THE VALIDATION, CROSS-VALIDATION AND DOUBLE CROSS-VALIDATION OF TWO INDICES OF JOB SATISFACTION

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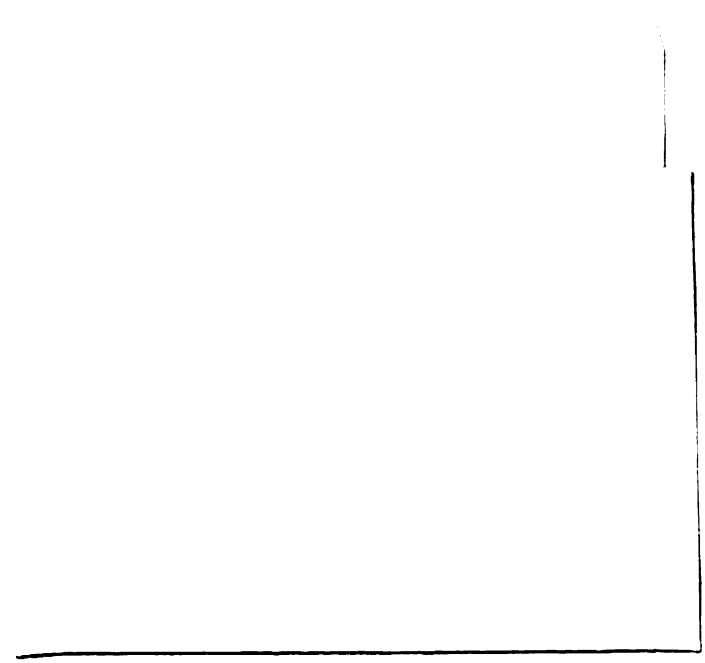

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By

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ABSTRACT

The purposes of this study were:

A) To examine the validities of two inventories designed to measure job satisfaction;

B) To explore the stability of inventory validities through a determination of their cross-and double-cross-validities;

C) To develop shortened forms of each inventory selecting items on the basis of item validities in excess of their reliabilities;

D) To examine the validity, cross-validity, and double cross-validity of the resulting shortened forms;

E) To compare inventories based upon item selection as in (B) with similar inventories developed on the basis of other methods of item selection, namely: (a) item choices based on high item reliabilities; (b) item choices based on high item validities (as in Cheek (7)).

The original inventories were the Science Research Associates Employee Inventory and Bullock's Job Satisfaction Scale. The criterion used here consisted of a four item revision of a five item questionnaire. The two inventories and the questionnaire were administered to 168 employees in a

small Michigan furniture factory.

Eight sets of data were incomplete and had to be rejected. The remaining 160 respondents were divided into four departmentally stratified random sub-samples of 40 subjects each. Each sub-sample was used at one time or another for purposes of item revision and/or the validation, cross-validation and double cross-validation of the original and/or shortened forms of each inventory.

For example inventory revision was achieved through item selection based upon an analysis of the data for groups 1 and 2. The revised inventory would then be validated on group 3 and cross-validated on group 4. Validation of the same revision on group 4 followed by cross-validation on group 3 would be "double cross-validation" in so far as cross-validation on 4 was supported by the cross-validation on 3. Item selection based on groups 4 and 3 followed by validation, cross-validation and double cross-validation using groups 2 and 1 would result in another revision of the same inventory.

The validity coefficients of the revised inventories were not significantly different from those of the original forms. There was one combination of short forms with a validity coefficient comparable with that of original inventories,

which combination of short forms if used would represent a marked savings in administration and scoring time.

Obtained differences in validity between inventories revised on the basis of item selection methods used in this study and inventories revised on the basis of other methods of item selection (as in Cheek (7)) were inconclusive evidence that the item selection method used here was superior to those methods used by Cheek (7).

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The writer also wishes to express his heartfelt thanks and deep appreciation to his wife, Lottie M. Jones, for the untiring efforts on her part, both physically and morally. To her the results of the study are herewith dedicated.

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INTRODUCTION

One of the first requirements of a science is an accurate means of measurement of the various aspects which that science encompasses. This study is an attempt at a partial analysis of two inventories now in use for measuring one aspect of Industrial Psychology, namely that of job satisfaction. The inventories were compared with each other; the reliability and validity coefficients of each were determined and shorter forms of each were constructed and validated.

This study is one of several written at Michigan State University on differing aspects of job satisfaction. The actual selection of the two indices used in this study and their administration was done by two previous students in the Department of Psychology. The inventories selected were the Science Research Associates Employee Inventory and Bullock's revision of Hoppock's job satisfaction scale (Appendices A and B). The validation study reported here was based on a four item revision of a five item objective-type criterion (Appendix C).

DEFINITIONS

The following definitions apply to this thesis:

Relibility —An item, index or battery is reliable to the degree that it measures the same thing upon repeated administrations, other things remaining constant.

Validity —An item, index or battery is valid to the degree that it measures that which it purports to measure.

Cross-Validity —An item, index or battery has cross-validity to the degree that the above defined validity will hold between samples of the parent population.

Double Cross-Validity — An item, index or battery has double cross-validity to the degree that the above defined validity and cross-validity will hold when applied to yet another sample from the parent population.

Job Satisfaction — Job satisfaction is the result of various attitudes the employee holds toward his job, toward related factors, and toward life in general (4).

BACKGROUND

There is not a general agreement among qualified persons that there is a significant relationship between job satisfaction and productivity. However one can cite numerous studies that lead to this assumption (6, 10,16, 18, 21, 24, 31 and 32). These studies have grown so in number that several reviews of the major studies have recently been published (14 and 27). By the same token one can also cite studies and examples that lead to the opposite conclusion (15, and 29).

Over a period of years one can observe a trend in the direction of refined techniques in job satisfaction measurement. Statistical factor analysis of job satisfaction inventories is of recent origin. Prior to that time items or inventories were analyzed at face value and those factors which enjoyed agreement among "experts" were named as components of satisfaction. One can find many good factor analysis studies in present day literature (1, 2, 5 and 30).

One of the first considerations in a statistical analysis of job satisfaction inventories is that of an adequate criterion. It is useless to derive indices that have a high correlation with the criterion if the criterion itself is worthless. One source (30) states,

"To determine the 'validity' of a criterion, it is

> suggested that the nature of the criterion can be established by examining its relation with other variables. A criterion measure may be regarded as adequate if it is related to other variables in a manner consistent with the concept of what constitutes good and poor performance of the behavior involved."

Brogden, et. al. (5) say in effect that a biased criterion can have two undesirable effects: in item selection items may be selected because of their correlation with the biasing elements of the criterion and in cross-validation an inflated validity can result because of the correlation between biasing elements in the predictor and the criterion.

Most text books on statistics stress the need for cross-validation. A recent symposium (25) discussed many theoretical aspects of cross-validation. Mosier (26) cites the classic examples of Kurtz (19) and his research on the Rorschach, and Cureton's paper (8): "Reliability, Validity and Boloney" in pressing for the need for cross-validation. Mosier states,

> "If the combining weights of a set of predictors have been determined from the statistics of one sample, the effectiveness of the predictor-composite must be determined on a separate, independent sample".

Mosier (26) goes on to define five designs closely related to cross-validation but quite different in purpose and results. These he calls "cross-validation, validity-generalization, validity extension, simultaneous validation and re-

plication." (See. 25, p. 8).

Langmuir, in the Test Service Bulletin (19), notes that,

> "Cross-validation is particularly important after we have used statistical data to choose the best tests to make up a battery for use with the next crop of applicants. A cross-validation experiment on a new group will tell us how good our choice really is. The purpose of cross-validation is to protect us from being fooled into putting confidence in a relationship which happens to hold true for the group we started with, but which will let us down in the long run."

Katzell (17) states that the need for cross-validation is even greater in connection with item analysis than it is in connection with a test battery. Shrinkage in correlations is relatively greater with items than with total-test scores because their number is so much larger and more degrees of freedom are lost. The selection of items brings into the revised test many items with chance-inflated correlations, and, the more selectivity, the greater the shrinkage.

Mosier (26) states in effect that our only interest in the samples is to determine beta weights and the multiple R as the values which will most likely apply in other samples for which criterion measures are not available. But the multiple R obtained on sample I is a biased estimate of predictive effectiveness, since it capitalizes on the idiosyncrasies of the Sample. To get an unbiased estimate of R, we must resort to Sample 2. But, Mosier says, it now becomes apparent that

the best available beta weights are those based on the larger sample, Sample I plus II. To overcome this dilemma Mosier recommends double cross-validation. He identifies a simplified version of the double cross-validation design as one in which weights are determined separately for Samples I and II and then each set of weights are applied back on the other sample to compute the predictive effectiveness.

Mosier states,

> "Composed with this (the above) design, simple cross-validation while simple, wastes half of the data and, in particular, determines the B's on only half of the available cases.")

In reference to the usual small number of cases available for an item analysis Katzell (17) feels that double cross-validation is a possible solution. He notes that,

> "This technique has not, to my knowledge, been used widely or recieved much mention in the literature. The basic principle is one which also has not recieved, in my opinion, wide enough attention, It is the principle of enhancing the reliability of findings through the replication of experiments. Greater confidence can be placed in congruent results from several small independent samples than in the result of a single experiment, where the total N is the same in both instances.")

