Navy Personnel Research and Development Center
San Diego, California 92152-7250 TN-96-37 March 1996

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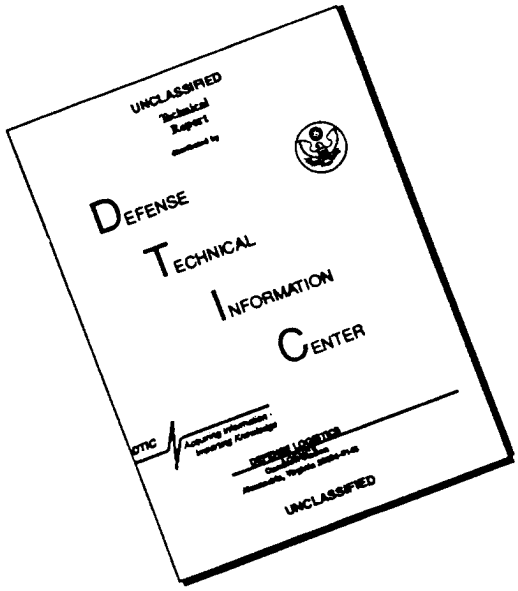

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATE COVERED
	March 1996	Final—14 April 1993-23 February 1994

4. TITLE AND SUBTITLE
Development of Interest Scales to Identify Female Applicants for Nontraditional Navy Ratings

5. FUNDING NUMBERS
Program Element: Reimbursable
Work Unit: N6298092POPS595

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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8. PERFORMING ORGANIZATION REPORT NUMBER
NPRDC-TN-96-37

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Chief of Naval Personnel
Special Assistant for Women's Policy (PERS-00W)
Navy Department
Washington, DC 20370-0000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Functional Area: Organizational Systems
Product Line: Women and Multicultural Research
Effort: Integration of Women

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE
A

13. ABSTRACT *(Maximum 200 words)*

The Navy is attempting to increase the participation of women in "nontraditional" (NT) Navy ratings. One way to increase the participation rate is to develop new screening criteria. A second option involves developing career guidance tools to identify women whose vocational interests indicate they should consider entering NT ratings. The purpose of this project was twofold: update the Navy Vocational Interest Inventory (NVII) items and demonstrate that keys could be developed which could identify female applicants with interests in NT ratings. Cross-validation results indicated that NVII scales from this study effectively differentiate between the interests of women in traditional and NT ratings. In addition, the cluster-specific scales were significantly and substantially related to self-reported satisfaction with work in nontraditional ratings.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Interests, women, nontraditional jobs, blue-collar jobs, vocations	78
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNLIMITED

Foreword

This report documents the development of career interest scales useful in providing information to female applicants who are considering entry into Navy ratings that have been historically open only to males.

This work was conducted under the sponsorship of the Chief of Naval Personnel (PERS-00W) within reimbursable Work Unit N6298092POPS59 (Contract N66001-90-D-9502 [Delivery Order 7515]).

The authors wish to acknowledge Stephanie Booth-Kewley for her assistance with contract monitoring and Zannette Perry for preparing revisions of this report.

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Executive Summary

Problem

Recently, the Joint Chiefs testified before the U.S. Congress about the armed services' difficulty in meeting their recruiting goals. Although the military recruitment pool was substantially expanded by legislation removing most of the prohibitions on women in combat, women continue to constitute a relatively small percentage of the recruits entering the Navy. Furthermore, women have been concentrated in relatively few enlisted ratings because (1) prior legislation banned women from some career fields, (2) women preferred the work in some occupations over other occupations, and (3) social/environmental factors influenced their choices. To help meet recruiting goals and maximize the quality of entering personnel, the Navy needs to develop aids that will attract women to both the Navy and occupational areas traditionally reserved for men.

Background

Although the Navy is attempting to increase the participation of women in "nontraditional" (NT) Navy ratings (i.e., those ratings historically open only to men), current selection procedures for entry into these ratings disqualify 40% to 70% of female applicants. At least two approaches can be taken for increasing the participation of women in NT ratings. One approach is to develop a new selection instrument (e.g., a vocational interest inventory) that could result in higher rates of eligibility for women. A second option involves developing career guidance tools to identify women whose vocational interests indicate the applicants should consider entering NT ratings. The Navy Vocational Interest Inventory (NVII) is a suitable instrument for developing interest scales for use in either selection or counseling.

Purpose

This report describes an effort to (1) update the NVII items and (2) demonstrate that keys could be developed to identify female applicants with interests in NT ratings.

Procedure

RGI, Incorporated psychologists evaluated the NVII items. Items were changed if they indicated gender bias or cultural anachronisms. Additional items were modified by researchers at the Navy Personnel Research and Development Center (NAVPERSRANDCEN).

The method used to construct the NVII interest keys was similar to that employed for the development of the Strong-Campbell interest scales (Hansen & Campbell, 1985). This approach involved identifying interest differences between women in NT and women in traditional (T) ratings (i.e., those ratings in which women have historically been concentrated). NVII items demonstrating large differences were used to construct scales.

NAVPERSRANDCEN mailed updated NVIIs to female enlisted personnel in T and NT ratings to collect the data for developing the interest scales. Although the number of returned NVIIs was not sufficient for the development of separate interest scales for each NT rating, statistical analyses revealed that the NT ratings fell into two clusters: Construction/Fabrication and Mechanical. An NVII scale was constructed and cross-validated for each cluster, as well as for the combined group of all NT ratings.

Results

Cross-validation results indicated that the NVII scales effectively differentiated between the interests of women in T and NT ratings. In addition, cluster-specific scales were significantly and substantially related to self-reported satisfaction with work in NT ratings.

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Introduction

Problem

Recently, the Joint Chiefs testified before the U.S. Congress about the armed services' difficulty in meeting their recruiting goals. Although the military recruitment pool was substantially expanded by legislation removing most of the prohibitions on women in combat, women continue to constitute a relatively small percentage of the recruits entering the Navy. Furthermore, women have been concentrated in relatively few enlisted ratings, because (1) prior legislation banned women from some career fields, (2) women preferred the work in some occupations over other occupations, and (3)social/environmental factors influenced their choices. To help meet recruiting goals and maximize the quality of entering personnel, the Navy needs to develop aids that will attract women to both the Navy and occupational areas traditionally reserved for men.

Background

The Navy is attempting to increase the participation of women in "nontraditional" (NT) Navy ratings (i.e., those ratings historically open only to men). Current selection procedures for entry into the NT ratings disqualify a large proportion of women. These procedures use composite scores based on subtests (e.g., Auto and Shop Information[1]) in the Armed Services Vocational Aptitude Test Battery (ASVAB). The ASVAB subtests measure cognitive abilities and knowledge; they do not assess noncognitive dimensions such as motivation or interest. Because success in "A" school training and subsequent job performance is a function of both cognitive and noncognitive dimensions, it is possible that women and men who could succeed in NT ratings are being inadvertently eliminated from consideration.

At least two possible approaches to alleviating the problem of low participation of women in NT ratings can be taken. New screening criteria, to include noncognitive components, that could result in higher rates of eligibility for women could be developed. A possible noncognitive component for inclusion in such criteria is an interest measure. A second, more passive approach would use interest measures to identify and counsel women who may not be aware of their interest in NT ratings.

The Navy Vocational Interest Inventory (NVII; Clark, 1961) is a suitable instrument for developing interest scales for use in either selection or counseling. During the late 1960s and early 1970s, researchers at the Navy Personnel Research and Development Center (NAVPERSRANDCEN) conducted a number of studies to evaluate the effectiveness of the NVII for use in predicting criteria such as final school grade (Abrahams, Lau, & Neumann, 1968; Lau & Abrahams, 1969), reenlistment (Lau, Lacey, & Abrahams, 1969), and job performance (Lau & Abrahams, 1971b). In general, NVII scale scores demonstrated significant predictive validities with these criteria. For example, in one study (Lau & Abrahams, 1969), NVII scale scores significantly increased the validity obtained when the Basic Test Battery—the cognitive measure that preceded the ASVAB—was used to predict final school grades for certain ratings.

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[1]The mean score of women recruits on this test is typically one and one-half standard deviations below the mean of men recruits.

Purpose

This report describes an effort to (1) update the NVII items and (2) demonstrate that scales could be developed that could identify female applicants with interests in NT ratings.

Approach

The NVII interest keys were developed with an approach similar to that used for the development of the Strong-Campbell Interest Inventory (Hansen & Campbell, 1985) scales. With this procedure, the interests of people from different occupational groups are contrasted, and interests that are different across groups are used to construct scales. The following sections specify the occupational groups (i.e., Navy ratings), data-collection procedures, key construction, and validation measures that were used in this study.

Navy Ratings Analyzed

NAVPERSRANDCEN identified 15 NT ratings that both use the Auto and Shop Information test (from the ASVAB) as a selector and have been open to women for at least 10 years. Twenty-eight traditional (T) ratings that women have been in for many years were also identified. Table 1 presents these ratings along with their standard Navy abbreviations.

Instrument

The NVII (Clark, 1961) consists of 190 items, each containing three activities. Respondents indicate relative preferences for the alternative activities in each triad by choosing the one activity they would most like to do and the one activity they would least like to do. For example, one NVII item with response options is shown below:

	Like	Dislike
1. Fix a doorbell	____	____
2. Make coffee	____	____
3. Sort mail	____	____

According to Lau and Abrahams (1971a), scale scores based on NVII items demonstrated acceptable levels of reliability. The authors reported a median 5-year test-retest reliability of .70 for NVII occupational interest scales. Furthermore, the introduction of this report cited evidence of validity for scales based on the NVII.

To update the NVII items (see Dann & Abrahams, 1973, for a copy of the original instrument), three psychologists independently evaluated the wording and the activities of each of the 190 items for gender bias (e.g., use of male pronouns) and cultural currency (e.g., anachronisms). These psychologists discussed the results of their independent evaluations and reached a consensus as to which items needed revision. As a result of this process, 70 items were revised. NAVPERSRANDCEN researchers subsequently modified additional items.

Table 1

Traditional and Nontraditional Ratings

Traditional	Nontraditional
Air Traffic Controller (AC)	Aircrew Survival Equipmentman (PR)
Aerographer's Mate (AG)	Aviation Structural Mechanic, Electrical (AME)
Aviation Storekeeper (AK)	Aviation Structural Mechanic, Hydraulics (AMH)
Aviation Maintenance (AZ)	Aviation Structural Mechanic, Structures (AMS)
Cryptologic Technician, Administrative (CTA)	Boiler Technician (BT)
Cryptologic Technician, Interpretive (CTI)	Builder (BU)
Cryptologic Technician, Collection (CTR)	Construction Mechanic (CM)
Disbursing Clerk (DK)	Damage Controlman (DC)
Illustrator/Draftsman (DM)	Engineman (EN)
Data Processing Technician (DP)	Equipment Operator (EO)
Dental Technician (DT)	Hull Maintenance Technician (HT)
Hospital Corpsman (HM)	Machinist's Mate (MM)
Intelligence Specialist (IS)	Mineman (MN)
Journalist (JO)	Machinery Repair (MR)
Lithographer (LI)	Steelworker (SW)
Legalman (LN)	
Musician (MU)	
Navy Counselor (NC)	
Operations Specialist (OS)	
Ocean Systems Technician Analyst (OTA)	
Postal Clerk (PC)	
Photographer's Mate (PH)	
Personnelman (PN)	
Radioman (RM)	
Religious Program Specialist (RP)	
Ship's Serviceman (SH)	
Storekeeper (SK)	
Yeoman (YN)	

Also, the NVII instructions were revised, and a set of background questions was developed for inclusion in the questionnaire. The background questions were designed primarily to identify experienced and satisfied incumbents of specific ratings. Appendix A contains a complete copy of the revised NVII along with the background questions.

