR PRESENT PAY GRADE?

ENLISTED		OFFICERS	
A.	E-1	J.	WO
B.	E-2	K.	O-1
C.	E-3	L.	O-2
D.	E-4	M.	O-3
E.	E-5	N.	O-4
F.	E-6	O.	O-5
G.	E-7	P.	O-6
H.	E-8	Q.	O-7 to O-10
I.	E-9		

2. WHEN WAS YOUR LAST (most recent) PROMOTION?

A.	Since October 1972	J.	February 1972
B.	October 1972	K.	January 1972
C.	September 1972	L.	January 1971 to December 1971
D.	August 1972	M.	January 1970 to December 1970
E.	July 1972	N.	January 1969 to December 1969
F.	June 1972	O.	January 1968 to December 1968
G.	May 1972	P.	Prior to January 1968
H.	April 1972		
I.	March 1972		

3. IF YOU ARE SERVING ASHORE IN THE U. S., TO WHICH NAVAL DISTRICT ARE YOU ATTACHED?

A.	Not serving ashore in the U. S.	I.	Ninth
B.	Naval District Washington	J.	Tenth
C.	First	K.	Eleventh
D.	Third	L.	Twelfth
E.	Fourth	M.	Thirteenth
F.	Fifth	N.	Fourteenth
G.	Sixth	O.	Fifteenth
H.	Eighth	P.	Do not know

THIS SECTION TO BE ANSWERED BY OFFICER PERSONNEL ONLY (Q4-Q7). ENLISTED PERSONNEL SKIP TO QUESTION 8.

4. ARE YOU PRESENTLY SERVING WITHIN YOUR INITIAL SERVICE OBLIGATION AS A COMMISSIONED OFFICER? Initial service obligation here means the minimum active service required by your original source of commissioning (e.g., OCS, NROTC, etc.), plus any additional service obligation you may have acquired during this initial period as a result of submarine, nuclear power or flight training etc. ALL LDOs AND WOs WOULD SELECT CHOICE "A".

A. Does not apply - I am a Limited Duty or Warrant Officer
B. Yes
C. No

If the answer to Question 4 is C (no), please answer the following question:

5. HAVE YOU COMPLETED YOUR INITIAL SERVICE OBLIGATION AS A COMMISSIONED OFFICER BETWEEN THE TIME YOU COMPLETED THE NAVY SAMPLE SURVEY 72-2 (NSS 72-2) AND NOW?

   A. Yes
   B. No

6. THROUGH WHICH OF THE FOLLOWING OFFICER PROCUREMENT PROGRAMS DID YOU OBTAIN YOUR COMMISSION/WARRANT?

   A. Naval Academy
   B. NROTC (Regular)
   C. NROTC (Contract)
   D. Integration
   E. Limited Duty Officer Program
   F. Officer Candidate School
   G. Aviation Officer Candidate
   H. Naval Aviation Cadet/V5
   I. Reserve Officer Candidate (ROC)
   J. Navy Enlisted Scientific Education Program (NESEP)
   K. Direct appointment from Merchant Marine
   L. Direct appointment from civilian status
   M. Warrant Officer Program
   N. Other

7. WHAT IS YOUR DESIGNATOR?

   A. 11XX Surface
   B. 112X Submarine
   C. 131X Aviation - Pilot
   D. 13XX Aviation - other than Pilot
   E. All Restricted Line Designators (14XX, 15XX, 16XX, 17XX, 18XX, 19XX)
   F. 210X Medical Corps
   G. 220X Dental Corps
   H. 230X Medical Service Corps
   I. 250X Judge Advocate General Corps
   J. 290X Nurse Corps
   K. 310X Supply Corps
   L. 410X Chaplain Corps
   M. 510X Civil Engineer Corps
   N. All Limited Duty Officer Designators
   O. All Warrant Officer Designators

OFFICERS, PLEASE SKIP QUESTIONS 8 - 13 AND GO ON TO QUESTION 14

THIS SECTION TO BE ANSWERED BY ENLISTED PERSONNEL ONLY (Q8-Q13)

IF YOU ARE A PETTY OFFICER OR AN OFFICIALLY DESIGNATED STRIKER (qualified to wear the striker rating badge), WHAT IS YOUR GENERAL RATING? (RATINGS ARE LISTED ALPHABETICALLY.) FOR EXAMPLE, IF YOUR GENERAL RATING IS "EM", ON LINE 9 ON THE ANSWER SHEET YOU WOULD BLACKEN THE SPACE UNDER "H". YOUR RESPONSE ON LINE 8 WOULD BE "Z", AND YOUR RESPONSE ON LINE 10 WOULD BE "Y".

8. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "AB-CT" YOUR RESPONSE ON LINE 8 ON THE ANSWER SHEET SHOULD BE "Z".

A. Not rated/ Not designated striker
B. AB
C. AC
D. AD
E. AE
F. AF
G. AG
H. AK
I. AM
J. AO
K. AQ
L. AS
M. AT
N. AV
O. AW
P. AX
Q. AZ
R. BM
S. BR
T. BT
U. BU
V. CE
W. CM
X. CS
Y. CT
Z. My Rating is not included in this list

9. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "CYN-MN", YOUR RESPONSE ON LINE 9 ON THE ANSWER SHEET SHOULD BE "Z".

A. CYN
B. DK
C. DM
D. DP
E. DS
F. DT
G. EA
H. EM
I. EN
J. EO
K. EQ
L. ET
M. EW
N. FT
O. GM
P. HM
Q. HT
R. IC
S. IM
T. JO
U. LI
V. LN
W. ML
X. MM
Y. MN
Z. My Rating is not included in this list

10. IF YOUR RATING IS NOT INCLUDED AMONG THOSE FROM "MR-YN", YOUR RESPONSE ON LINE 10 ON THE ANSWER SHEET SHOULD BE "Y".

A.	MR	J.	PR	S.	ST
B.	MT	K.	PT	T.	SW
C.	MU	L.	QM	U.	TD
D.	OM	M.	RD	V.	TM
E.	OT	N.	RM	W.	UT
F.	PC	O.	SD	X.	YN
G.	PH	P.	SH	Y.	My Rating is not included in this list
H.	PM	Q.	SK		
I.	PN	R.	SM		

11. WHAT IS YOUR PRESENT ENLISTMENT AND/OR EXTENSION STATUS?

A. First enlistment
B. Extension of first enlistment
C. Second enlistment
D. Extension of second enlistment
E. Third or later enlistment or extension

12. HAS YOUR ENLISTMENT AND/OR EXTENSION STATUS CHANGED BETWEEN THE TIME YOU COMPLETED THE NAVY SAMPLE SURVEY 72-2 (NSS 72-2) AND NOW?

A. Yes
B. No

13. THROUGH WHICH OF THE FOLLOWING PROGRAMS DID YOU ENTER THE NAVY?

A. 6 year Obligor program
B. 4 year Enlistment program
C. 3 year Seafarer or Airman program
D. 2 year (2x6) Reserve program
E. 4x10 Reserve program
F. Some other program

(QUESTIONS 14 THROUGH 35 ARE TO BE ANSWERED BY OFFICER AND ENLISTED PERSONNEL)

14. IN WHICH OF THE FOLLOWING ACTIVITIES DID YOU PARTICIPATE MOST FREQUENTLY (active participant and/or spectator) BEFORE ENTERING THE NAVY?

A. Live entertainment
B. Library
C. Outdoor Recreation
D. Spontaneous participation activities
E. Organized social activities
F. Sports
G. Crafts
H. Tours
I. Volunteer Service
J. Other activity (not listed)

15. WHEN DID YOU FIRST JOIN THE NAVY?

A. 1971-72
B. 1969-70
C. 1967-68
D. 1965-66
E. 1960-65
F. 1956-59
G. 1950-55
H. Prior to 1950

16. WHAT INFLUENCE DID THE DRAFT HAVE ON YOUR DECISION TO ENTER ACTIVE MILITARY SERVICE?

A. Was not subject to the draft
B. Definitely would not have entered if no draft
C. Probably would not have entered if no draft
D. Do not know what I would have done if no draft
E. Probably would have entered even if no draft
F. Definitely would have entered even if no draft

17. WHAT ARE YOUR CURRENT SERVICE PLANS?

A. Plan to remain on active duty until I retire
B. I am undecided about my service plans
C. Plan to get out as soon as possible

18. HAVE YOUR SERVICE PLANS CHANGED BETWEEN THE TIME YOU COMPLETED NSS 72-2 AND NOW?

A. Yes
B. No

19. WHEN WILL YOU BE ELIGIBLE FOR RETIREMENT?

A. FY 1973 (1 July 1972 - 30 June 1973)
B. FY 1974 (1 July 1973 - 30 June 1974)
C. FY 1975 (1 July 1974 - 30 June 1975)
D. FY 1976 (1 July 1975 - 30 June 1976)
E. After FY 1976 (After 1 July 1976)

20. WHERE ARE YOU NOW SERVING?

A. Atlantic Fleet
B. Pacific Fleet
C. Ashore in the U. S. (Including Alaska and Hawaii)
D. Ashore in Europe
E. Ashore in the Far East
F. Other