Katzell (17) then goes on to note that,

> "This is simply a consequence of the fact that the compound probability for an event observed in several independent samples of equal size is the product of the several independent probability values. Thus, if we can reject the null hypothesis at the 10 percent level in each of two independent samples, then we can reject it at

the 1 percent level when considering simultaneously the results of the two experiments."

However, Baker (3) goes to some length to make a proper distinction between "joint" and "compound" probabilities in criticism of the above. He defines joint probability as,

> "Given two independent events with probabilities p_1 and p_2, the probability of their joint occurance is properly termed joint probability and is given by the product of their separate probabilities: $P_j = p_1 p_2$.

He defines compound probability as,

> "Given two independent observations of a single event or a single hypothesis, the two observations yielding probabilities p_1 and p_2 for the event or hypothesis; then the probability statement based upon the two observations taken together is that which is here defined as compound probability and is given by the probability of a chi-square with 4 degrees of freedom where $Chi^2 = -2 \log_e p_1 p_2$.

The danger of using joint probability in place of compound probability lies in the inflation of the significance of the two combined probabilities. For example, the joint probability of $p_1 = .03$, and $p_2 = .10$ is .003; the compound probability of $p_1 = .03$, and $p_2 = .10$ in only .02. Using Katzell's own example of $p_1 = p_2 = .10$, he found a "compound probability" (actually joint probability) of .01 whereas the true compound probability is .06 (as estimated by Bakers abac).

The design for the use of compound probability for double cross-validation as presented by Baker is the one followed in the present study.

HYPOTHESES

1. A significant correlation will be obtained between the two job satisfaction indices examined and between each index and the criterion.

2. The coefficients from above will remain significant when the indices are cross-validated and double cross-validated.

3. Optimal weighting of each of the two inventories will result in validity coefficients which will be significantly greater than the validity coefficients for the original unweighted forms and will remain significantly greater when cross-validated and double cross-validated.

4. Shorter forms of the indices can be derived which will be more valid than the parent index and this validity will hold when the shortened forms are cross-validated and double cross-validated.

5. The method of item selection followed in the present study will result in short forms of both indices which will be more valid than short forms of the indices as constructed by the method of item selection followed by Cheek (7, p. 13-14).

PROCEDURE

The procedure in general was a thorough examination of the validity of two so-called job satisfaction inventories by a statistical analysis. The following sections give the details of the two inventories, the criterion, the sample used, and the statistical procedure followed.

The Inventories

The two inventories selected for examination in this study were: The Science Research Associates' Employee Inventory (Appendix A) (hereinafter referred to as the "SRA") and the Hoppock Job Satisfaction Scale as revised by Bullock in a study done at Ohio State University (Appendix B) (hereinafter referred to as the "OSU"). The SRA is composed of seventy-eight items grouped into five broad areas (11): the job and conditions of work; financial rewards; personal relations in the company; operating efficiency; and individual satisfactions. These five areas are broken down into fourteen categories which the manual assumes to be various factors related to job satisfaction. The category titles and number of items are: Job Demands (5 items); Working Conditions (6 items); Pay (4 items);

Employee Benefits (4 items); Friendliness and Cooperation of Fellow Employees (4 items); Supervisor-Employee Interpersonal Relations (8 items); Confidence in Management (7 items); Technical Competence of Supervision (6 items): Effectiveness of Administration (5 items); Adequacy of Communication (6 items); Security of Job and Work Relations (7 items); Status and Recognition (6 items); Identification with the Company (4 items); Opportunity for Growth and Advancement (4 items). A fifteenth category measured the employees reaction to the inventory and contained two items. The items on the inventory are grouped in such a way that while consecutive items are not necessarily in the same category, they are arranged so as to permit category scoring on the answer pad. There are three possible responses to each question, "Agree", "?", and "Disagree". For most of the items a response of "Agree" indicates satisfaction, while others are worded in a negative way and a response of "Disagree" indicates satisfaction. For purrposes of the present study a "?" response always indicates other than satisfaction. Only the satisfied responses are recorded on the answer pad and the score for a respondent is simple the number of satisfied responses, with the highest pos-

sible score being seventy-eight.

The OSU inventory is much shorter than the SRA, containing only ten items arranged on a Lickert-type scale (22) with the usual five alternative responses to each item. As is customary, the responses are assigned a value of from 5 down to 1 with 5 indicating greatest satisfaction and 1 indicating least satisfaction. Therefore a respondents score may range from 10 to 50. The items, according to Bullock (6) require "evaluations of the employing organization, the job itself, and the respondent's own position in the work group".

The Criterion

The original criterion consisted of 5 objective-type questions which were thought to be good measures of job satisfaction (Appendix C). Items 1, 2, and 3 were designed by Bullock (6) and items 4 and 5 were designed for use with a previous study (7). However, the present study used a four-item criterion (Appendix D) due to Cheek's (7) finding: "through item analysis that one question was essentially irrelevant and should be discarded". As with the SRA each criterion item had three possible responses, "Yes",

"?", and "No". Again on some of the items a negative response indicated satisfaction and a response of "?" indicated other than satisfaction. Scoring each correct answer as one gave a possible range of from 0 to 4 with 4 indicating greatest possible satisfaction as measured by this criterion.

The respondents were dichotomized into either a satisfied or other than satisfied group on the basis of their performance on the criterion with the dichotomy falling at three of the four items "correct"; that is a score below three indicated other than satisfied (Table 11).

The Subjects*

The two job satisfaction indices and the criterion were administered to 168 of the 175 employees of a small furniture manufacturer in Michigan. Eight sets of data were found to be incomplete for this study, leaving a total sample of 160 respondents.

Practically the entire work force participated in the study, including executives, foreman, office, and factory workers. Every possible attempt was made to establish

*Inasmuch as the author did not participate in the administration of the inventories, this section is adapted from Cheek's thesis (7).

an atmosphere of confidence and trust, since the administration had to be nonanonymous for another student's thesis (28).

The furniture company was using the services of a consulting psychologist at the time of the survey and many "reforms" had been suggested and partially carried out. However, just prior to the survey it had been announced that for the first time in many months due to a drop in production, there would be no bonus paid.

Statistical Procedure

The 160 subjects were divided into four equal sub-samples (A, A', B and C) of 40 subjects each, using a scheme for departmental stratification of random samples (Appendix E). No one or two of these sub-samples can be properly called the validation, cross-validation, or double cross-validation group as each sub-sample served different purposes at various times during the procedure.

The four sub-samples were first scored using an arbitrary weight of one for each "correct" answer for the two inventories and the criterion. A Pearson product-moment coefficient of correlation between scores on the two inventories and between each inventory score and performance on

the criterion was computed. The remaining steps of the procedure are essentially as follows:

1. The criterion measures and the item responses on each inventory were dichotomized for purposes of determining item reliabilities and item validities. Using sub-samples A and A', biserial coefficients of correlation between item response and total test score were found for each item of the SRA and OSU in each sub-sample. These were the item reliability coefficients. Similarly, tetrachoric coefficients of correlation found between response to each item and the criterion were the measures of item validity.

2. The deviations from zero for each item reliability and item validity coefficient were then stated in terms of the probability of obtaining so large a deviation by chance. These estimates of probability were made for each item on each inventory as applied to both sub-samples A and A'. These single probabilities are the basis for the compound probabilities referred to in step 3.

3. The compound probabilities were found for each pair of probabilities for each item by Baker's method (3).

4. Item selection was accomplished by plotting the compound probabilities of each item as a point with projections on a pair of cartesian coordinates, one of which repre-

sented item validity and the other item reliability. Inventory revision was then accomplished by selecting those items wherein the validity exceeded the reliability.

5. Using sub-samples A and A', weights were then calculated for each item on both inventories using as the weight for each item the difference in criterion-score means of those passing and those failing the item.

6. The revised inventories were then applied to sub-sample B using appropriate weight for each item. The Pearsonian correlations between these scores and the criterion scores were computed, for sub-sample B, giving a validity coefficient for each inventory.

7. From this data, regression equations and standard errors of estimate were developed for each inventory.

8. The regression equations developed on sub-sample B and scoring weights (as derived in step 5) were applied to inventory scores in sub-sample C to predict measures of criterion performance for this group of subjects.

9. The Pearsonian correlations between the predicted and actual criterion scores were computed yielding a cross-validity coefficient for each of the inventories.

10. The validation and cross-validation process (steps 6 through 9 above) was then repeated using sub-sample C for

validation (as in step 6) followed by development of regression equations based on sub-sample C (as in step 7) and the correlation between predicted and observed scores with reference to sub-sample B (as in steps 8 and 9). This reexamination of the validity and cross validity of each inventory is called "double-cross-validation".

(These 10 steps resulted in revised inventories SRA_{15} and OSU_{6A}).

11. Steps 1 through 10 were repeated using sub-samples C and B in place of A and A' in steps 1, 2, 3, 4, and 5. Sub-samples A and A' replaced B and C in steps 6 through 10.

(Step 11 resulted in inventory rivisions SRA_{19} and OSU_{6B}).

12. Using item weights found in step 5, the validities, cross and double cross-validities of each of the original inventories, as well as the intercorrelations between each of them were examined.