Subjects

To collect NVII response data for use in developing interest scales, NAVPERSRANDCEN mailed NVIIs to female enlisted personnel in the T and NT ratings. Using lists drawn from the Enlisted Master Record, NAVPERSRANDCEN mailed a copy of the NVII to every female petty officer (i.e., paygrade E-4 through E-6) who was identified as a member of an NT rating (N = 2,572) , and to a random sample of female petty officers (N = 3,354) in T ratings.

Procedure

Survey Administration

Appendix B contains the letter that accompanied each questionnaire. This letter described the study and instructed the respondents to return the completed instrument to NAVPERSRANDCEN. NAVPERSRANDCEN monitored the return rate to determine when to end data collection. To increase the probability of candid responses, respondents were not required to provide their names or other identifying information. After the returned NVIIs were electronically scanned, NAVPERSRANDCEN provided the resulting data (N = 1,848) to the contractor for analysis.

Quality Checks on Data

The scanned data (background items and interest items) were examined for missing answers, multiple responses, and membership in the T or NT ratings. Cases with missing or multiple responses on more than 5% of the NVII items were eliminated. Respondents who did not indicate membership in one of the T or NT ratings were also excluded. These data-quality checks excluded 108 cases; the resulting data base contained 1,740 usable NVIIs (1,044 and 696 from women in T and NT ratings, respectively) for an effective return rate of 29% from the original sample.

Hansen and Campbell (1985) typically eliminated respondents from key construction samples if the respondents had less than 3 years of tenure in an occupation. Because of the small sample sizes of the present study, data from respondents with at least 1 year of experience were included. This tenure requirement helped to ensure that the data were from occupational group members who met minimum knowledge and experience levels, and had sufficient time in the ratings to develop stable assessments of their satisfaction with the occupation.

Because interest keys should be developed using individuals who are satisfied with their rating, determining an acceptable level of satisfaction was important (Hansen & Campbell, 1985). Accordingly, key construction samples were limited to those individuals who answered *satisfied*, *very satisfied*, or *extremely satisfied* on background Item 7.

Finally, the returned NVII data were screened to eliminate NVIIs from women reporting their paygrades as other than E-4 through E-6. Because the ultimate use of the scales/keys is for measuring interests in nonsupervisory or nonmanagerial jobs, it was essential to use NVII data

from only those individuals who were actually performing the nonsupervisory tasks. After screening cases based on tenure, paygrade, and satisfaction criteria, 1,166 usable NVIIs were available to construct and cross-validate keys. Table 2 presents the number of women in each rating.

Table 2

Number of Usable Navy Vocational Interest Inventories Per Rating

Traditional ($N = 750$)				Nontraditional ($N = 416$)	
Rating	*n*	Rating	*n*	Rating	*n*
AC	34	LN	36	AME	17
AG	42	MU	20	AMH	21
AK	30	NC	13	AMS	54
AZ	30	OS	27	BT	9
CTA	28	OTA	18	BU	15
CTI	31	PC	22	CM	8
CTR	23	PH	33	DC	13
DK	21	PN	34	EN	68
DM	15	RM	18	EO	8
DP	34	RP	31	HT	97
DT	34	SH	20	MM	24
HM	28	SK	22	MN	17
IS	27	YN	31	MR	28
JO	35			PR	33
LI	13			SW	4

Note. See Table 1 for full rating titles.

Clustering Nontraditional Ratings for Scale Construction

The number of incumbents per rating ranged from 4 to 97. Whereas Hansen and Campbell (1985) indicated that valid keys are possible on sample sizes as small as 50, they preferred to collect data from 200 to 300 subjects (per occupational scale to be developed) for Strong-Campbell scale construction. Furthermore, the design in the present study required cross-validation samples. The sample sizes required for these purposes (key construction and cross-validation) precluded the development of scales for individual ratings.

In order to increase the sample sizes for scale construction, NT ratings were examined for similarities which would permit grouping the ratings into logical clusters. Two sources were used to create clusters of homogeneous NT ratings. One source was a prior cluster analysis of Navy

ratings (Reynolds, Barnes, D. A. Harris, & J. H. Harris, 1992) that grouped ratings with similar task requirements. The other source was descriptions of the NT ratings. These descriptions were used to confirm both cluster membership decisions and cluster titles. This two-step procedure resulted in two clusters of NT ratings. One cluster involved construction/fabrication (C/F) work and contained the following 10 NT ratings: Aircrew Survival Equipmentman; Aviation Structural Mechanic, Electrical; Aviation Structural Mechanic, Hydraulics; Aviation Structural Mechanic, Structures; Builder; Damage Controlman; Equipment Operator; Hull Maintenance Technician; Machinery Repairman; and Steelworker. The other NT cluster represented a mechanical (M) work orientation and contained 5 ratings: Boiler Technician, Construction Mechanic, Engineman, Machinist's Mate, and Mineman.

Analyses

Key Construction

As indicated earlier, the present project followed the general approach used in the derivation of the Strong-Campbell occupational interest scales (e.g., see Hansen & Campbell, 1985). Essentially, this approach involved identifying differences in interests between people in an occupational group and peers in a reference group. In this study, women in the T ratings comprised the reference group.

The following steps were taken to construct each interest scale and to calculate each respondent's score on each scale.

1. For each occupational group (T, NT, C/F, and M), 70% of the group was randomly assigned to a key construction subgroup, and the remaining 30% was assigned to a cross-validation subgroup.

2. The percentage in a key construction group that endorsed each of the three activities in a triad was calculated. A parallel calculation was performed for activities in the triads that were liked least.

3. For each activity, a percentage difference value was computed by subtracting the percentage of one key construction subgroup who chose an activity from the percentage who chose the activity in the other key construction subgroup[2] (NT vs. T, C/F vs. T, or M vs. T). This is the "vertical percent" method (see Devlin, Abrahams, & Edwards, 1992, for a comparison of item-analysis methods).

4. Activities with the largest differences between key construction subgroups were selected for inclusion in an interest scale. Hansen and Campbell (1985) concluded that scale validity increases little if more than 60 item-response alternatives are selected for a scale when the differences are 16 percentage points or greater.

5. Unit weights were assigned to the alternatives with large differences. Hansen and Campbell (1985) reported that unit weights equal or exceed the effectiveness of variable weights

[2]For example, if 65% of the NT key-construction group and 50% of the T key-construction group chose "fix a doorbell" for the activity that they would most like to do, the percentage difference would be 15.

in interest scale construction. A negative or positive unit weight was assigned to correspond to the sign of the percentage difference. If members of an NT cluster endorsed an alternative more frequently than did members of T ratings, a +1 was assigned to that alternative. In contrast, item alternatives endorsed more frequently by members of T ratings received a weight of -1. The NAVPERSRANDCEN "Keycon-n" software (version dated 1985) was used to construct the keys.

6. A score was computed for each NVII scale using a specially developed, computerized scoring program. For items selected by each respondent, the program added together the +1 and -1 weights for those items that comprised the scale, as cited in Step 5. Finally, a constant of 100 was added to each scale score to remove negative values.

Before constructing separate scales for the C/F and M occupational groups, it was important to ensure that these occupational subgroups had measurable differences in their interests (rather than only differences in task requirements). Toward this end, a preliminary scale was developed by contrasting the interests of members of the C/F cluster with the interests of members of the M cluster. If a scale could be developed to differentiate between the interests of members of the two clusters, that evidence would support constructing separate scales for these two occupational groups.

Measures of Scale Validity

Estimates of concurrent and predictive validity are typically calculated for interest scales. In the present study, only estimates of concurrent validity could be calculated. As defined by Hansen and Campbell (1985), "Concurrent validity is the power of a scale to discriminate between people concurrently in different occupations" (p. 68). Several measures of concurrent validity were calculated for both key construction and cross-validation samples.

One measure calculated was Tilton's (1937) percent overlap, which is the percentage of overlap between the scale score distributions for individuals in T and nontraditional (NT, C/F, or M) ratings. This index reflects the ability of a continuous variable to differentiate between two groups of individuals. Hansen and Campbell (1985) reported a median percent overlap of 36% for the Strong-Campbell occupational scales.

The differences between mean scale scores were also assessed with *t* tests. In this manner, the respondents from the T and nontraditional (NT, C/F, and M) subgroups were compared.

Point-biserial correlations were calculated to determine the magnitude of the relationship between scale scores and group membership. In addition, expectancy tables were developed to illustrate graphically the relationships. These tables were constructed using the following procedure. For each NT scale, score distributions for the combined cross-validation samples (i.e., women from both the NT and T cross-validation samples) were divided into fifths as nearly equal in sample size as possible. Next, for each fifth, the percentage of women in the combined sample who were actually members of NT ratings was computed and displayed as a bar in an expectancy table.

Finally, the relationship of interest scores to satisfaction was evaluated. The mean scale score of satisfied NT subjects (i.e., those who responded as *satisfied* to *extremely satisfied* on background

Item 7) was compared to the mean scale score of dissatisfied NT subjects (i.e., those who responded as *dissatisfied* to *extremely dissatisfied* on Item 7).

Results

Preliminary Findings

A preliminary analysis determined whether the interests of women in the C/F subgroup differed from the interests of women in the M subgroup. The absence of a difference in interests between the C/F and M subgroups would suggest that there was no value in developing separate scales for the two clusters of ratings. Instead, only an overall NT scale would be needed/useful.

The means for the cross-validated C/F and M samples were 103.90 (SD = 6.90) and 98.73 (SD = 7.19), respectively. The difference between these means, reflecting approximately three quarters of a standard deviation, was significant ($p < .01$) and sufficient to support the development of the separate scales for each cluster.

Development of Nontraditional, Construction/Fabrication, and Mechanical Scales

The first scale-development analysis was performed to determine if women in the NT group had a different pattern of interests than did women in the T group. Percentage differences of at least 34.2 percentage points were detected between the two groups on 46 of the NVII alternatives. Appendix C displays the 40 NVII items that contained the 46 activities with the largest differences. The abbreviations (i.e., NT or T) in the cells following the options designate the group with the highest endorsement rate. For example, relative to women in NT ratings, a higher percentage of the women in the T ratings cited "Take a broken lock apart to see what is wrong with it" as an activity that they least liked. No difference was detected among the response patterns of the two groups for the other activities appearing in Item 2.

When the interests of the C/F-ratings subgroup were contrasted with the interests of the T ratings subgroup, 44 alternatives from 38 NVII items produced differences of at least 34.8 percentage points. Appendix D lists the items that had large differences for the women in the C/F and T ratings. An examination of the items in the scale typically showed face validity. For example, women in the C/F ratings reported liking most activities such as "Operate a drill press" (option 20.a.) and liking least activities such as "Make a chemical analysis of a new toothpaste" (option 36.c.). In contrast, women in the T ratings reported an interest in being an interpreter of a foreign language (option 38.a.) and not being interested in fixing a leaky faucet (option 34.b.).

Appendix E shows the items and activities that had differences of at least 33.4 percentage points when the interests of women in M ratings were contrasted with the interests of women in T ratings. Differences were detected for 47 activities from 38 items. Again, the options distinguishing the interests of women in the two types of ratings appear to be face valid. For instance, women in the M ratings reported that they would like most to "Overhaul an automobile engine" (option 36.b.) but like least to "Be a court reporter" (option 86.a.). On the other hand, women in T ratings indicated that they would like most to "Check for errors in the copy of a report" (option 16.c.) and like least to "Operate a conveyor belt" (option 29.a.).