21. HAVE YOU CHANGED DUTY STATIONS BETWEEN THE TIME YOU FILLED OUT THE NAVY SAMPLE SURVEY 72-2 (NSS 72-2) AND NOW?

A. Yes
B. No

22. HOW OLD ARE YOU?

A. Under 21
B. 21-25
C. 26-35
D. Over 35

23. WHAT IS YOUR SEX?

A. Male
B. Female

24. WHICH OF THE FOLLOWING <u>BEST</u> DESCRIBES YOU?

A. American Indian
B. Caucasian
C. Black
D. Malaysian
E. Oriental

25. WHAT IS YOUR MARITAL STATUS?

A. Never been married
B. Married
C. Divorced and not remarried
D. Legally separated
E. Widow/widower

26. HOW MANY DEPENDENTS DO YOU HAVE?

A. None
B. One
C. Two
D. Three
E. Four
F. Five
G. Six or more

27. HAVE THE NUMBER OF DEPENDENTS CHANGED (i.e., INCREASED, DECREASED) BETWEEN THE TIME YOU COMPLETED NSS 72-2 AND NOW AND IF SO, BY HOW MANY?

A. Yes, increased by more than two
B. Yes, increased by one or two
C. No change
D. Yes, decreased by one or two
E. Yes, decreased by more than two

28. WHAT IS THE HIGHEST LEVEL OF EDUCATION YOU HAVE COMPLETED?

A. Less than high school graduate
B. High school graduate or GED equivalency
C. Some college or formal technical training beyond high school
D. Associate level degree
E. Bachelor's level degree
F. Graduate hours but no graduate degree
G. Master's or Doctoral level degree

29. HAVE YOU ADVANCED YOUR EDUCATIONAL LEVEL SIGNIFICANTLY (i.e., completed GED requirements, graduated from a technical school, completed degree requirements for a B.A., M.A., etc.) BETWEEN THE TIME YOU COMPLETED NSS 72-2 AND NOW?

A. Yes
B. No

30. IF YOU ARE SERVING AT SEA, INDICATE THE TYPE OF ACTIVITY TO WHICH YOU ARE ASSIGNED.

A. Not serving at sea
B. Carrier based A/C Squadron or Detachment
C. Aircraft carrier type ship
D. Service Force ship
E. Amphibious ship/craft
F. Destroyer type ship
G. Minecraft
H. Cruiser
I. Submarine, Diesel
J. Submarine, Nuclear
K. Afloat staff
L. Tender
M. Other sea duty

31. DO YOU CURRENTLY SMOKE?

A. Yes, primarily cigarettes
B. Yes, primarily cigars
C. Yes, primarily pipes
D. No (gave it up)
E. No (never did)

32. HAVE YOU CHANGED YOUR SMOKING HABITS (i.e., quit smoking, started smoking, changed from cigarettes to a pipe, etc.) BETWEEN THE TIME YOU COMPLETED NSS 72-2 AND NOW?

A. Yes
B. No

33. WHAT WAS THE SINGLE MOST IMPORTANT REASON WHY YOU INITIALLY JOINED THE NAVY?

A. Job opportunities looked better than in civilian life
B. For travel, adventure, new experience
C. To learn or develop leadership skills
D. Opportunity for advanced education or technical training
E. Wanted to fulfill my military obligation at the time and/or in the service of my choice rather than be drafted
F. Wanted to serve my country
G. To continue a family tradition of military service
H. Interest in the sea and/or shipboard life
I. Interest in flying or astronautics
J. For a secure job with promotions and favorable retirement benefits
K. Other reason

34. HAVE YOU HAD A BIRTHDAY SINCE YOU FILLED OUT NSS 72-2 WHICH WOULD PUT YOU IN A DIFFERENT AGE CATEGORY (i.e., did you turn 26 between the time you filled out NSS 72-2 and now which would change your age category from "21-25" to "26-35")?

A. Yes, I am now in age category "21-25"
B. Yes, I am now in age category "26-35"
C. Yes, I am now in age category "Over 35"
D. No, I have not changed age categories

35. DURING WHICH MONTH DID YOU FILL OUT NSS 72-2?

A. September, 1972
B. October, 1972

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Navy Department
Washington, D. C. 20370

Chief of Naval Personnel (Pers-B2)
Navy Department
Washington, D. C. 20370

Chief of Naval Personnel (Pers-E)
Navy Department
Washington, D. C. 20370

Chief of Naval Personnel (Pers-N)
Navy Department
Washington, D. C. 20370

Chief of Naval Personnel (Pers-P)
Navy Department
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