NOTE: In the interest of clarity the type of correlation used and where each was used is repeated here. For item analysis the validity was established by using a tetrachoric correlation while the reliability was established through the use of a biserial correlation. For inventory analysis the validity was established by using a point-biserial r for the SRA and a tetrachoric r for the OSU while the reliability was established through the use of Dressel's variation of the Kuder-Richardson formula. All cross-validity coefficients are Pearsonian correlations between predicted and observed criterion scores.

FINDINGS

Table I shows sub-sample mean scores and standard deviations on the inventories and the criterion for both the original inventories and the shortened forms of the originals. The "t" rations between the means of each group within any one inventory or criterion were calculated and none were found to be significantly other than zero.

The Pearsonian coefficient of correlation between the original forms of the SRA (SRA_{78}) and the OSU (OSU_{10}) was $r = 0.689 \pm 0.042$. The regression equations (based on 160 cases) for predicting SRA scores from OSU or OSU scores from SRA are (A) SRA = 2.04 OSU - 22.36 and (B) OSU = 0.234 SRA + 25.54. The Pearsonian correlation between the SRA_{78} and the four item criterion was $r = 0.524 \pm 0.057$ and the correlation between the OSU_{10} and the four item criterion was $r = 0.457 \pm 0.062$. Both correlations were significantly other than zero beyond the 0.1 percent level of confidence and both were based on the total N of 160, which explains the seeming discreptancy of these figures with those of Table III. The use of optimal weighting and compound probability in revising each test resulted in two shortened forms for each inventory: a 19 item SRA (SRA_{19}) (Appendix F), a 15 item SRA (SRA_{15}) (Appendix G), a 6 item OSU (OSU_{6A}) (Appendix H) and another 6 item OSU (OSU_{6B}) (Appendix I).

The distribution of respones to the four item criterion are shown in Table II. There was no significant difference in the number of "correct" or "incorrect" responses between sub-samples.

Table III shows the point biserial validity coeffi cients for all forms of the inventories, singly and in combination, as validated on the four item criterion. The validity and cross-validity coefficients for the original, unweighted forms when used singly and in combination are also shown.

The regression equations (based on 160 cases) for prediction or best estimate of the four item criterion (Y') scores with a knowledge of performance on <u>either</u> the original, unweighted SRA_{78} or OSU_{10} were:

$$(C)\ Y'_4 = 0.026\ SRA_{78} + 2.94$$

$$(D)\ Y'_4 = 0.092\ OSU_{10} + 0.693$$

The two regression equations (derived from both forward and backward application of the data) for predicting scores on the four item criterion with a knowledge of performance on <u>both</u> the original unweighted inventories were:

$$(E)\ Y'_4 = 0.070\ SRA_{78} + 0.030\ OSU_{10} - 2.42$$

$$(E')\ Y' = 0.035\ SRA_{78} + 0.044\ OSU_{10} - 0.99$$

The coefficients of multiple correlation for predicting performance on the criterion from a knowledge of unweighted OSU and SRA scores were $R_4 = 0.538$, and $R_4 = 0.483$ which were significantly different from zero beyond the 1 percent level of confidence.

The regression equations (derived from a two-way application of the data) for predicting criterion scores with a knowledge of performance on forms of the inventories; SRA_{78}, OSU_{10}, SRA_{19}, SRA_{15}, OSU_{6A} and OSU_{6B} were:

$$(F)\ Y'_4 = 0.057_{sra78} + 0.120$$
$$(G)\ Y'_4 = 0.216_{osu10} + 1.17$$
$$(H)\ Y'_4 = 0.080_{sra19} + 1.26$$
$$(I)\ Y'_4 = 0.088_{osu6A} + 1.97$$

(Derived form group B and used to predict criterion performance on group C).

$$(F')\ Y'_4 = 0.008_{sra78} + 2.53$$
$$(G')\ Y'_4 = 0.045_{osu10} + 2.23$$
$$(H')\ Y'_4 = 0.037_{sra19} + 2.09$$
$$(I')\ Y'_4 = 0.063_{osu6A} + 2.19$$

(Derived from group C and used to predict criterion performance on group B).

$$(J)\ Y'_4 = 0.176_{sra15} + 0.779$$
$$(K)\ Y'_4 = 0.393_{osu6B} + 0.831$$

(Derived from group A' and used to predict criterion performance on group A).

$$(J')\ Y'_4 = 0.159_{sra15} + 0.972$$
$$(K')\ Y'_4 = 0.223_{osu6B} + 1.59$$

(Derived from group A and used to predict criterion performance on group A').

The regression equations for predicting criterion scores with a knowledge of performance on several combinations of the weighted inventories SRA_{78} and OSU_{10}; SRA_{19} and OSU_{6A}; SRA_{15} and OSU_{6B} were:

$$(L)\ Y'_4 = 0.052_{sra78} + 0.080_{osu10} + 0.128$$
$$(M)\ Y'_4 = 0.109_{sra19} - 0.051_{osu6A} + 1.18$$

(Derived from group B and used to predict criterion performance on group C).

$$(L')\ Y'_4 = 0.051_{sra78} + 0.072_{osu10} + 0.248$$
$$(M')\ Y'_4 = 0.061_{sra19} + 0.121_{osu6A} + 0.813$$

(Derived from group C and used to predict criterion performance on group B).

$$(N)\ Y'_4 = 0.073_{\ sral5} + 0.301_{\ osu6B} + 0.463$$

(Derived from group A' and used to predict criterion performance on group A).

$$(N')\ Y'_4 = 0.092_{\ sral5} + 0.243_{\ osu6B} + 1.091$$

(Derived from group A and used to predict criterion performance on group A').

The coefficients of multiple correlation for the forms used in combination were 0.539 and 0.428, 0.443 and 0.452, 0.669 and 0.497 in that order (L-L' through N-N').

The above regression equations were used later for the cross-validation of all forms of the indices. These cross-validity coefficients were Pearsonian correlations between the observed scores and those predicted on the basis of these equations (see table III).

Table IV shows the standard errors for the foregoing regression equations.

Table V shows the Kuder-Richardson reliability coefficients for all forms of the inventories as computed by Dressel's variation of the Kuder-Richardson formula (9).

Table VI compares reliability coefficients obtained from the present study with those obtained by Cheek.

Table VII compares validity coefficients obtained from the present study with those obtained by Cheek.

Table VIII shows the reliability and validity coefficients one may expect when the different forms are inflated and deflated to equate them in length to each other.

TABLE I

COMPARISON OF GROUP MEAN SCORES AND STANDARD DEVIATIONS ON THE INVENTORIES AND THE CRITERION

INVENTORY	GROUP				
	A	A'	B	C	Total
$M_{sra\ 78}$	55.70	57.75	55.45	58.65	56.89
$\sigma_{sra\ 78}$	12.11	15.58	15.22	11.95	13.72
$M_{osu\ 10}$	37.90	38.45	39.25	40.78	38.85
$\sigma_{osu\ 10}$	5.70	3.14	4.50	5.22	4.64
M_{crit}	2.65	2.70	2.75	2.80	2.73
σ_{crit}	1.17	1.17	0.94	0.81	1.02
$M_{sra\ 19}$			18.55	19.49	19.02
$\sigma_{sra\ 19}$			5.06	4.15	4.61
$M_{sra\ 15}$	10.54	10.92			10.73
$\sigma_{sra\ 15}$	2.88	3.60			3.20
$M_{osu\ 6A}$			8.92	9.69	9.31
$\sigma_{osu\ 6A}$			3.39	3.22	3.31
$M_{osu\ 6B}$	4.77	4.78			4.78
$\sigma_{osu\ 6B}$	2.07	1.92			1.99

Note: "t" ratios were calculated between all groups within each inventory and none was found to be significantly other than zero.

TABLE II

DISTRIBUTION OF RESPONSES TO FOUR ITEM CRITERION

# of "correct" responses	Sub-sample A	A'	B	C
4	13	12	9	8
3*	9	12	16	18
2	10	11	12	12
1	7	2	2	2
0	1	3	1	0
Totals	40	40	40	40

* Dichotomized at this score; a score of 3 or more indicates the respondent is satisfied with this job.

TABLE III

VALIDITY AND CROSS-VALIDITY COEFFICIENTS FOR ALL FORMS OF THE INVENTORIES

Inventory	Val. -Group	C-val.-Gr.	Val.-Gr.	C-val.-Gr.
SRA_{78}*#	0.562 AA'	0.304 BC	0.524 BC	0.316 AA'
SRA_{78}#	0.558 B	0.425 C	0.455 C	0.398 B
SRA_{19}	0.432 B------	0.192" C	0.147" C---	0.425 B
SRA_{15}	0.495 A'	0.382 A	0.451 A	0.366 A'
OSU_{10}*#	0.384 AA'	0.331 BC	0.358 BC	0.346 AA'
OSU_{10}#	0.432 B	0.368 C	0.483 C	0.389 B
OSU_{6A}	0.316 B	0.248" C	0.280 C	0.212" B
OSU_{6B}	0.646 A'	0.449 A	0.639 A	0.459 A'
SRA_{78} + OSU_{10}*#	0.538 AA'	0.308 BC	0.483 BC	0.312 AA'
SRA_{78} + OSU_{10}#	0.541 B	0.386 C	0.438 C	0.319 B
SRA_{19} + OSU_{6A}	0.443 B------	0.107" C	0.452 C	0.211" B
SRA_{15} + OSU_{6B}	0.669 A'	0.313 A	0.497 A	0.361 A'

*Unweighted

-----.....significantly different from each other.