Scale Validity

Comparisons of Means, Percentages of Overlap, and Correlations

Table 3 contains the descriptive statistics and measures of validity for the three scales. Not surprisingly, the methods (*t* tests, point-biserial correlations, and percentage overlap) of assessing the usefulness of the interest scales were in agreement. More specifically, they showed that the scales distinguish women who are interested in traditional versus nontraditional enlisted ratings. The corresponding mean differences and correlations were smaller for the key construction samples than for the cross-validation samples, and the percent overlap values were larger for the key construction samples than for the cross-validation samples.[3]

Table 3

Navy Vocational Interest Inventory Statistics and Validity Measures

	Traditional			Nontraditional				
Scale/Subgroup	*n*	Mean	*SD*	*n*	Mean	*SD*	r_{pb}	% Overlap
Nontraditional Scale								
Key Construction	520	85.48	12.94	294	108.26	14.38	.63	40.44
Cross-Validation	230	87.57	13.79	122	107.22	13.24	.57	46.72
Construction/ Fabrication Scale								
Key Construction	520	87.95	13.13	209	111.61	14.12	.62	38.52
Cross-Validation	230	90.50	14.01	81	111.04	12.62	.56	43.50
Mechanical Scale								
Key Construction	520	86.05	12.54	85	109.33	14.26	.54	38.51
Cross-Validation	230	88.07	13.37	41	106.80	13.76	.45	48.98

The differences in means varied little from key construction sample to cross-validation sample, and all six of the comparisons of means yielded statistically significant differences ($p < .01$). For the NT scale, the difference in means was 22.78 points for the key construction sample and 19.65 for the cross-validation sample. Differences of 23.66 and 20.54 were detected for the C/F scale when the average scores of women in the T ratings were compared to the average scores of women in the NT ratings. The difference in average M scale scores was similar to those of the NT and C/F scale differences. For the key construction group, M scale differences were 23.28. The M scale difference for the cross-validation sample was 20.17.

[3]Selection of items and weights during scale development capitalizes on favorable chance effects along with real differences/relationships between groups. As a consequence, mean differences and correlations shrink when the scale is applied to a new (cross-validation) group. In contrast, overlap values become larger (rather than smaller) during cross-validation because some of the favorable sample-specific covariation (i.e., the difference in distributions) is removed. In the extreme case of no correlation or no difference in means, the distributions would overlap 100%.

The validity and cross-validity coefficients for the three scales were computed by correlating each set of scale scores with the respondents' rating group status (i.e., T vs. NT ratings). High point-biserial correlations were obtained for all six analyses. As shown in Table 3, the validity coefficients were .63 for the NT scale, .62 for the C/F scale, and .54 for the M scale. Corresponding cross-validity coefficients for the three respective scales were .57, .56, and .45.

Examination of the NT-scale-score distributions for the T and NT samples showed that over 40% of the distributions overlapped in both the key construction and cross-validation samples.

With regard to the percent overlap statistics, smaller values indicate better validity than do larger values. For every analysis, the percent overlap statistic showed that 50% of each group's score distribution did *not* overlap the distribution of its comparison group's score distribution. Another way to judge the percent overlap statistic is to compare it to findings from comparable analyses. The values reported in the last column of Table 3 are similar to the median percent overlap value of 36 that Hansen and Campbell (1985) reported for the Strong-Campbell key construction samples. In part, the better (i.e., lower) percent overlap statistics obtained by Hansen and Campbell reflect the Strong-Campbell's larger number of items and its larger key construction and cross-validation samples.

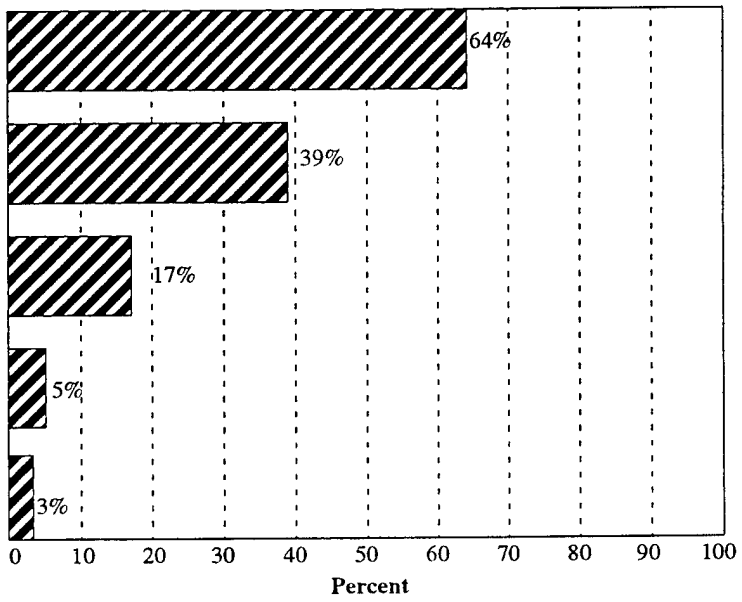
Accuracy of Classification Decisions

Given that the information in the prior section showed that C/F and M scales were predictive of rating type (i.e., T vs. C/F or M clusters), this section will examine only those two scales rather than the grosser level of prediction—whether a woman was in a T or an NT rating. Two types of analyses were conducted for each scale. The expectancy tables examine the proportion of women who were members of the target group relative to five levels of scoring on the C/F or M scale. In the other analyses, a table depicts the number of people who were actually in the C/F or M group and the number of women who would be correctly predicted by the interest scale to be in that group. Both sets of analyses used the cross-validation samples to lessen the possibility of spuriously positive conclusions.

Figure 1 depicts the expectancies for the C/F scale. As shown, those women in the top fifth of the C/F score distribution (i.e., respondents with scores of 113 and above) were more than 20 times as likely to be members of the C/F ratings than were women scoring in the lowest fifth (i.e., respondents with scores of 79 and below). Figure 1 also shows that 64% (i.e., 41 of 64) of the women scoring in the top 20% were members of the C/F (rather than T) ratings. Since incumbents of C/F ratings comprise 26% (i.e., 81 of 311) of the *combined total* sample, the observed 64% represents an increase of 38 percentage points over the 26% expected by chance alone.

The same procedures were applied to the M and T cross-validation sample to construct Figure 2. Figure 2 shows results similar to those in Figure 1. That is, women scoring in the top fifth of the score distribution were 20 times more likely to be M incumbents than were those respondents scoring in the bottom fifth of the distribution. The results presented in Figures 1 and 2 *suggest* that female applicants or recruits obtaining high scores on either of these two scales (i.e., indicating interests similar to NT incumbents) would be more likely to choose an NT rating than would those women obtaining low scores. Conversely, women scoring low on these scales would be more likely to enter T ratings.

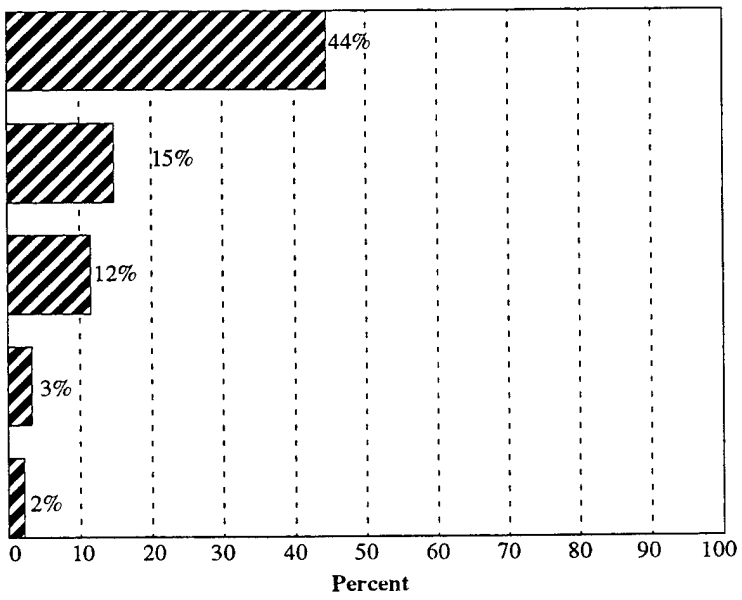
C/F Interval & Scale Scores	No. of Respondents Total	C/F	T
Top 20% (113 & Above)	64	41	23
Next 20% (99 to 112)	64	25	39
Middle 20% (88 to 98)	58	10	48
Next 20% (80 to 87)	58	3	55
Lowest 20% (79 & Below)	67	2	65



Note. T = traditional.

Figure 1. Percentage of women in each scale interval who were in construction/fabrication (C/F) ratings.

M Interval & Scale Scores	No. of Respondents Total	M	T
Top 20% (106 & Above)	54	24	30
Next 20% (93 to 105)	52	8	44
Middle 20% (85 to 92)	51	6	45
Next 20% (77 to 84)	58	2	56
Lowest 20% (76 & Below)	56	1	55



Note. T = traditional.

Figure 2. Percentage of women in each scale interval who were in mechanical (M) ratings.

The data used to compute the statistics shown in Figures 1 and 2 can be displayed in an alternative manner. For example, Table 4 shows the accuracy of the C/F scale in correctly classifying individuals with respect to group membership. Because there are 81 C/F incumbents in the cross-validation sample, the 81 women who scored the highest on the C/F scale were predicted to be members of C/F ratings. Those respondents scoring lower than the top 81 women were predicted to be members of T ratings. Table 4 shows the correspondence between actual and predicted group membership.

As Table 4 shows, the number (51.3) of C/F incumbents correctly classified by the C/F scale was more than double the number (21.1) expected due to chance alone. The table also shows that the total number of correct classifications was equal to 251.6 (i.e., 200.3 + 51.3) out of a possible 311. This number of correct classifications compares favorably to 191.2 (i.e., 170.1 + 21.1) correct classifications expected by chance alone.

Table 5 presents parallel results for the M scale. For the M scale, Table 5 reveals that 231 of the possible 271 cases were correctly classified. If the scale had no relationship to actual group membership, 201.4 correct classifications would be expected by chance.

Relationship of Satisfaction to Scale Scores

Before progressing with the next set of analyses, it is important to ascertain the comparability of the two samples with respect to their average paygrade and mean level of satisfaction. In both cases, the means were virtually identical. The mean paygrade levels for women in T and NT ratings were 5.12 ($SD = 0.74$) and 5.05 ($SD = 0.74$), respectively. The mean level of satisfaction was 2.13 ($SD = 0.79$) for women in T ratings and 2.13 ($SD = 0.78$) for those in NT ratings. These satisfaction scale means were based on responses to background Item 7. Scores of 1, 2, and 3 were assigned to responses of *extremely satisfied*, *very satisfied*, and *satisfied*, respectively.

In addition to examining the ability of scale scores to predict group membership, the relationship between scale scores and satisfaction was evaluated. This set of analyses differed from prior analyses in that incumbents from an NT cluster were compared to other incumbents from within the same cluster of NT ratings. Prior analyses had contrasted women in NT ratings or subgroups of NT ratings to women in T ratings.