" .....not significantly other than zero at the 5% level of confidence.

.....based on N of 80 each for validation and cross-validation.

TABLE IV

STANDARD ERROR OF ESTIMATE** FOR REGRESSION EQUATIONS DERIVED FOR ALL FORMS OF THE INVENTORIES

Inventory	Standard error
SRA_{78}*	0.972
SRA_{78}	0.935
SRA_{19}	0.894
SRA_{15}	1.028
OSU_{10}*	1.015
OSU_{10}	0.888
OSU_{6A}	0.939
OSU_{6B}	0.935
SRA_{78} + OSU_{10}*	0.919
SRA_{78} + OSU_{10}	0.806
SRA_{19} + OSU_{6A}	0.887
SRA_{15} + OSU_{6B}	0.932

**Corrected for bias

*Unweighted

TABLE V

KUDER-RICHARDSON RELIABILITY COEFFICIENTS**
FOR ALL FORMS OF THE INVENTORIES

Inventory	Reliability
SRA_{78}*	0.928
SRA_{78}	0.942
SRA_{19}	0.801
SRA_{15}	0.768
OSU_{10}*	0.781
OSU_{10}	0.814
OSU_{6A}	0.865
OSU_{6B}	0.782

*Unweighted

**Coefficients calculated by Dressel's variation of the Kuder-Richardson formula as follows:

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{\sigma^2 t - wi^2\ pi\ qi}{\sigma^2 t}\right)$$

in which n = number of items in the test.
p = proportion passing an item.
q = 1 - p
σ^2_t = variance
wi = weight for item I.

TABLE VI

COMPARISON OF RELIABILITY COEFFICIENTS FOR THE PRESENT STUDY AND FOR CHEEK'S STUDY

- PRESENT STUDY-		- CHEEK'S STUDY -	
Inventory	Reliability*	Inventory	Reliability**
SRA_{78}	0.942	SRA_{78}	0.93
SRA_{19}	0.801	SRA_{53}'	0.85
SRA_{15}	0.768	$SRA_{15}"$	0.71
OSU_{10}	0.814	OSU_{10}	0.79
OSU_{6A}	0.865	OSU_{9}'	0.99
OSU_{6B}	0.782	$OSU_{6}"$	0.88

*.....Original reliabilities calculated by Dressel's variation of the Kuder-Richardson formula.

**....Original reliabilities calculated by the standard Kuder-Richardson formula 21.

'.....Short form derived on the basis of reliability alone.

".....Short form derived on the basis of validity alone.

TABLE VII

COMPARISON OF VALIDITY COEFFICIENTS FOR THE PRESENT STUDY AND FOR CHEEK'S STUDY

- PRESENT STUDY -			- CHEEK'S STUDY -	
Inventory	Validity		Inventory	Validity
SRA_{78}	0.558	0.455	SRA_{78}	0.56
SRA_{19}	0.432	0.147	SRA_{53}*	0.43
SRA_{15}	0.495	0.451	SRA_{15}**	0.38
OSU_{10}	0.432	0.483	OSU_{10}	0.31
OSU_{6A}	0.316	0.280	OSU_{9}*	0.33
OSU_{6B}	0.646	0.639	OSU_{6}**	0.51

*.....Short form derived on the basis of reliability alone.

**....Short form derived on the basis of validity alone.

TABLE VIII

INFLATION AND DEFLATION OF ORIGINAL RELIABILITY AND VALIDITY COEFFICIENTS** FOR DIFFERING INVENTORY LENGTHS

Inventory	78 items	19 items	15 items		10 items	6A items	6B items
Validity Coefficients							
SRA_{78}*	<u>0.562</u>	0.506	0.491	OSU_{10}*	<u>0.384</u>	0.358	0.358
SRA_{78}	<u>0.558</u>	0.502	0.488	OSU_{10}	<u>0.432</u>	0.404	0.404
SRA_{19}	0.467	<u>0.432</u>	0.421	OSU_{6A}	0.325	<u>0.316</u>	0.316
SRA_{15}	0.550	0.509	<u>0.495</u>	OSU_{6B}	0.677	0.646	<u>0.646</u>
Reliability Coefficients							
SRA_{78}*	<u>0.928</u>	0.733	0.712	OSU_{10}*	<u>0.781</u>	0.681	0.681
SRA_{78}*	<u>0.942</u>	0.795	0.755	OSU_{10}	<u>0.814</u>	0.724	0.724
SRA_{19}	0.942	<u>0.801</u>	0.760	OSU_{6A}	0.913	<u>0.865</u>	0.865
SRA_{15}	0.969	0.811	<u>0.768</u>	OSU_{6B}	0.858	0.782	<u>0.782</u>

*Unweighted
**Originals are underlined.
NOYT: The inflation and deflation of the reliabilities was computed by the standard Spearman-Brown prophecy formula while the validity was inflated and deflated by the following variation (13, p. 407):

$$r_{nx.y} = \frac{r_{xy}}{\sqrt{\frac{1-r_{xx}}{n} + r_{xx}}}$$

where $r_{nx.y}$ = correlation of variable Y with test X increased by ratio n.
r_{xy} = correlation of Y with X in original length.
n = ratio by which length of X is changed.
r_{xx} = reliability of X.

RESULTS

A high correlation was shown between the two job-satisfaction inventories, SRA and OSU, and between each inventory and the four item criterion supporting hypothesis 1. This finding was supported by cross-validation and double cross-validation which supports hypothesis 2.

Hypothesis 3 failed to gain support when the weighting of the original forms resulted in both validity and cross-validity coefficients which, while exceeding the coefficients for the unweighted forms, were not significantly in excess.

The derive short forms of the two inventories made up on the basis of those items wherein the item validity exceeded its reliability were not significantly more valid than the original forms of the inventories. Thus hypothesis 4 was not upheld.

Some of the derived forms were significantly less valid than the parent index. However, one shortened form of each inventory, the SRA_{15} and OSU_{6B}, are of interest. While being numerically smaller the SRA_{15} was not significantly less valid than the original (SRA_{78}) while the OSU_{6B}, was significantly more valid than the original (OSU_{10}). When these two short forms were used in combination they were significantly more valid

than the parent indices used in combination. Both the SRA_{15} and the OSU_{6B} had higher cross-validity coefficients than did the parent inventories when used either singly or in combination. However, using the SRA_{15} and OSU_{6B} in combination does not yield validity coefficients that are more valid than when the OSU_{6B} is used singly.

One short form of each inventory, the SRA_{15} and the OSU_{6B}, based upon the method of item selection followed in this study was found to have validity coefficients which were in excess of most of the short forms based upon the method of item selection followed in the study by Cheek. However, Cheek found a short form for which the validity was in excess of several of the validities from the present study. Therefore hypothesis 5 was not established by these findings. A direct comparison of cross-validation results, between studies, is not possible.

COMMENTS

In a statistical analysis the author must be able to defend his choice of the particular statistics used. This section is devoted to that end.

The method of validation and cross-validation is the first consideration. If group I is used for the purpose of item analysis it is inappropriate to use group I for the purpose of establishing the validity of any inventory revision based on the item analysis. By the same token the coefficients obtained upon application of the derived inventory are validity coefficients and not cross-validity coefficients. Mosier (26), calls this type of study "validity generalization." Langmuir (20) states "We do not have cross-validation data until we administer the tests without change, without further revision or refinement, to an entirely new and independent set of criterion groups." And again "A published "validity" coefficient based on the sample which contributed to the selection of the items and the making of the key is misleading. Coefficients so derived should be unambignously described. They are <u>not</u> validity coefficients which tell the practical user what he may expect if he uses the test or inventory."

Due to the above considerations the author used four

groups in this study: two were used to obtain compound probabilities, the third for validation and the fourth for cross-validation of an inventory.

Inasmuch as the sample showed a non-normal distribution on the criterion, it was assured that the parent population was also non-normally distributed and a point-biserial coefficient of correlation was employed to obtain a validity coefficient for the SRA. The use of r_{pbi} gives a more conservative estimate of correlation than does the biserial correlation which would be called for if one could assume normality of the dichotomized distribution.

No limits of confidence were set for item selection, such as Cheek used (7, page 14). Rather, item selection favored those items wherein the validity exceeded the reliability as expressed by the compound probabilities of each. For a single test to have maximum validity, each item must correlate as high as possible with the criterion and as low as possible with the test as a whole. If the test is quite homogeneous there will be a positive correlation between reliability and validity with a scarcity of items that meet the necessary qualifications. Had the author had to hold to some required level of confidence, any derived form would have been much shorter and its validity very unstable.

The Kuder-Richardson formula 21 estimates reliability for an index based upon the assumptions that the items are of equal, or nearly equal, difficulty and intercorrelation. In its standard form it does not apply for the test in which items are differentially weighted. Dressel (9) has provided a variation of the Kuder-Richardson formula for application in such a case. (See table V, page).

The multiple-regression principle of weighting followed in this study is that suggested by Guilford (13, p. 444 - 445). It was hypothesized that optimal weighting of the inventories would significantly increase the validity of the inventories. This procedure requires differential weighting of the items. Item analysis shows that items are not all equally correlated with a criterion, and that they have unequal correlations with other items. However, since the number of items is usually large, one does not take the impractical course of determining the optimal weights by a complete multiple-regression solution.

One common short cut is to assume that the beta coefficient (the standard, partial regression coefficient) is directly proportional to the correlation of the item with the criterion. By use of a mathematical proof it can be seen that the weight to assign to an item is the difference in criterion-score means of those passing and those failing the item. This is consistent with the principle of least squares. The

best prediction of criterion score for those passing an item is the mean of their scores Mp. The best prediction of criterion scores for those failing an item is the mean of their scores Mq. In applying this weight one multiples the item score of 1 times the difference Mp - Mq for the passer, and for the failer the same weight is theoretically multiplied by the item score of zero. Or in actual practice one abandons the item scores of 1 and zero for passing and failing and used the derived weight for passing and a no score for those failing the item.

The use of one more statistic should be mentioned here: namely the use of the Spearman-Brown prophecy formula for inflation or deflation of coefficients to equate inventories in length. It must be realized that one formula does <u>not</u> apply to both reliability and validity. Guilford (13, p. 407) states that "the standard Spearman-Brown formula covers the relationship of length to reliability; it is also involved, but less simply, in the relation to validity. In terms of factor theory, as the homogeneous lengthening increases true variance at the expense of error variance, it also increases in the same ratio the proportions of common-factor variance and hence the common-factor loadings, which are the basis of validity.....As with increases in reliability with lengthening of a test, most is gained in r_{xy} when r_{xx} is

small and when n is large. It can be less clearly seen, but validity changes with length less rapidly than does reliability." Due to the above consideration a variation of the Spearman-Brown prophecy formula was used in calculating the inflation and deflation of validity coefficients.

CONCLUSIONS AND DISCUSSION

The hypothesis that the two inventories would correlate significantly with each other and each with the criterion was supported by the results of this study.

Significant validity coefficients were obtained for each of the two inventories and these coefficients were upheld in the sense that the cross-validities were significantly different from zero when the inventories were cross-validated and double cross-validated, which supports the second hypothesis.

The hypothesis that optimal weighting of the original forms would result in significantly greater validity and cross-validity coefficients than would be obtained by the original weighted forms was not upheld by the findings. The coefficients, both validity and cross-validity, were in excess of the originals but not significantly so.

The hypothesis that shorter forms of the inventories could be derived which would be more valid than the parent index and that validity would be upheld when the shortened forms were cross-validated and double cross-validated was not upheld except in the case of the SRA_{15} and OSU_{6B}, alone and in combination.

The fifth hypothesis was not supported. One short form of each inventory, the SRA_{15} and the OSU_{6B}, was found to yield

validity coefficients that exceeded most of the short forms as derived by Cheek. The OSU_{6A} from the present study was as valid as Cheek's OSU_9 but was significantly less valid than her OSU_6.

The findings in this study are not absolute and should be interpreted in the light of the situation from which they were obtained. As Guilford says "the coefficient of correlation is purely relative to the circumstances under which it was obtained and should be interpreted in the light of those circumstances; very rarely, certainly, in any absolute sense" (12, p. 167). Therefore, one must not make the error of speaking about <u>the</u> validity, reliability, etc., of an inventory. These various correlations must be obtained for each circumstance. Also one must keep in mind that the relationship between two variables is <u>not</u> directly proportional to the size of "r". The coefficient of correlation is an index number, not a measurement on a linear scale with equal units.

The internal consistency reliability of the original inventories was significantly high and remained so even after a drastic cut to as low as 1/5 of the original number of items in deriving the shortened forms of the inventories. This indicates a high degree of homogeneity for both indices which may seriously effect the validity. This equality of item intercorrelations

helped to explain why the differential weighting of items did not significantly increase the validity and cross-validity coefficients obtained. This is more apparent when one keeps in mind that the homogeneous lengthening of a test increases the reliability much more than it does the corresponding validity.

To understand why optimal weighting by the multiple-regression principle did not significantly increase the validity of the inventories it is necessary to know the underlying theory of the principle of weighting. The effectiveness of weights in changing the essential character of variance in scores depends upon several things. It depends first of all upon the range of weights relative to their mean. The greater this ratio, the greater the possibility that one set of weights will give a score that does not correlate highly with that from another set of weights. Differential weighting is more effective when the intercorrelation of items is low. Weighting of items is most effective in short tests and usually pays little dividends when there are more than 10 to 20 items. Thus weights of 1 for all items in a long test is as adequate as differential weighting when one considers the small benefits realized from what can be a laborious process.

The greatest gain in validity of the original forms occurs with the OSU_{10} rather than the SRA_{78} if the two are

equated in length. This finding fits the above theory nicely. The ratio of the range of weights to their mean for the OSU is less than one fifth that ratio for the SRA, being 0.93 and 4.83 respectively (see Appendixes J, K, and L). The ratio of the range of the weights to their mean would naturally be 1 if the items were not differentially weighted but scored 1 for passing the item and zero for failing. Therefore one can postulate on the basis of the above theory that inasmuch as the ratio for the OSU very nearly approached 1, this combined with its relatively high internal consistency held it from becoming significantly more valid than the unweighted original. The SRA_{78} was further handicapped both by its excessive length and exceedingly high internal consistency.

The OSU_{6B} has a significantly higher validity than the OSU_{6A} and again this finding follows the theory of weighting. The ratio of range to mean for the OSU_{6B} weights is less than half that of the ratio for the OSU_{6A} weights (see Appendix L). Further, the reliability of the OSU_{6B} is less than that of the OSU_{6A}. The validity of the SRA_{15} exceeded that of the SRA_{19} while the ratio of weight mean to weight range for the SRA_{15} (Appendix K) exceeded that of the SRA_{19} (Appendix J). The SRA_{15} had the advantage of fewer items and a lower reliability.

The item reliability coefficients found may appear to be really a test-retest coefficient or even an alternate forms

coefficient due to the use of two distinct groups for item analysis. However, such is not the case. First, for each item the probability was calculated of so large a deviation from zero correlation occuring in each of the sub-samples. Then one finds the compound probability for the two correlations by Baker's method (3), taking care not to use joint probability. Therefore, one has a type of double reliability coefficient or what may be called a "cross-reliability" coefficient.

One way of looking at the regression equation is to regard it as a line that is a moving average; a moving arithmetic mean. The deviations from the line are measured by a standard deviation called the standard error of estimate. This is the margin of error of predicting one variable from a knowledge of the other. The standard errors of estimate corrected for bias of a small sample are reported in Table V. Like any standard deviation, the standard error of estimate can be referred to the normal curve of distribution. When one predicts Y from X, the average dispersion of observed measurements about Y' is given by a standard deviation of some value. To illustrate, if one has a predicted score of Y' = 10 from an observed score of X = 6, with a standard error of 0.5 one would expect two-thirds of the observed cases to lie within the limits of plus or minus 0.5 from Y', or the odds are 2 to 1 that any individual whose

X score is 6 will not have a Y score above 10.5 or below 9.5.

As was stated earlier there was not a derived form of each inventory which was more valid than the original parent form. The SRA_{15} did not have an original validity in excess of the SRA_{78} but did have a cross-validity that exceeded that of the parent index, but not significantly so, while the OSU_{6B} had an original validity that was significantly more valid, and a cross-validity that was significantly more valid than the parent index. The two used in combination were more valid than the parent indices and a cross-validity that was only slightly larger than the two parent indices used in combination. Upon the proper inflation of the validity coefficients the OSU_{6B} was still significantly in excess of the parent index, due to its original excess but the SRA_{15} was not in excess of its parent index. However, of importance is the fact that it is not significantly less valid. Therefore the findings indicate that these two shorter forms can be used to measure job satisfaction as adequately, if not more adequately, than the original forms. Further, these two short forms can be used singly or in combination with as much confidence as would be held for the original forms.

Since the shorter forms have a total of 21 items against a total of 88 for the originals, it may be possible to derive a savings of three-quarters of the necessary adminis-

istration time. Also, one could hypothesize that the validity of the shorter forms may increase upon actual application due to increased interest, motivation, etc., of answering a shorter inventory. However, one must also recognize the possibility that the validity of the shortened form may decrease, indeed to the point of insignificance, upon actual application to a new sample. At any rate one must take the caution to validate any form for the individual situation at hand.

For a comparison between the method of item analysis followed in the present study and that followed in Cheek's study it is necessary to summarize her procedure of item analysis. Items were analyzed by the Kelly method (23) to determine item reliability, and to determine item validity on the basis of the four item criterion. Using items found to be reliable at the 5% level of confidence or higher, a new, shorter form of each of the two inventories was formed. Using items found to be valid at the 5% level of confidence or higher, another new form of each of the two inventories was developed. Thus, each of the two original forms of the inventories had two corresponding short forms each; one composed of items considered reliable, the other composed of items considered valid. The short forms based on reliability alone are the SRA_{53} and the OSU_9 while the short forms based on validity alone are the SRA_{15} and OSU_6.