The 81 satisfied C/F-rating incumbents in the cross-validation sample had a mean C/F scale score of 111.04 ($SD = 12.62$). In contrast, the mean for 75 C/F-rating women who indicated dissatisfaction with their ratings (and thus had not been used in earlier analyses) was 91.09 ($SD = 15.00$). These means were significantly different, $t(154) = 9.03$, $p < .01$. For the M scale, the 41 satisfied M-rating incumbents obtained a mean score of 106.80 ($SD = 13.76$), while the 49 dissatisfied M-rating incumbents obtained a mean of 88.82 ($SD = 15.63$). These differences between means demonstrated a significant relationship, $t(88) = 5.74$, $p < .01$, between scores on these interest scales and satisfaction with working in NT ratings.

Table 4

Actual and Expected Number of Individuals Assigned in Each Possible Classification Outcome for the Construction/Fabrication Scale

	Construction/Fabrication		Traditional		
Predicted	Actual Assigned[a]	Expected by Chance[b]	Actual Assigned[a]	Expected by Chance[b]	Total Obtained
Construction/ Fabrication	51.3	21.1	29.7	59.9	81
Traditional	29.7	59.9	200.3	170.1	230
Total	81		230		311

[a]Fractional actual people are a statistical artifact caused when a continuous scale (e.g., the C/F scale) is used to categorize people into discrete/dichotomous categories. For example, more than one person had a score at the cut point where some people were predicted to be in the Construction/Fabrication ratings and others were predicted to be in Traditional rating. For statistical accuracy, an interpolated value (i.e., a fractional person) was calculated to determine what proportion (of people who fell on the cut score) should be assigned to each of the groups.

[b]Expected number is the number of respondents who would be expected in the category if the C/F scale were not valid (i.e., no relationship existed between the predicted and actual group membership).

Table 5

Actual and Expected Number of Individuals Assigned in Each Possible Classification Outcome for the Mechanical Scale

	Mechanical		Traditional		
Predicted	Actual Assigned	Expected by Chance[a]	Actual Assigned	Expected by Chance[a]	Total Obtained
Mechanical	21.0	6.2	20.0	34.8	41
Traditional	20.0	34.7	210.0	195.2	230
Total	41		230		271

[a]Expected number is the number of respondents who would be expected in the category if the Mechanical scale were not valid (i.e., no relationship existed between predicted and actual group membership).

Discussion

This study demonstrated that scales can be developed to differentiate the interests of women in T ratings and the interests of women in NT ratings. Moreover, the derived scales are valid in differentiating these groups and are substantially related to self-reported satisfaction with work in NT ratings.

As suggested in the introduction, such scales might prove useful as selection criteria or in career counseling. Whereas interest scales developed and normed on women may be effective in

effective in identifying women likely to be satisfied in NT ratings, their use in employment decisions is controversial. A recent article (Scientific Affairs Committee, 1993) in *The Industrial Organizational Psychologist* recommended against the use of subgroup norms in situations where test scores might be used to make selection or classification decisions about individuals. Thus, it is recommended that if interest scales are used for selection, the scales should be developed and normed on samples of males and females. (Because of the exploratory nature of this critical research, such analysis was outside the scope of this effort).

As indicated above, the use of gender-based procedures is not recommended for selection decisions. However, there is no reason to avoid their use in counseling. In fact, the Scientific Affairs committee (1993) stated that, "In employment settings where the sole use of test or psychological assessments is to provide information and counsel to the individual the use of subgroup norms should not be banned or limited" (p. 49).

Thus, the scales developed in the current study could be used for counseling purposes. However, because of variability in rating sample size (in the key construction samples), the scales might not be equally effective for every NT rating. Furthermore, the present study used a concurrent validity design. The predictive validity of the NVII scales should also be evaluated for each NT rating prior to their operational use. For example, predictive validity studies should be conducted that use applicants or recruits as subjects and relate NVII scale scores to final "A" school grades for all NT ratings.

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Appendix A

NVII (Revised) and Background Questions

This is a questionnaire designed to measure the interests of petty officers and chief petty officers in doing different types of activities. It is NOT a test of intelligence, ability, or personality. Before answering the interest items, please complete the background information requested. If you are NOT in paygrades E4-E9, just complete item 2 and mail the questionnaire back.

Authority to request this information is granted under Title 5, United States Code 301, and the Department of Navy Regulations. License to administer this questionnaire is granted under OPNAV Report Control Symbol 1000-16, which expires 30 Sept 94. All responses will be held in confidence. Information you provide will be summarized with the responses of others. Completion of this questionnaire is entirely voluntary.

* USE NO. 2 PENCIL ONLY
* Erase cleanly and completely any changes you make.
* Make black marks that fill the circle.
* Do not make stray marks on the form.

CORRECT MARK: ●
INCORRECT MARK: ⊘ ⊘ ⊘ ⊘

For each question in the next section (Background), pick the answer that best describes you. Then fill in the circle or circles that correspond(s) to your answer. For some questions, you will also need to write numbers or letters in the boxes at the top of the block.

EXAMPLE

1. What is your gender?

○ Male
● Female

EXAMPLE

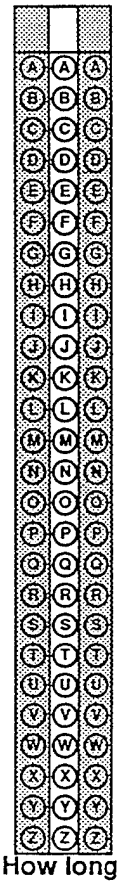
2. What is your time in service?

Years		Months	
0	9	0	1

srr 8/10/93

BACKGROUND

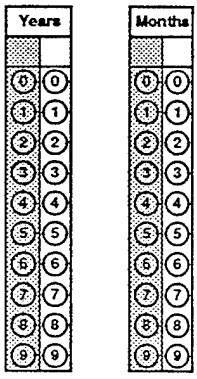
1. What is your current rating (i.e., YN, CTA)?



2. What is your pay grade?

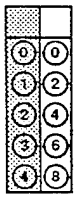
- ○ E-1
- ○ E-2
- ○ E-3
- ○ E-4
- ○ E-5
- ○ E-6
- ○ E-7
- ○ E-8
- ○ E-9

3. How long have you been in your current pay grade?

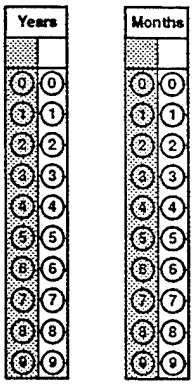


4. What was your last overall evaluation mark in Block 39 (e.g., if you received a 4.0, write and mark 40)?

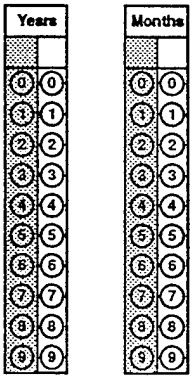
- ○ Not observed



5. How long have you been rated in your CURRENT rating?



6. How many years and months have you worked on tasks WITHIN your CURRENT rating?



7. When you are working on tasks WITHIN your CURRENT rating, how satisfied are you in doing that type of work?
   - ○ Extremely Satisfied
   - ○ Very Satisfied
   - ○ Satisfied
   - ○ Somewhat Dissatisfied
   - ○ Very Dissatisfied
   - ○ Extremely Dissatisfied

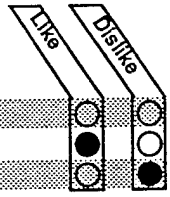
8. If you had to choose over again, would you choose the same rating?
   - ○ Definitely
   - ○ Probably
   - ○ Possibly
   - ○ Possibly Not
   - ○ Probably Not
   - ○ Definitely Not

9. Will you re-enlist if allowed to?
   - ○ Definitely
   - ○ Probably
   - ○ Possibly
   - ○ Possibly Not
   - ○ Probably Not
   - ○ Definitely Not

2

Following are many activities that are arranged in groups of three. For each group, first read the three activities. Then choose the ONE activity you would most like to do, and the ONE activity you would least like to do. For the activity you would most like to do, darken the corresponding circle in the column marked "Like". For the activity you would least like to do, darken the corresponding circle in the column marked "Dislike". Leave the circles for the remaining activity blank.

Example



1. a. Play poker
   b. Play basketball
   c. Play checkers

Please answer each group of interest items. DO NOT SKIP any group. When in doubt, make the best guess you can.

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

			Like	Dislike
1.	a.	Catch up on your letter writing	○	○
	b.	Try to fix a kitchen clock	○	○
	c.	Discuss your philosophy of life with someone	○	○
2.	a.	Type a letter for a friend	○	○
	b.	Play solitaire with playing cards	○	○
	c.	Take a broken lock apart to see what is wrong with it	○	○
3.	a.	Solicit money for a charity	○	○
	b.	Check a computer print-out for errors	○	○
	c.	Install an electric or gas meter	○	○
4.	a.	Tape a bruised ankle	○	○
	b.	Maintain a bookkeeping system	○	○
	c.	Solve mechanical puzzles	○	○
5.	a.	Watch a surgical operation	○	○
	b.	Attend a lecture on interactive television	○	○
	c.	Go to an exhibit of recent inventions	○	○
6.	a.	Set up an antenna for a friend's television	○	○
	b.	Try to win someone over to your side in an argument	○	○
	c.	Experiment with making candy without knowing the recipe	○	○
7.	a.	Be an office manager	○	○
	b.	Be a bookkeeper	○	○
	c.	Be an artist	○	○
8.	a.	Play a musical instrument	○	○
	b.	Play tennis	○	○
	c.	Work crossword puzzles	○	○

			Like	Dislike
9.	a.	Do clerical work	○	○
	b.	Be a cook in a diner	○	○
	c.	Sew on buttons	○	○
10.	a.	Write a newspaper column of advice on personal problems	○	○
	b.	Take part in a sports event	○	○
	c.	Take part in a public speaking contest	○	○
11.	a.	Work in a hospital	○	○
	b.	Work as a night watchman at a military supply depot	○	○
	c.	Work in a textile (clothing) factory	○	○
12.	a.	Study chemistry	○	○
	b.	Take word processing training	○	○
	c.	Take technical training	○	○
13.	a.	Make model trains	○	○
	b.	Repair a clock	○	○
	c.	Fix a radio	○	○
14.	a.	Be a teller in a bank	○	○
	b.	Be a radio announcer	○	○
	c.	Be an electrician	○	○
15.	a.	Listen to recordings of a symphony concert	○	○
	b.	Play a card game	○	○
	c.	Go to a track meet	○	○
16.	a.	Repair electrical wiring	○	○
	b.	Fix a clogged drain	○	○
	c.	Check for errors in the copy of a report	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

			Like	Dislike
17.	a.	Work in the control room of a television studio	○	○
	b.	Work in a dental laboratory	○	○
	c.	Work at an information desk	○	○
18.	a.	Be an electrical engineer	○	○
	b.	Be an aeronautical engineer (design airplanes)	○	○
	c.	Be a surgeon	○	○
19.	a.	Perform laboratory experiments	○	○
	b.	Work with electrical devices	○	○
	c.	Make out shipping bills	○	○
20.	a.	Operate a drill press	○	○
	b.	Be a cook in a restaurant	○	○
	c.	Take dictation	○	○
21.	a.	Send radio messages using codes	○	○
	b.	Conduct research on the effects of drugs	○	○
	c.	Sell computers	○	○
22.	a.	Do scientific research	○	○
	b.	Write a novel	○	○
	c.	Repair watches	○	○
23.	a.	Tinker with a broken sewing machine	○	○
	b.	Refinish an old piece of furniture	○	○
	c.	Conduct a study on mental illnesses	○	○
24.	a.	Set type for a small newspaper	○	○
	b.	Inspect clothing for damage or flaws	○	○
	c.	Plan menus	○	○
25.	a.	Work on developing a new form of plastic	○	○
	b.	Inspect machines to see if they are in good condition	○	○
	c.	Put together the parts of a copy machine	○	○
26.	a.	Study architectural design	○	○
	b.	Study sociology	○	○
	c.	Study calculus	○	○

			Like	Dislike
27.	a.	Be a machine operator	○	○
	b.	Be a bill collector	○	○
	c.	Work as a wallpaper hanger	○	○
28.	a.	Conduct research on improving airplane design	○	○
	b.	Work on the development of a lighter and stronger metal	○	○
	c.	Do an experiment to prove the earth is round	○	○
29.	a.	Operate a conveyor belt	○	○
	b.	Be a filing clerk	○	○
	c.	Work in a laboratory where telescope lenses are made	○	○
30.	a.	Leaf through an illustrated (picture) cook book	○	○
	b.	Do addition problems in your head	○	○
	c.	Practice hitting a punching bag	○	○
31.	a.	Sell clothes in a store	○	○
	b.	Type letters	○	○
	c.	Operate a simple drill	○	○
32.	a.	Be a grocer	○	○
	b.	Be a printer	○	○
	c.	Be a shop supervisor	○	○
33.	a.	Make drawings for a newspaper	○	○
	b.	Check stock in a store room	○	○
	c.	Make small repairs around the home or garage	○	○
34.	a.	Write letters	○	○
	b.	Fix a leaky faucet	○	○
	c.	Interview someone for a newspaper story	○	○
35.	a.	Take a course in biology	○	○
	b.	Take a course in cost accounting	○	○
	c.	Take a course in engine design	○	○
36.	a.	Operate precision tools	○	○
	b.	Overhaul an automobile engine	○	○
	c.	Make a chemical analysis of a new toothpaste	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

		Like	Dislike
37.	a. Make a new key to replace a broken one	○	○
	b. Add columns of figures	○	○
	c. Install an electrical light switch	○	○
38.	a. Be an interpreter of a foreign language	○	○
	b. Be a railway conductor	○	○
	c. Be a welder	○	○
39.	a. Varnish a floor	○	○
	b. Learn to use a new computer software package	○	○
	c. Repair a broken connection on an electric iron	○	○
40.	a. Fix a doorbell	○	○
	b. Make coffee	○	○
	c. Sort mail	○	○
41.	a. Study word processing	○	○
	b. Study shop work	○	○
	c. Study business math	○	○
42.	a. Put a closet in order	○	○
	b. File cards in alphabetical order	○	○
	c. Make a pie	○	○
43.	a. Be a master mechanic	○	○
	b. Be a chemist	○	○
	c. Be a recreation director	○	○
44.	a. Fill prescriptions in a drug store	○	○
	b. Operate a FAX machine	○	○
	c. Operate a printing press	○	○
45.	a. Tune a piano	○	○
	b. Cook a meal	○	○
	c. Change a tire on an automobile	○	○
46.	a. Install an electric light bulb socket	○	○
	b. Look for errors in the draft of a report	○	○
	c. Test water to see if it's pure	○	○
47.	a. Study blood smears under a microscope	○	○
	b. Take dictation	○	○
	c. Make drawings of airplane parts	○	○

		Like	Dislike
48.	a. Be a private secretary	○	○
	b. Be an explorer	○	○
	c. Be a radio equipment repair technician	○	○
49.	a. Study story writing	○	○
	b. Study building construction	○	○
	c. Study personnel administration	○	○
50.	a. Read electric and gas meters	○	○
	b. Put tags and labels on merchandise	○	○
	c. Locate and replace shorted wires	○	○
51.	a. Study carpentry	○	○
	b. Study first aid	○	○
	c. Study welding	○	○
52.	a. Repair and refinish old furniture	○	○
	b. Operate a cash register	○	○
	c. Test computer components	○	○
53.	a. Be a fingerprint expert	○	○
	b. Be a weather forecaster	○	○
	c. Be an efficiency expert who improves shop procedure	○	○
54.	a. Set up the electrical equipment on a movie sound stage	○	○
	b. Draw plans for a large bridge	○	○
	c. Do a chemical analysis of a new product	○	○
55.	a. Rivet sheet metal	○	○
	b. Solve physics problems	○	○
	c. Read radio wiring diagrams	○	○
56.	a. Build rowboats	○	○
	b. Make novelty toys	○	○
	c. Make illustrations for books	○	○
57.	a. Be a mechanical engineer	○	○
	b. Be an auto mechanic	○	○
	c. Be a machinist	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

			Like	Dislike
58.	a.	Be a salesperson in a hardware store	○	○
	b.	Be a salesperson in a real estate office	○	○
	c.	Be an insurance agent	○	○
59.	a.	Set up your own photographic darkroom	○	○
	b.	Build outdoor furniture for your patio or yard	○	○
	c.	Carve figures from wood	○	○
60.	a.	Repair torn clothing	○	○
	b.	Wash and polish an automobile	○	○
	c.	Adjust a carburetor	○	○
61.	a.	Be a concert musician	○	○
	b.	Be a graphic artist	○	○
	c.	Be a surveyor	○	○
62.	a.	Make machine tools	○	○
	b.	Develop negatives in a photographic darkroom	○	○
	c.	Play music for an all night radio program	○	○
63.	a.	Install electrical switches	○	○
	b.	Operate an office calculator	○	○
	c.	Drive a taxi	○	○
64.	a.	Install a telephone	○	○
	b.	Make a written report of a month's work	○	○
	c.	Draw a detailed terrain map	○	○
65.	a.	Take part in a debate	○	○
	b.	Have your fortune told	○	○
	c.	Play chess	○	○
66.	a.	Teach mathematics	○	○
	b.	Help young people select their careers	○	○
	c.	Do chemical research	○	○
67.	a.	Work crossword puzzles	○	○
	b.	Work mental arithmetic problems	○	○
	c.	Show a friend how to operate a jigsaw	○	○

			Like	Dislike
68.	a.	Be an FBI agent	○	○
	b.	Write a book on modern music	○	○
	c.	Make a study of flower arrangement	○	○
69.	a.	Inspect food for spoilage	○	○
	b.	Wash dishes	○	○
	c.	Fix a broken flashlight	○	○
70.	a.	Get a job selling chemical supplies	○	○
	b.	Get a job as a telephone repair worker	○	○
	c.	Get a job as an office worker	○	○
71.	a.	Direct the work of a construction gang	○	○
	b.	Sell office equipment	○	○
	c.	Plan musical programs	○	○
72.	a.	Draw graphs and charts	○	○
	b.	Operate a copy machine	○	○
	c.	Manage an office	○	○
73.	a.	Learn to play golf	○	○
	b.	Learn to cook	○	○
	c.	Learn to use a news camera	○	○
74.	a.	Take care of plants	○	○
	b.	Paint water colors	○	○
	c.	Help someone prepare their income tax returns	○	○
75.	a.	Teach English	○	○
	b.	Teach chemistry	○	○
	c.	Teach arithmetic	○	○
76.	a.	Transmit messages on a computer network	○	○
	b.	Write a report	○	○
	c.	Adjust automobile brakes	○	○
77.	a.	Inspect and repair a computer	○	○
	b.	Operate a steam clothes presser	○	○
	c.	Handle orders for supplies	○	○
78.	a.	Putter around in a garden	○	○
	b.	Take part in an amateur contest	○	○
	c.	Cook spaghetti	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

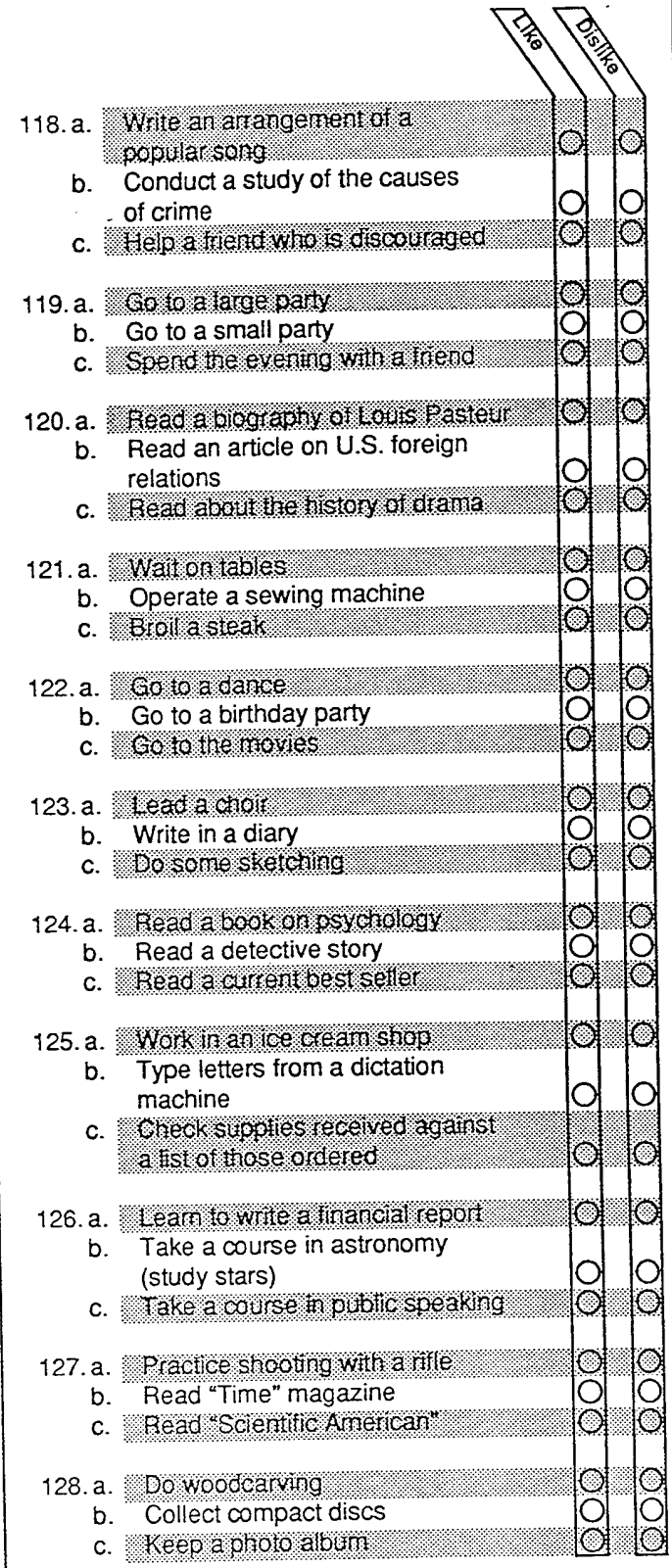
		Like	Dislike
79.	a. Repair damage to a tree after a storm	○	○
	b. Construct a cabinet according to a blueprint	○	○
	c. Install a garage door opener	○	○
80.	a. Check the spelling of a list of names	○	○
	b. Patch a leaky roof	○	○
	c. Help load boxes onto a truck	○	○
81.	a. Fix a wobbly table	○	○
	b. Retouch negatives	○	○
	c. Operate a video camera	○	○
82.	a. Arrange a pile of letters in order of the date received	○	○
	b. Scramble eggs	○	○
	c. Pack food products for shipping	○	○
83.	a. Interview job applicants	○	○
	b. Supervise the building of a bridge	○	○
	c. Plan a television program	○	○
84.	a. Write daily reports on the progress of a charity drive	○	○
	b. Make charts for use by ship companies or airlines	○	○
	c. Help select equipment for a machine shop	○	○
85.	a. Conduct research on the psychology of music	○	○
	b. Conduct research on the causes of earthquakes	○	○
	c. Figure out new schemes to get work done rapidly and efficiently	○	○
86.	a. Be a court reporter	○	○
	b. Be a machinist	○	○
	c. Be a career counselor	○	○
87.	a. Operate a computer	○	○
	b. Operate earth moving equipment	○	○
	c. Operate a precision machine	○	○
88.	a. Make ice cream in a hand freezer	○	○
	b. Check copies of reports to make sure they are correct	○	○
	c. Check for breakage in a shipment of parts	○	○
89.	a. Collect mugs	○	○
	b. Collect compact discs	○	○
	c. Collect stamps	○	○
90.	a. Build a fire in a fireplace	○	○
	b. Fix a noisy radiator	○	○
	c. Make half quantity of a given recipe	○	○
91.	a. Have charge of the care and upkeep of manufacturing equipment	○	○
	b. Help with work to improve the efficiency of artificial arms and legs	○	○
	c. Help with research on high definition television	○	○
92.	a. Hang a large wall mirror	○	○
	b. Read aloud to someone	○	○
	c. Take the initiative in settling an argument between two people	○	○
93.	a. Fix a wrist watch	○	○
	b. Translate a code message into words	○	○
	c. Repair a broken zipper	○	○
94.	a. Be an office personnel manager	○	○
	b. Be a skilled airplane mechanic	○	○
	c. Be an animal doctor	○	○
95.	a. Make pottery dishes	○	○
	b. Measure cloth by the yard	○	○
	c. Splice wire together	○	○
96.	a. Record readings from weather forecasting instruments	○	○
	b. Collect coins from parking meters and record receipts	○	○
	c. Keep records of donations to a charity	○	○
97.	a. Draw a series of comic strips	○	○
	b. Design an airplane	○	○
	c. Build models of ships	○	○