The categories which are represented on the shortened forms of the SRA inventories are of special interest. Of the fifteen categories represented in the original index only 5 were not represented in the SRA_{15} derived in the Present study; Pay. Supervisor-Employee Interpersonal Relation, Adequacy of Communication, Opportunity for Growth and Advancement, and Reactions to the Inventory. Some of the categories deserve further discussion. Of greater importance seems to be the three categories on Working Conditions (II), Pay (III), and Employee Benefits (IV). None of the four items in category III was found to be valid, that is they were not adequate predictors of job satisfaction. Category II had three valid items while Category IV had two valid items. Therefore it seems that job satisfaction of the typical worker in this particular situation can be partially measured by his reactions to working conditions and employee benefits but not by his reactions to the pay he receives. This seems to point to the old maxim that a company can pay enough to keep employees but possibly not enough to keep employees satisfied. Category IV points out that the employee is concerned over the companys interest in him as evidenced by employee benefits. This finding is substaniated by the two items found valid in the Identification with Company category; interest in company and pride in company. The above category findings are substantiated by the findings in the

SRA_{19} in which the category findings were almost identical; that is each derived form had five valid items in categories II and IV and no valid items in category III. Further, the items that were valid in each of the above categories for the SRA_{15} were the identical items which discriminated in the SRA_{19}.

A full one-third of the items on the SRA_{15} point at least indirectly toward security. These are the items relating to absence of friction with fellow employees, friendliness of management, management's knowledge of the job, efficiency of company operation and recognition of length of service. With this thought in mind it is not too surprising that none of the items pertaining to opportunity for growth and advancement were represented on either the SRA_{15} or SRA_{19}. The worker seems more concerned with security than with advancement. Perhaps this relates to the old adage of "A bird in the hand, etc."

An interesting by-product of the validation study is that one is able to derive a composite picture of the factors that discriminate job satisfaction for the average employee in this particular experimental situation. One could describe an employee in this situation as one who is concerned with the pressure on his job, that he works good hours under adequate conditions, has a good deal of concern over his security, identifies to a fair degree with the company, and has a rather stoic attitude toward advancement.

Three items from the OSU are not represented on either of the short forms, OSU_{6A} or OSU_{6B}. These are items, 5, 6, and 9. While item 5 resembles several of the items selected it appears to be vague and ambiguous. Is the respondent being asked to relate known knowledge or to empathize in answering the item? The author agrees with Cheek's statement that..."A person seeing himself as satisfied or dissatisfied in comparison with other people (in item 5) was not the same thing as asking him how satisfied he actually was." (7, p. 28).

Item 6 is comparable to items 27 and 53 of the SRA. All three of these items failed to be represented on either the OSU_{6A}, OSU_{6B}, or SRA_{15}. Only one of them, item 53, appeared on the relatively invalid SRA_{19}.

Items 1, 2, 3 and 10 appear to measure or at least to ask the same thing. With this apparent relationship it is not surprising that if one item is valid they all are. Item 3 was represented in the OSU_{6A} but was replaced by item 8 in the OSU_{6B} One would expect item 8 to be valid inasmuch as it has a close resemblance to items 3 and 5 of the criterion.

Item 4 of the OSU is representative of category XIII of the SRA which had a good representation on the SRA_{15} though not as great as in Cheek's findings. Item 7 appears to be closely related to category II of the SRA which had strong representation on both the SRA_{15} and SRA_{19}.

The author has no ready explanation for the results of item 9 of the OSU. Taken at face value one would expect this item to appear on both short forms of the OSU. Item 9 is like item 3 of the criterion and like category XIII, which was well represented on the SRA_{15}. It is also like item 4 of the OSU which was represented on both short forms of the OSU. Given new sub-samples one may well expect to find this item among those on a new derived form.

The author wishes to restate that although this study indicates that a shorter form of the indices may predict job-satisfaction as adequately as the original forms, one must do the necessary item analysis and validation for the individual situation at hand. The sample used may be atypical of the industry represented and most certainly of industry in general.

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APPENDIX

SRA Employee Inventory

Purpose of the Inventory Your company would like to know what you think about your job, your pay, your boss, and the company in general. This Inventory is designed to help you tell us your ideas and opinions quickly and easily without signing your name. This booklet contains a number of statements. All you have to do is to mark a cross by each statement to show how you feel. It is easy to do and you can be completely frank in your answers.

How to fill in the Inventory Read each statement carefully and decide how you feel about it. You will agree with some statements, and you will disagree with others. You may be undecided about some. To help you express your opinion, three possible answers have been placed beside each statement:

	AGREE	?	DISAGREE
I would rather work in a large city than in a small town.....	☐	☐	☐

Choose the answer most like your own opinion and mark a cross in the box under it.

For example:

This person feels he wants to work in a large city:

	AGREE	?	DISAGREE
I would rather work in a large city than in a small town.....	☒	☐	☐

This person wants to work in a small town:

	AGREE	?	DISAGREE
I would rather work in a large city than in a small town.....	☐	☐	☒

This person can't decide between a large city and a small town:

	AGREE	?	DISAGREE
I would rather work in a large city than in a small town.....	☐	☒	☐

This is not a test There are no "right" answers and no "wrong" answers. It is your own, honest opinion that we want.

Work rapidly but answer [illegible] statement Do *not* spend too much time on any one statement. If you cannot decide about a statement, mark the "?" box, and go on to the next statement. Some of the statements may not be worded exactly the way you would like them. However, answer them the best way you can. Be sure to mark *every* statement. Leave no blanks. Mark only one answer for each statement. If you make a mistake, do NOT erase your mark. Put a circle around the cross inside the box like this ⊠ , and mark a cross in the correct box.

General information Do *not* make any marks in this booklet. Do *not* sign your name on the Answer Pad. *Be sure* to fill in the blanks for general information on the back of the Answer Pad. This information will be used only to make the results more meaningful. It will not be used to find out which Answer Pad is yours. *Please turn now* to the back of the Answer Pad and fill in the general information.

When you have finished Check to see that you have marked every statement. If you think anything has been left out, or if there is any special thing that is worrying you about your work, please write or print your *comments* in the space provided on the Answer Pad. When you are finished, remove the Answer Pad from the booklet and drop your Answer Pad in the ballot box.

Go on to the next page

Make no marks on these pages! 1 1

	AGREE	?	DISAGREE
1. The hours of work here are O.K.	☐	☐	☐
2. Management does everything possible to prevent accidents in our work	☐	☐	☐
3. Management is doing its best to give us good working conditions	☐	☐	☐
4. In my opinion, the pay here is lower than in other companies	☐	☐	☐
5. They should do a better job of handling pay matters here	☐	☐	☐
6. I understand what the company benefit program provides for employees	☐	☐	☐
7. The people I work with help each other out when someone falls behind or gets in a tight spot	☐	☐	☐
8. My boss is too interested in his own success to care about the needs of employees	☐	☐	☐
9. My boss is always breathing down our necks; he watches us too closely	☐	☐	☐
10. My boss gives us credit and praise for work well done	☐	☐	☐
11. Management here does everything it can to see that employees get a fair break on the job	☐	☐	☐
12. If I have a complaint to make, I feel free to talk to someone up-the-line	☐	☐	☐
13. ~~My boss sees that~~ employees here are properly trained for their jobs	☐	☐	☐
14. My boss sees that we have the things we need to do our jobs	☐	☐	☐
15. Management here is really trying to build the organization and make it successful	☐	☐	☐
16. Management here sees to it that there is cooperation between departments	☐	☐	☐
17. Management tells employees about company plans and developments	☐	☐	☐
18. They encourage us to make suggestions for improvements here	☐	☐	☐
19. I am often bothered by sudden speed-ups or unexpected slack periods in my work	☐	☐	☐
20. Changes are made here with little regard for the welfare of employees	☐	☐	☐
21. Compared with other employees, we get very little attention from management	☐	☐	☐
22. Sometimes I feel that my job counts for very little in this organization	☐	☐	☐
23. The longer you work for this company the more you feel you belong	☐	☐	☐
24. I have a great deal of interest in this company and its future	☐	☐	☐
25. I have little opportunity to use my abilities in this organization	☐	☐	☐
26. There are plenty of good jobs here for those who want to get ahead	☐	☐	☐

Do not mark in booklet! 2

	2	1
27. I often feel worn out and tired on my job	AGREE ? DISAGREE	AGREE ? DISAGREE
28. They expect too much work from us around here	AGREE ? DISAGREE	AGREE ? DISAGREE
29. Poor working conditions keep me from doing my best in my work	AGREE ? DISAGREE	AGREE ? DISAGREE
30. For my kind of job, the working conditions are O.K.	AGREE ? DISAGREE	AGREE ? DISAGREE
31. I'm paid fairly compared with other employees	AGREE ? DISAGREE	AGREE ? DISAGREE
32. Compared with other companies, employee benefits here are good	AGREE ? DISAGREE	AGREE ? DISAGREE
33. A few of the people I work with think they run the place	AGREE ? DISAGREE	AGREE ? DISAGREE
34. The people I work with get along well together	AGREE ? DISAGREE	AGREE ? DISAGREE
35. My boss has always been fair in his dealings with me	AGREE ? DISAGREE	AGREE ? DISAGREE
36. My boss gets employees to work together as a team	AGREE ? DISAGREE	AGREE ? DISAGREE
37. I have confidence in the fairness and honesty of management	AGREE ? DISAGREE	AGREE ? DISAGREE
38. Management here is really interested in the welfare of employees	AGREE ? DISAGREE	AGREE ? DISAGREE
39. Most of the higher-ups are friendly toward employees	AGREE ? DISAGREE	AGREE ? DISAGREE
40. My boss keeps putting things off; he just lets things ride	AGREE ? DISAGREE	AGREE ? DISAGREE
41. My boss lets us know exactly what is expected of us	AGREE ? DISAGREE	AGREE ? DISAGREE
42. Management fails to give clear-cut orders and instructions	AGREE ? DISAGREE	AGREE ? DISAGREE
43. I know how my job fits in with other work in this organization	AGREE ? DISAGREE	AGREE ? DISAGREE
44. Management keeps us in the dark about things we ought to know	AGREE ? DISAGREE	AGREE ? DISAGREE
45. Long service really means something in this organization	AGREE ? DISAGREE	AGREE ? DISAGREE
46. You can get fired around here without much cause	AGREE ? DISAGREE	AGREE ? DISAGREE
47. I can be sure of my job as long as I do good work	AGREE ? DISAGREE	AGREE ? DISAGREE
48. I have plenty of freedom on the job to use my own judgment	AGREE ? DISAGREE	AGREE ? DISAGREE
49. Everybody in this organization tries to boss us around	AGREE ? DISAGREE	AGREE ? DISAGREE
50. I really feel part of this organization	AGREE ? DISAGREE	AGREE ? DISAGREE
51. The people who get promotions around here usually deserve them	AGREE ? DISAGREE	AGREE ? DISAGREE
52. I can learn a great deal on my present job	AGREE ? DISAGREE	AGREE ? DISAGREE