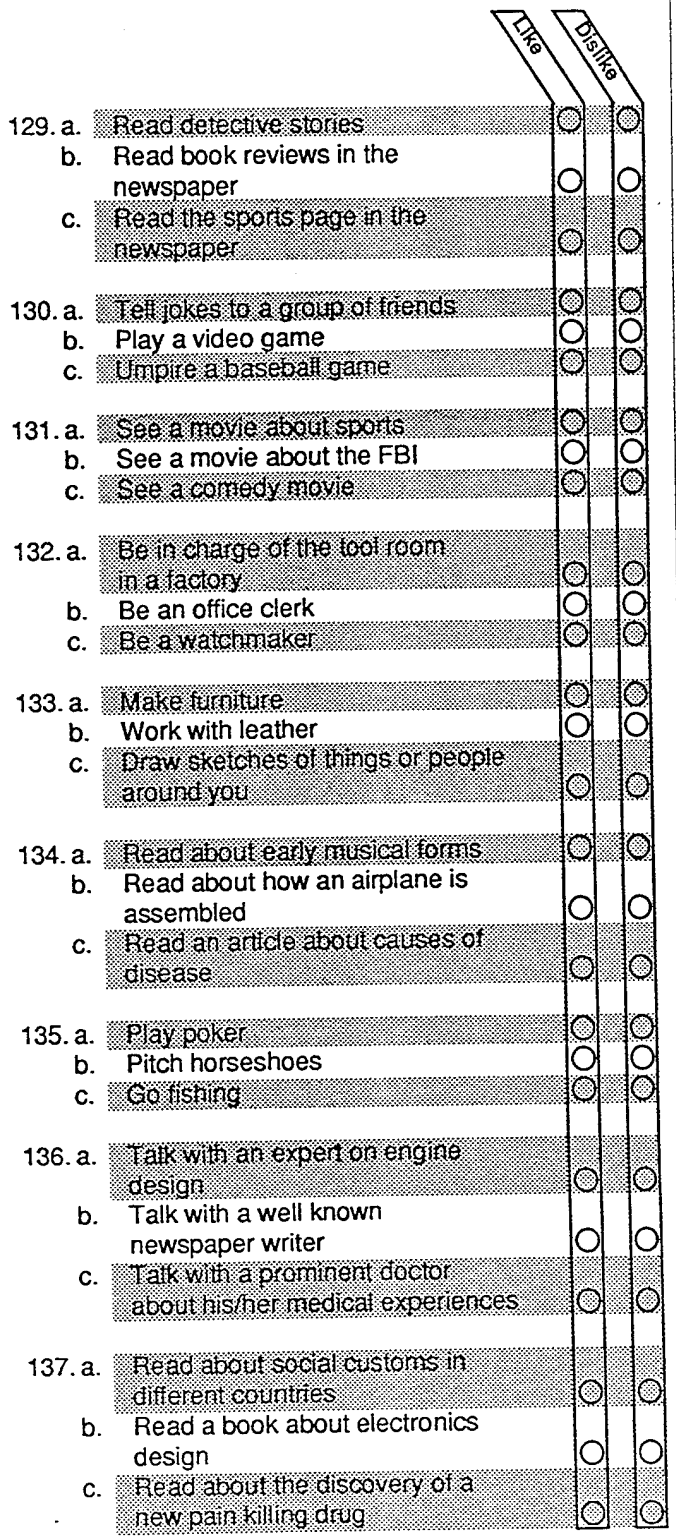
For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

		Like	Dislike
98.	a. Drive a large truck	○	○
	b. Put new pockets in clothes	○	○
	c. Adjust front wheel bearings	○	○
99.	a. Address envelopes	○	○
	b. Try to find an error in a financial account	○	○
	c. Help put out the fire in a burning building	○	○
100.	a. Pack breakable articles for shipping	○	○
	b. Inspect cloth for defects or damages	○	○
	c. Operate a sewing machine	○	○
101.	a. Be a hospital attendant	○	○
	b. Be a bank teller	○	○
	c. Be a tool maker	○	○
102.	a. Take still life photographs	○	○
	b. Take news photographs	○	○
	c. Practice golf shots	○	○
103.	a. Spend an evening meeting with new people at a social club	○	○
	b. Spend an evening just chatting with a group of friends	○	○
	c. Go to a hockey game	○	○
104.	a. Read the sports page of a newspaper	○	○
	b. Read the editorial page of a newspaper	○	○
	c. Read the financial page of a newspaper	○	○
105.	a. Wash clothes	○	○
	b. Assemble furniture	○	○
	c. Take care of the lawn	○	○
106.	a. Do a lot of reading	○	○
	b. Write letters on business matters	○	○
	c. Look up new words in the dictionary	○	○
107.	a. Belong to an amateur astronomy club (study stars)	○	○
	b. Belong to a bowling league	○	○
	c. Belong to a debate club	○	○

		Like	Dislike
108.	a. Take a course in sales techniques	○	○
	b. Take a course in business law	○	○
	c. Take a course in mathematics	○	○
109.	a. Get a job in a factory	○	○
	b. Get a job in a retail store	○	○
	c. Go to school	○	○
110.	a. Help campaign for donations for a homeless shelter	○	○
	b. Work in an office	○	○
	c. Set up machines for a wood-working shop	○	○
111.	a. Raise chickens	○	○
	b. Repair shoes	○	○
	c. Operate a clothes press	○	○
112.	a. Take a machine apart to see how it works	○	○
	b. Assist a doctor at the scene of an accident	○	○
	c. Teach someone how to use a machine	○	○
113.	a. Play poker	○	○
	b. Play basketball	○	○
	c. Play checkers	○	○
114.	a. Perform in an amateur show	○	○
	b. Go on a canoe trip	○	○
	c. Play pool	○	○
115.	a. Work in a factory	○	○
	b. Work at a desk	○	○
	c. Work outdoors	○	○
116.	a. Be introduced to a famous scientist	○	○
	b. Be introduced to a well known movie star	○	○
	c. Be introduced to a prominent politician	○	○
117.	a. Interview job applicants	○	○
	b. Investigate the causes of mental illness	○	○
	c. Try out different sails on a model sailboat to see which sail is best	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.



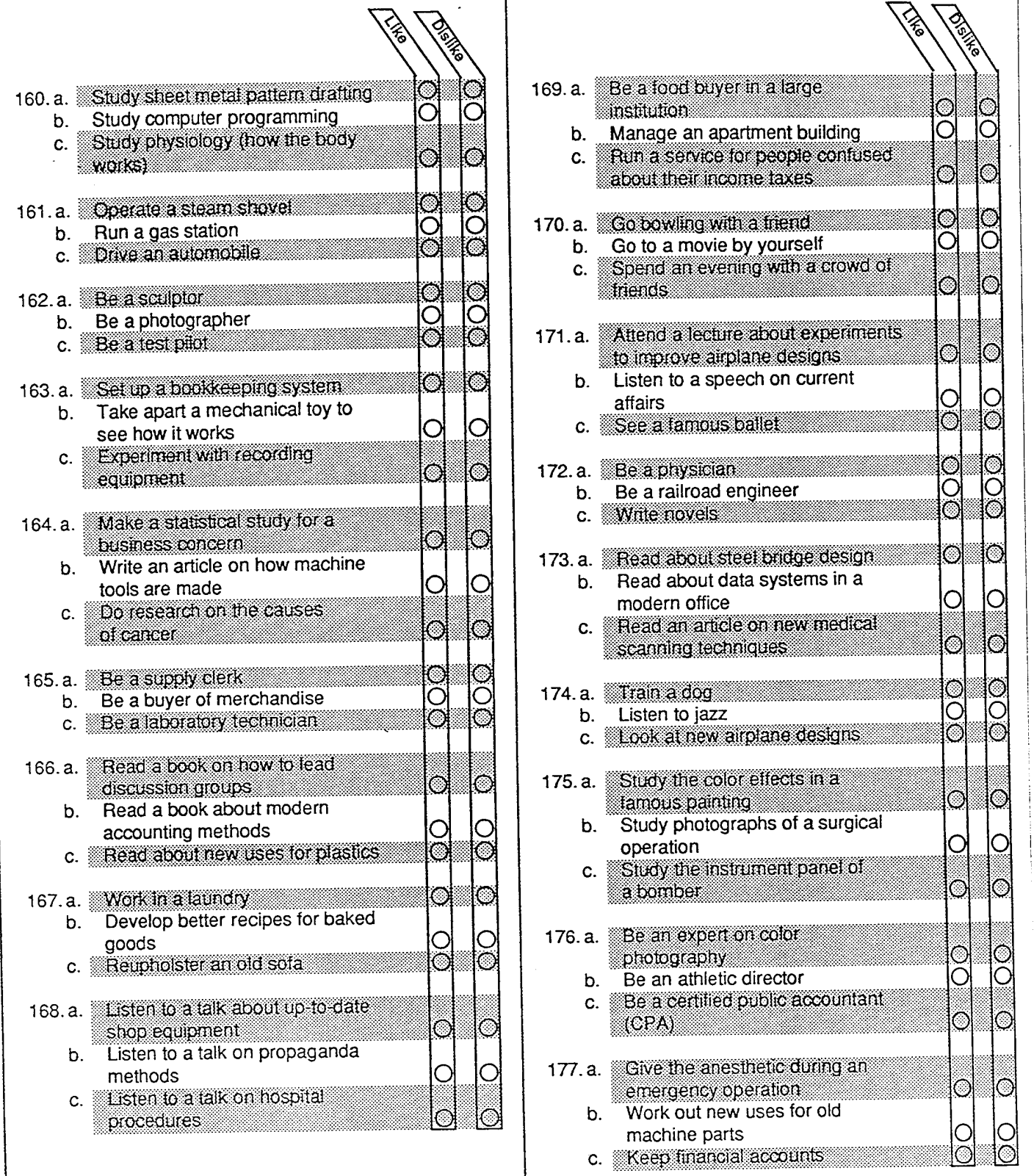


For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

		Like	Dislike
138.	a. Take care of mental patients	○	○
	b. Assist in a chemical laboratory	○	○
	c. Operate an office copy machine	○	○
139.	a. Be a statistician	○	○
	b. Be a professional athlete	○	○
	c. Be a lawyer	○	○
140.	a. Sell computers	○	○
	b. Grind lenses for telescopes	○	○
	c. Draw the pictures for a magazine article	○	○
141.	a. Improve methods of reproducing pictures in color	○	○
	b. Work out a catalog system for books in a library	○	○
	c. Think up new time saving gadgets for use around the house	○	○
142.	a. Study care of the war wounded	○	○
	b Study accounting	○	○
	c. Study refrigeration and air conditioning	○	○
143.	a. Tailor men's clothes	○	○
	b. Proofread for a newspaper	○	○
	c. Inspect machinery for repair needs	○	○
144.	a. Assemble mechanical parts	○	○
	b. Fry bacon and eggs	○	○
	c. Sharpen machine drills	○	○
145.	a. Give "first aid" assistance	○	○
	b. Scuba dive	○	○
	c. Keep computers in repair	○	○
146.	a. Write feature stories for a newspaper	○	○
	b. Read reviews of recent books	○	○
	c. Work in a medical laboratory	○	○
147.	a. Study shorthand	○	○
	b. Study engineering mathematics	○	○
	c. Study foreign languages	○	○
148.	a. Operate a computer	○	○
	b. File records	○	○
	c. Send coded messages by radio	○	○

		Like	Dislike
149.	a. Be a librarian	○	○
	b. Be a mechanical engineer	○	○
	c. Be a sales person	○	○
150.	a. Repair radio equipment	○	○
	b. Build things from wood	○	○
	c. Sort mail in a post office	○	○
151.	a. Supervise workers on an assembly line	○	○
	b. Keep records for a doctor's office	○	○
	c. Build boats	○	○
152.	a. Play basketball	○	○
	b. See an educational movie	○	○
	c. Visit someone in the hospital	○	○
153.	a. Keep accounts	○	○
	b. Make maps	○	○
	c. Keep mailing lists	○	○
154.	a. Be a garage mechanic	○	○
	b. Be a professional musician	○	○
	c. Be a pharmacist	○	○
155.	a. Manage an office	○	○
	b. Repair a television	○	○
	c. Estimate the cost of manufacturing a new medicine	○	○
156.	a. Arrange music for an orchestra	○	○
	b. Take an inventory of supplies in a wholesale store	○	○
	c. Write a popular article on how to repair household appliances	○	○
157.	a. Decode messages written in code	○	○
	b. Do blood chemistry in a medical laboratory	○	○
	c. Assist in research on automobile design	○	○
158.	a. Take photographs of your friends	○	○
	b. Write a popular article on how a diesel engine works	○	○
	c. Plan a recreation schedule	○	○
159.	a. Be a mechanical engineer	○	○
	b. Be a chef	○	○
	c. Be a physical therapist	○	○

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.



		Like	Dislike
160. a.	Study sheet metal pattern drafting		
b.	Study computer programming		
c.	Study physiology (how the body works)		
161. a.	Operate a steam shovel		
b.	Run a gas station		
c.	Drive an automobile		
162. a.	Be a sculptor		
b.	Be a photographer		
c.	Be a test pilot		
163. a.	Set up a bookkeeping system		
b.	Take apart a mechanical toy to see how it works		
c.	Experiment with recording equipment		
164. a.	Make a statistical study for a business concern		
b.	Write an article on how machine tools are made		
c.	Do research on the causes of cancer		
165. a.	Be a supply clerk		
b.	Be a buyer of merchandise		
c.	Be a laboratory technician		
166. a.	Read a book on how to lead discussion groups		
b.	Read a book about modern accounting methods		
c.	Read about new uses for plastics		
167. a.	Work in a laundry		
b.	Develop better recipes for baked goods		
c.	Reupholster an old sofa		
168. a.	Listen to a talk about up-to-date shop equipment		
b.	Listen to a talk on propaganda methods		
c.	Listen to a talk on hospital procedures		
169. a.	Be a food buyer in a large institution		
b.	Manage an apartment building		
c.	Run a service for people confused about their income taxes		
170. a.	Go bowling with a friend		
b.	Go to a movie by yourself		
c.	Spend an evening with a crowd of friends		
171. a.	Attend a lecture about experiments to improve airplane designs		
b.	Listen to a speech on current affairs		
c.	See a famous ballet		
172. a.	Be a physician		
b.	Be a railroad engineer		
c.	Write novels		
173. a.	Read about steel bridge design		
b.	Read about data systems in a modern office		
c.	Read an article on new medical scanning techniques		
174. a.	Train a dog		
b.	Listen to jazz		
c.	Look at new airplane designs		
175. a.	Study the color effects in a famous painting		
b.	Study photographs of a surgical operation		
c.	Study the instrument panel of a bomber		
176. a.	Be an expert on color photography		
b.	Be an athletic director		
c.	Be a certified public accountant (CPA)		
177. a.	Give the anesthetic during an emergency operation		
b.	Work out new uses for old machine parts		
c.	Keep financial accounts		

For each group of activities listed, choose ONLY TWO responses per group: one for the most liked activity and one for the least liked activity.

		Like	Dislike
178.	a. Take a blood sample	○	○
	b. Explain to someone how to fill out insurance forms	○	○
	c. Fix a faulty light switch	○	○
179.	a. Be a professor of a foreign language	○	○
	b. Be an architect	○	○
	c. Be a psychologist	○	○
180.	a. Manage a cafeteria	○	○
	b. Keep personnel records and reports	○	○
	c. Write articles on hobbies	○	○
181.	a. Sing in a chorus	○	○
	b. Read detective stories	○	○
	c. Watch news programs	○	○
182.	a. Be a carpenter	○	○
	b. Be a telephone operator	○	○
	c. Be a doctor's assistant	○	○
183.	a. Alphabetize cards	○	○
	b. Cut meat	○	○
	c. Varnish floors	○	○
184.	a. Mix pancake batter	○	○
	b. Install a hot water heater	○	○
	c. Take part in a military drill	○	○

		Like	Dislike
185.	a. Go to a boxing match	○	○
	b. Go bicycling	○	○
	c. Go to a dance	○	○
186.	a. Be a professor of mathematics	○	○
	b. Be a writer	○	○
	c. Be a scientific researcher	○	○
187.	a. Spend an afternoon reading in the library	○	○
	b. Visit a famous medical research laboratory	○	○
	c. Visit famous art galleries	○	○
188.	a. Write the script for a television program	○	○
	b. Talk before a group of people	○	○
	c. Be a telephone receptionist	○	○
189.	a. Handle the advertising for a newspaper	○	○
	b. Keep business letters in alphabetical order	○	○
	c. Make mechanical drawings	○	○
190.	a. Be a public relations director for a large company	○	○
	b. Be a pharmacist	○	○
	c. Be a jeweler	○	○

Thank you for your participation!

Within 10 days, please return your completed questionnaire in the enclosed pre-addressed envelope or mail it to:

Navy Personnel Research and Development Center
Survey Operations Division 163
53335 Ryne Road
San Diego, CA 92152-7250

Appendix B

Survey Cover Letter

THE CHIEF OF NAVAL PERSONNEL

Dear Navy Member,

Women entering the Navy today have more career choices than ever before. As applicants, however, they often know very little about Navy ratings and associated occupational tasks. Also, they have very little inclination to enter technical ratings due to their life experiences up to that point. As a result, the majority of female applicants continue to enter traditional ratings despite the expanded opportunities within the nontraditional specialties. For this reason, we have asked researchers at the Navy Personnel Research and Development Center to analyze our ratings selection procedures.

The enclosed survey and your responses will provide us vital information concerning interests and job satisfaction of navy women in both traditional and nontraditional ratings. Comparisons and analysis of your likes and dislikes will assist us in evaluating the role and importance of personal interests in successful performance within nontraditional ratings.

Only 4,300 women have been chosen for this effort so your responses are critical to its success. Please take the time to answer the questions carefully and return the questionnaire promptly.

Thank you in advance for your assistance, and best wishes in your naval career.

Sincerely,

Appendix C

NVII Items and Response Options for the NT Scale (Based on All Ratings Combined)

NVII Items and Response Options for the NT Scale (Based on All Ratings Combined)

		LIKE	DISLIKE
2	a. Type a letter for a friend		
	b. Play solitaire with playing cards		
	c. Take a broken lock apart to see what is wrong with it		T
20	a. Operate a drill press	NT	
	b. Be a cook in a restaurant		
	c. Take dictation		
31	a. Sell clothes in a store		
	b. Type letters		
	c. Operate a simple drill	NT	T
34	a. Write letters		
	b. Fix a leaky faucet	NT	T
	c. Interview someone for a newspaper story		
36	a. Operate precision tools		
	b. Overhaul an automobile engine		
	c. Make a chemical analysis of a new toothpaste	T	NT
38	a. Be an interpreter of a foreign language	T	
	b. Be a railway conductor		
	c. Be a welder	NT	T
41	a. Study word processing		
	b. Study shop work	NT	T
	c. Study business math		

		LIKE	DISLIKE
43	a. Be a master mechanic	NT	T
	b. Be a chemist		
	c. Be a recreation director		
49	a. Study story writing		
	b. Study building construction	NT	
	c. Study personnel administration		
51	a. Study carpentry		
	b. Study first aid		
	c. Study welding		T
55	a. Rivet sheet metal	NT	
	b. Solve physics problems		
	c. Read radio wiring diagrams		
56	a. Build rowboats		T
	b. Make novelty toys		
	c. Make illustrations for books		
62	a. Make machine tools		T
	b. Develop negatives in a photographic darkroom		
	c. Play music for an all night radio program		
70	a. Get a job selling chemical supplies		
	b. Get a job as a telephone repair worker	NT	
	c. Get a job as an office worker	T	
76	a. Transmit messages on a computer network		
	b. Write a report		
	c. Adjust automobile brakes	NT	T

		LIKE	DISLIKE
83	a. Interview job applicants		
	b. Supervise the building of a bridge	NT	T
	c. Plan a television program		
84	a. Write daily reports on the progress of a charity drive		
	b. Make charts for use by ship companies or airlines		
	c. Help select equipment for a machine shop	NT	
86	a. Be a court reporter		
	b. Be a machinist		T
	c. Be a career counselor		
87	a. Operate a computer	T	
	b. Operate earth moving equipment		
	c. Operate a precision machine		
91	a. Have charge of the care and upkeep of manufacturing equipment		T
	b. Help with work to improve the efficiency of artificial arms and legs		
	c. Help with the research on high definition television		
94	a. Be an office personnel manager		NT
	b. Be a skilled airplane mechanic		T
	c. Be an animal doctor		
98	a. Drive a large truck		
	b. Put new pockets in clothes		NT
	c. Adjust front wheel bearings		