Do not mark in booklet! 2

	2			1		
	AGREE	?	DISAGREE	AGREE	?	DISAGREE
27. I often feel worn out and tired on my job	☐	☐	☐	☐	☐	☐
28. They expect too much work from us around here	☐	☐	☐	☐	☐	☐
29. Poor working conditions keep me from doing my best in my work	☐	☐	☐	☐	☐	☐
30. For my kind of job, the working conditions are O.K.	☐	☐	☐	☐	☐	☐
31. I'm paid fairly compared with other employees	☐	☐	☐	☐	☐	☐
32. Compared with other companies, employee benefits here are good	☐	☐	☐	☐	☐	☐
33. A few of the people I work with think they run the place	☐	☐	☐	☐	☐	☐
34. The people I work with get along well together	☐	☐	☐	☐	☐	☐
35. My boss has always been fair in his dealings with me	☐	☐	☐	☐	☐	☐
36. My boss gets employees to work together as a team	☐	☐	☐	☐	☐	☐
37. I have confidence in the fairness and honesty of management	☐	☐	☐	☐	☐	☐
38. Management here is really interested in the welfare of employees	☐	☐	☐	☐	☐	☐
39. Most of the higher-ups are friendly toward employees	☐	☐	☐	☐	☐	☐
40. My boss keeps putting things off; he just lets things ride	☐	☐	☐	☐	☐	☐
41. My boss lets us know exactly what is expected of us	☐	☐	☐	☐	☐	☐
42. Management fails to give clear-cut orders and instructions	☐	☐	☐	☐	☐	☐
43. I know how my job fits in with other work in this organization	☐	☐	☐	☐	☐	☐
44. Management keeps us in the dark about things we ought to know	☐	☐	☐	☐	☐	☐
45. Long service really means something in this organization	☐	☐	☐	☐	☐	☐
You can ' around here without much cause	☐	☐	☐	☐	☐	☐
an bo b as do good work	☐	☐	☐	☐	☐	☐
ve ple n use my own judgment	☐	☐	☐	☐	☐	☐
body at oss us around	☐	☐	☐	☐	☐	☐
feel a	☐	☐	☐	☐	☐	☐
ople ot re usually deserve them	☐	☐	☐	☐	☐	☐
earn n	☐	☐	☐	☐	☐	☐

Go on to the next page

	3	3	2	1
53. My job is often dull and monotonous	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
54. There is too much pressure on my job	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
55. Some of the working conditions here are annoying	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
56. I have the right equipment to do my work	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
57. My pay is enough to live on comfortably	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
58. I'm satisfied with the way employee benefits are handled here	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
59. The company's employee benefit program is O.K.	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
60. The people I work with are very friendly	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
61. My boss really tries to get our ideas about things	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
62. My boss ought to be friendlier toward employees	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
63. My boss lives up to his promises	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
64. Management here has a very good personnel policy	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
65. Management ignores our suggestions and complaints	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
66. My boss knows very little about his job	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
67. My boss has the work well organized	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
68. This company operates efficiently and smoothly	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
69. Management really knows its job	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
70. They have a poor way of handling employee complaints here	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
71. You can say what you think around here	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
72. You always know where you stand with this company	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
73. When layoffs are necessary, they are handled fairly	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
74. I am very much underpaid for the work that I do	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
75. I'm really doing something worthwhile in my job	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
76. I'm proud to work for this company	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
77. Filling in this Inventory is a good way to let management know what employees think	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
78. I think some good may come out of filling in an Inventory like this one	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE

4	3	2	1
Do not mark the spaces in this column unless you are told to do so.	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
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	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
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AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE
	AGREE ? DISAGREE	AGREE ? DISAGREE	AGREE ? DISAGREE

Write your comments in the space provided on the back of the Answer Pad.

ANSWER PAD

for the

SRA Employee Inventory

FORM AH

Prepared by
The Employee Attitude Research Group,
The Industrial Relations Center of the University of Chicago

Published by SCIENCE RESEARCH ASSOCIATES, INC., 57 West Grand Avenue, Chicago 10, Illinois.

Please use number 7-1582 when reordering this answer pad.

ANSWER SHEET

General Information

1. GROUP	2. DATE
3.	4.

1	27	53
2	28	54
3	29	55
4	30	56
5	31	57
6	32	58
7	33	59
8	34	60
9	35	61
10	36	62
11	37	63
12	38	64
13	39	65
14	40	66
15	41	67
16	42	68
17	43	69
18	44	70
19	45	71
20	46	72
21	47	73
22	48	74
23	49	75
24	50	76
25	51	77
26	52	78

I II III IV V VI VII VIII IX X XI XII XIII XIV XV

79 DISAGREE ? AGREE ☐ ☐ ☐

80 DISAGREE ? AGREE ☐ ☐ ☐

81 DISAGREE ? AGREE ☐ ☐ ☐

82 DISAGREE ? AGREE ☐ ☐ ☐

83 DISAGREE ? AGREE ☐ ☐ ☐

84 DISAGREE ? AGREE ☐ ☐ ☐

85 DISAGREE ? AGREE ☐ ☐ ☐

86 DISAGREE ? AGREE ☐ ☐ ☐

87 DISAGREE ? AGREE ☐ ☐ ☐

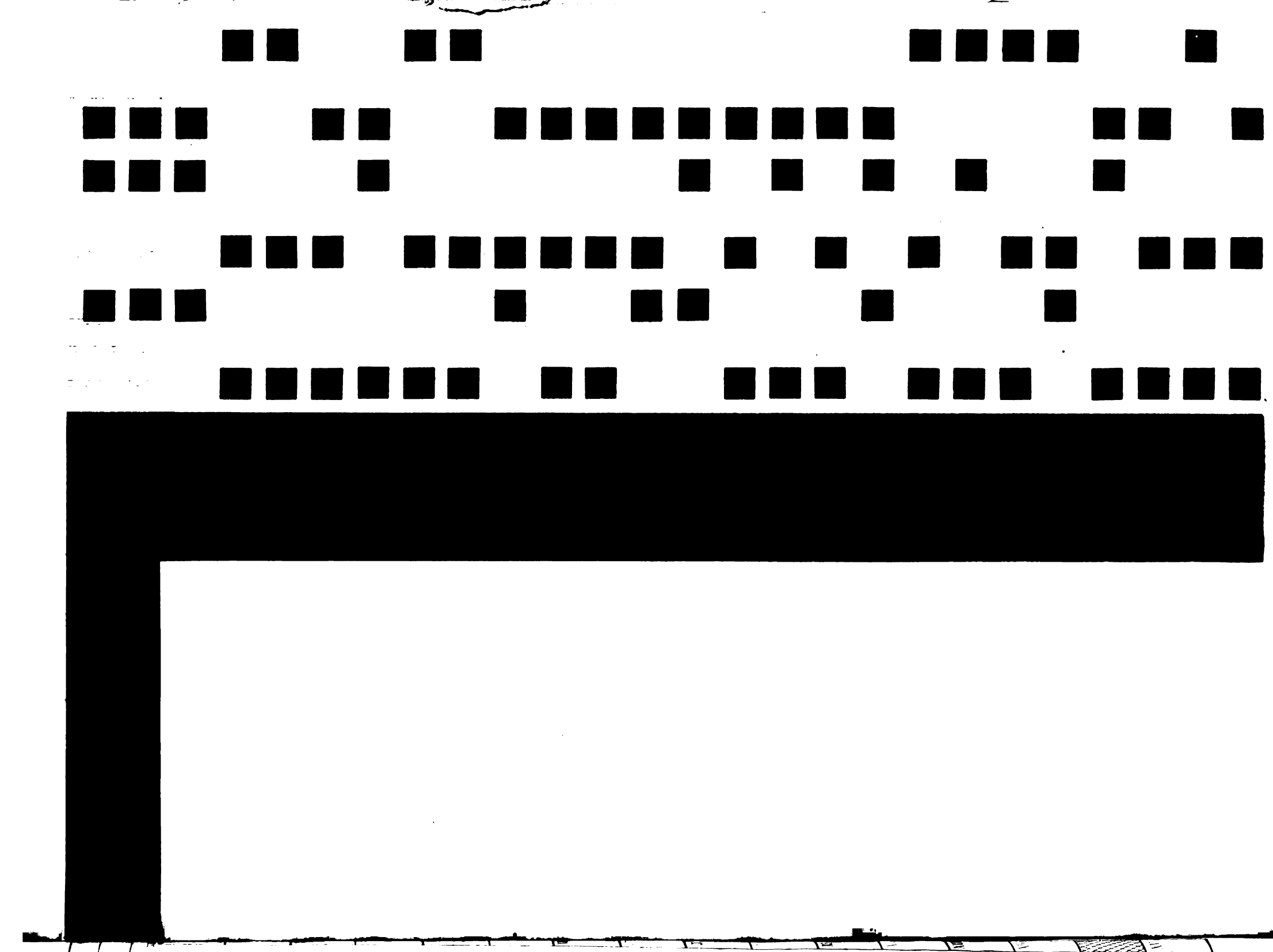
88 DISAGREE ? AGREE ☐ ☐ ☐

89 DISAGREE ? AGREE ☐ ☐ ☐

90 DISAGREE ? AGREE ☐ ☐ ☐

CATEGORY

I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
XIII
XIV
XV



Cut on line

Do not write in this space.