		LIKE	DISLIKE
101	a. Be a hospital attendant		
	b. Be a bank teller		
	c. Be a tool maker	NT	T
110	a. Help campaign for donations for a homeless shelter		
	b. Work in an office		
	c. Set up machines for a woodworking shop	NT	T
132	a. Be in charge of the tool room in a factory	NT	
	b. Be an office clerk	T	
	c. Be a watchmaker		
136	a. Talk with an expert on engine design		T
	b. Talk with a well known newspaper writer		
	c. Talk with a prominent doctor about his/her medical experiences		
142	a. Study care of the war-wounded		
	b. Study accounting		
	c. Study refrigeration and air conditioning	NT	
143	a. Tailor men's clothes		
	b. Proofread for a newspaper	T	
	c. Inspect machinery for repair needs	NT	T
144	a. Assemble mechanical parts	NT	
	b. Fry bacon and eggs	T	
	c. Sharpen machine drills		
149	a. Be a librarian		
	b. Be a mechanical engineer	NT	
	c. Be a sales person		

		LIKE	DISLIKE
151	a. Supervise workers on an assembly line		
	b. Keep records for a doctor's office	T	NT
	c. Build boats		
154	a. Be a garage mechanic	NT	T
	b. Be a professional musician		
	c. Be a pharmacist		
159	a. Be a mechanical engineer	NT	T
	b. Be a chef		
	c. Be a physical therapist		
160	a. Study sheet metal pattern drafting		T
	b. Study computer programming		
	c. Study physiology (how the body works)		
168	a. Listen to a talk about up-to-date shop equipment	NT	
	b. Listen to a talk on propaganda methods		
	c. Listen to a talk on hospital procedures		
171	a. Attend a lecture about experiments to improve airplane designs		T
	b. Listen to a speech on current affairs		
	c. See a famous ballet		
173	a. Read about steel bridge design		T
	b. Read about data systems in a modern office		
	c. Read an article on new medical scanning techniques		
178	a. Take a blood sample		
	b. Explain to someone how to fill out insurance forms		
	c. Fix a faulty light switch	NT	

		LIKE	DISLIKE
184	a. Mix pancake batter		
	b. Install a hot water heater		T
	c. Take part in a military drill		
189	a. Handle the advertising for a newspaper		
	b. Keep business letters in alphabetical order		
	c. Make mechanical drawings	NT	

Appendix D

NVII Items and Response Options for the C/F Scale

NVII Items and Response Options for the C/F Scale

		LIKE	DISLIKE
2	a. Type a letter for a friend		
	b. Play solitaire with playing cards		
	c. Take a broken lock apart to see what is wrong with it		T
20	a. Operate a drill press	C/F	
	b. Be a cook in a restaurant		
	c. Take dictation		
31	a. Sell clothes in a store		
	b. Type letters		
	c. Operate a simple drill	C/F	T
34	a. Write letters		
	b. Fix a leaky faucet	C/F	T
	c. Interview someone for a newspaper story		
36	a. Operate precision tools		
	b. Overhaul an automobile engine		
	c. Make a chemical analysis of a new toothpaste		C/F
38	a. Be an interpreter of a foreign language	T	
	b. Be a railway conductor		
	c. Be a welder	C/F	T
41	a. Study word processing		
	b. Study shop work	C/F	T
	c. Study business math		

		LIKE	DISLIKE
43	a. Be a master mechanic	C/F	T
	b. Be a chemist		
	c. Be a recreation director		
49	a. Study story writing		
	b. Study building construction	C/F	
	c. Study personnel administration		
51	a. Study carpentry		
	b. Study first aid		
	c. Study welding		T
55	a. Rivet sheet metal	C/F	
	b. Solve physics problems		
	c. Read radio wiring diagrams		
56	a. Build rowboats		T
	b. Make novelty toys		
	c. Make illustrations for books		
62	a. Make machine tools		T
	b. Develop negatives in a photographic darkroom		
	c. Play music for an all night radio program		
69	a. Inspect food for spoilage		
	b. Wash dishes		
	c. Fix a broken flashlight	C/F	
70	a. Get a job selling chemical supplies		
	b. Get a job as a telephone repair worker	C/F	
	c. Get a job as an office worker	T	

		LIKE	DISLIKE
71	a. Direct the work of a construction gang	C/F	
	b. Sell office equipment		
	c. Plan musical programs		
76	a. Transmit messages on a computer network		
	b. Write a report		
	c. Adjust automobile brakes	C/F	T
83	a. Interview job applicants		
	b. Supervise the building of a bridge	C/F	T
	c. Plan a television program		
84	a. Write daily reports on the progress of a charity drive		C/F
	b. Make charts for use by ship companies or airlines		
	c. Help select equipment for a machine shop	C/F	
86	a. Be a court reporter		
	b. Be a machinist		T
	c. Be a career counselor		
87	a. Operate a computer	T	
	b. Operate earth moving equipment		
	c. Operate a precision machine		
91	a. Have charge of the care and upkeep of manufacturing equipment		T
	b. Help with work to improve the efficiency of artificial arms and legs		
	c. Help with the research on high definition television		

		LIKE	DISLIKE
94	a. Be an office personnel manager		C/F
	b. Be a skilled airplane mechanic		T
	c. Be an animal doctor		
98	a. Drive a large truck		
	b. Put new pockets in clothes		C/F
	c. Adjust front wheel bearings		
101	a. Be a hospital attendant		
	b. Be a bank teller		
	c. Be a tool maker	C/F	T
110	a. Help campaign for donations for a homeless shelter		
	b. Work in an office		
	c. Set up machines for a wood-working shop	C/F	T
132	a. Be in charge of the tool room in a factory	C/F	
	b. Be an office clerk	T	C/F
	c. Be a watchmaker		
143	a. Tailor men's clothes		
	b. Proofread for a newspaper	T	
	c. Inspect machinery for repair needs	C/F	T
144	a. Assemble mechanical parts		
	b. Fry bacon and eggs	T	
	c. Sharpen machine drills		
149	a. Be a librarian		
	b. Be a mechanical engineer	C/F	
	c. Be a sales person		

		LIKE	DISLIKE
151	a. Supervise workers on an assembly line		
	b. Keep records for a doctor's office	T	C/F
	c. Build boats		
154	a. Be a garage mechanic		T
	b. Be a professional musician		
	c. Be a pharmacist		
160	a. Study sheet metal pattern drafting		T
	b. Study computer programming		
	c. Study physiology (how the body works)		
171	a. Attend a lecture about experiments to improve airplane designs		T
	b. Listen to a speech on current affairs		
	c. See a famous ballet		
173	a. Read about steel bridge design	C/F	T
	b. Read about data systems in a modern office		
	c. Read an article on new medical scanning techniques		
178	a. Take a blood sample		
	b. Explain to someone how to fill out insurance forms		
	c. Fix a faulty light switch	C/F	
182	a. Be a carpenter	C/F	T
	b. Be a telephone operator		
	c. Be a doctor's assistant		

		LIKE	DISLIKE
189	a. Handle the advertising for a newspaper		
	b. Keep business letters in alphabetical order		
	c. Make mechanical drawings	C/F	

Appendix E

NVII Items and Response Options for the M Scale

NVII Items and Response Options for the M Scale

		LIKE	DISLIKE
2	a. Type a letter for a friend		
	b. Play solitaire with playing cards		
	c. Take a broken lock apart to see what is wrong with it		T
16	a. Repair electrical wiring		
	b. Fix a clogged drain		
	c. Check for errors in the copy of a report	T	
20	a. Operate a drill press	M	
	b. Be a cook in a restaurant		
	c. Take dictation		
27	a. Be a machine operator	M	
	b. Be a bill collector		
	c. Work as a wallpaper hanger		
29	a. Operate a conveyor belt		T
	b. Be a filing clerk		
	c. Work in a laboratory where telescope lenses are made		
31	a. Sell clothes in a store		
	b. Type letters		
	c. Operate a simple drill	M	T
34	a. Write letters		
	b. Fix a leaky faucet	M	T
	c. Interview someone for a newspaper story		

		LIKE	DISLIKE
35.	a. Take a course in biology		
	b. Take a course in cost accounting		
	c. Take a course in engine design	M	T
36	a. Operate precision tools		
	b. Overhaul an automobile engine	M	T
	c. Make a chemical analysis of a new toothpaste	T	M
43	a. Be a master mechanic	M	T
	b. Be a chemist		
	c. Be a recreation director		
56	a. Build rowboats		T
	b. Make novelty toys		
	c. Make illustrations for books		
60	a. Repair torn clothing		M
	b. Wash and polish an automobile		
	c. Adjust a carburetor		T
70	a. Get a job selling chemical supplies		
	b. Get a job as a telephone repair worker		
	c. Get a job as an office worker	T	
76	a. Transmit messages on a computer network	T	
	b. Write a report		
	c. Adjust automobile brakes	M	T
83	a. Interview job applicants		
	b. Supervise the building of a bridge		T
	c. Plan a television program		

		LIKE	DISLIKE
84	a. Write daily reports on the progress of a charity drive		
	b. Make charts for use by ship companies or airlines		
	c. Help select equipment for a machine shop	M	
86	a. Be a court reporter		M
	b. Be a machinist	M	T
	c. Be a career counselor		
87	a. Operate a computer	T	
	b. Operate earth moving equipment		
	c. Operate a precision machine		
88	a. Make ice cream in a hand freezer		
	b. Check copies of reports to make sure they are correct		
	c. Check for breakage in a shipment of parts		T
90	a. Build a fire in a fireplace		
	b. Fix a noisy radiator		T
	c. Make half quantity of a given recipe		M
91	a. Have charge of the care and upkeep of manufacturing equipment		T
	b. Help with work to improve the efficiency of artificial arms and legs		
	c. Help with research on high definition television		
94	a. Be an office personnel manager		M
	b. Be a skilled airplane mechanic	M	T
	c. Be an animal doctor		
98	a. Drive a large truck		
	b. Put new pockets in clothes		M
	c. Adjust front wheel bearings		

		LIKE	DISLIKE
101	a. Be a hospital attendant		
	b. Be a bank teller		
	c. Be a tool maker		T
110	a. Help campaign for donations for a homeless shelter		
	b. Work in an office		M
	c. Set up machines for a woodworking shop		
132	a. Be in charge of the tool room in a factory		
	b. Be an office clerk	T	
	c. Be a watchmaker		
136	a. Talk with an expert on engine design	M	T
	b. Talk with a well known newspaper writer		
	c. Talk with a prominent doctor about his/her medical experiences		
142	a. Study care of the war-wounded		
	b. Study accounting		
	c. Study refrigeration and air conditioning	M	
143	a. Tailor men's clothes		
	b. Proofread for a newspaper	T	
	c. Inspect machinery for repair needs	M	T
144	a. Assemble mechanical parts	M	
	b. Fry bacon and eggs	T	
	c. Sharpen machine drills		
149	a. Be a librarian		
	b. Be a mechanical engineer	M	
	c. Be a sales person		

		LIKE	DISLIKE
154	a. Be a garage mechanic	M	T
	b. Be a professional musician		
	c. Be a pharmacist		
157	a. Decode messages written in code		
	b. Do blood chemistry in a medical laboratory		
	c. Assist in research in automobile design	M	
158	a. Take photographs of your friends		
	b. Write a popular article on how a diesel engine works		T
	c. Plan a recreation schedule		M
159	a. Be a mechanical engineer	M	T
	b. Be a chef		
	c. Be a physical therapist		
164	a. Make a statistical study for a business concern		
	b. Write an article on how machine tools are made		T
	c. Do research on the causes of cancer		
168	a. Listen to a talk about up-to-date shop equipment	M	
	b. Listen to a talk on propaganda methods		
	c. Listen to a talk on hospital procedures		
184	a. Mix pancake batter		
	b. Install a hot water heater		T
	c. Take part in a military drill		

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