General Information

1. GROUP	2. DATE
3.	4.

Please write your comments here.

To remove Answer Pad, lift here

APPENDIX B

Your name _____

The following statements will help you to describe how you feel about your job. Think about your experience while working on the job and check those statements which most accurately and honestly answer these questions.

---

1. Place a check mark in front of the statement which best tells how good a job you have.
   ___A. The job is an excellent one, very much above the average.
   ___B. The job is a fairly good one.
   ___C. The job is only average.
   ___D. The job is not as good as average in this kind of work.
   ___E. The job is a very poor one, very much below the average.

2. Place a check mark in front of the statement which best describes your feelings about your job.
   ___A. I am very satisfied and happy on this job.
   ___B. I am fairly will satisfied on this job.
   ___C. I am neither satisfied nor dissatisfied--it is just average.
   ___D. I am a little dissatisfied on this job.
   ___E. I am very dissatisfied and unhappy on this job.

3. Check one of the following statements to show how much of the time you are satisfied with your job.
   ___A. Most of the time.
   ___B. A good deal of the time.
   ___C. About half the time.
   ___D. Occasionally.
   ___E. Seldom.

4. Place a check mark in front of the statement which best tells what kind of an organization it is to work for.
   ___A. It is an excellent organization to work for--one of the best organizations I know of.
   ___B. It is a good organization to work for but not one of the best.
   ___C. It is only an average organization to work for. Many others are just as good.
   ___D. It is below average as an organization to work for. Many others are better.
   ___E. It is probably one of the poorest organizations to work for that I know of.

5. Place a check mark in front of the statement which best tells how your feelings compare with those of other people you know.
   ___A. I dislike my job much more than most people dislike theirs.
   ___B. I dislike my job more than most people dislike theirs.
   ___C. I like my job about as well as most people like theirs.
   ___D. I like my job better than most people like theirs.
   ___E. I like my job much better than most people like theirs.

6. Place a check mark in front of the statement which best tells how you feel about the work you do on your job.
   ___A. The work I do is very unpleasent. I dislike it.
   ___B. The work I do is not pleasent.
   ___C. The work is just about average. I don't have any feeling about whether it is pleasent or not.
   ___D. The work is pleasent and enjoyable.
   ___E. The work is very enjoyable. I very much like to do the work called for on this job.

7. Check one of the following which best describes any general conditions which affect your work or comfort on this job.

___A. General working conditions are very bad.
___B. General working conditions are poor--not so good as the average for this kind of job.
___C. General working conditions are about average, neither good nor bad.
___D. In general, working conditions are good, better than average.
___E. General working conditions are very good, much better than average for this kind of job.

8. Check one of the following statements which best tells how you feel about changing your job.

___A. I would quit this job at once if I had anything else to do.
___B. I would take almost any other job in which I could earn as much as I am earning here.
___C. This job is as good as the average and I would just as soon have it as any other job but would change jobs if I could make more money.
___D. I am not eager to change jobs but would do so if I could make more money.
___E. I do not want to change jobs even for more money because this is a good one.

9. Suppose you had a very good friend who is looking for a job in your line of work and you know of a vacancy in this organization which your friend is well qualified to fill: Would you:

___A. Recommend this job as a good one to apply for?
___B. Recommend this job but caution your friend about its shortcomings?

___C. Tell your friend about the vacancy but not anything else, then let him decide whether to apply or not?

___D. Tell your friend about the vacancy but suggest that he or she look for other vacancies elsewhere before applying?

___E. Try to discourage your friend from applying by telling the bad things about the job?

10. On the line below, place a check mark to show how well satisfied you are with this job. You may palce your mark anywhere on the line either above one of the statements or between them.

Completely dissatisfied	More dissatisfied than satisfied	About half and half	More satisfied than dissatisfied	Completely satisfied

APPENDIX C

THE CRITERION

The next five questions may be answered in the following way:

Draw a circle around "Yes" if your answer is "yes," or a circle around "No" if your answer is "no." If you don't know or are not sure draw a circle around the question mark.

Circle only one answer for each question.

Yes ? No 1. Since working here, have you had any pay raise or promotion?

Yes ? No 2. Have you ever recommended this organization or a job with this organization to one of your friends?

Yes ? No 3. Since working here, have you registered with an employment agency or applied for a job with any other organization?

Yes ? No 4. Since working here, have you had any grievance in connection with your job?

Yes ? No 5. Have you ever tried to transfer to another job or department?

APPENDIX D

THE FOUR ITEM CRITERION

Draw a circle around "Yes" if your answer is "yes," or a circle around "No" if your answer is "no." If you don't know or are not sure draw a circle around the question mark.

Circle only one answer for each queation.

Yes ? No 2. Have you ever recommended this organization or a job with this organization to one of your friends?

Yes ? No 3. Since working here, have you registered with an employment agency or applied for a job with any other organization?

Yes ? No 4. Since working here, have you had any grievance in connection with your job?

Yes ? No 5. Have you ever tried to transfer to another job or department?

Note: The "correct" responses indicating job satisfaction were (for either the four- or five-question type criterion):

1. yes
2. yes
3. no
4. no
5. no

See Appendices C and D.

APPENDIX E

DEPARTMENTALLY STRATIFIED RANDOM SAMPLES OF EMPLOYEES

Department	Total N	Group A	A'	B	C
Cabinet.....	23	6	6	6	5
Office.....	25	6	6	6	7
Machine and trim.....	21	5	5	5	6
Finishing.....	23	6	6	6	5
Upholstering.....	16	4	4	4	4
Coordination.....	4	1	1	1	1
Miscellaneous.....	8	2	2	2	2
Veneer.....	14	3	3	4	4
Plywood.....	14	4	4	3	3
Shipping Supervision..... Product	12	3	3	3	3
Totals.....	160	40	40	40	40

APPENDIX F

THE 19 ITEM SRA

Item numbers:

1	17	30	53
2	18	32	56
10	19	34	60
12	24	43	62
13	29	47	

APPENDIX G

THE 15 ITEM SRA

Item numbers:

1	32	48	66
24	34	54	68
29	39	56	76
30	45	59	

APPENDIX H

THE 6 ITEM OSU (A)

Item numbers:

1, 2, 3, 4, 7, 10.

APPENDIX I

THE 6 ITEM OSU (B)

Item numbers:

1, 2, 4, 7, 8, 10.

APPENDIX J

SRA WEIGHTS FOR COMBINED GROUP AA'

Item No.	Item Weights	Item No.	Item Weights	Item No.	Item Weights	Item No.	Item Weights
1.	2.42	21	1.59	41.	1.00	61	2.32
2	0.00	22	2.14	42	1.37	62	2.26
3	0.58	23	2.15	43	0.69	63	2.22
4	-0.01	24	3.01	44	0.49	64	0.39
5	0.66	25	2.23	45	1.54	65	0.99
6	-0.91	26	1.71	46	0.69	66	1.51
7	0.56	27	1.34	47	2.26	67	1.22
8	0.70	28	1.66	48	1.09	68	0.81
9	2.41	29	0.31	49	2.56	69	1.14
10	2.30	30	-0.61	50	2.22	70	1.94
11	2.62	31	2.13	51	1.60	71	1.36
12	1.99	32	0.39	52	1.92	72	1.57
13	1.14	33	1.79	53	2.11	73	0.78
14	1.38	34	2.81	54	1.76	74	2.14
15	1.42	35	1.59	55	1.43	75	1.87
16	1.13	36	1.01	56	1.24	76	3.13
17	0.86	37	2.42	57	1.87	77	-0.52
18	-2.85	38	1.77	58	0.98	78	0.12
19	2.00	39	0.89	59	1.20		
20	0.16	40	0.19	60	2.52		

*...SRA_{19} derived from this sample.

Range = -2.85 to 3.13 or 5.98

Mean = 104.87/78 or 1.34

Ratio = $\frac{\text{range}}{\text{mean}} = \frac{5.98}{1.34} = 4.42$

APPENDIX K

SRA WEIGHTS FOR COMBINED GROUP BC*

Item No.	Item Weights	Item No.	Item Weights	Item No.	Item Weights	Item No.	Item Weights
1	0.58	21	0.50	41	0.79	61	-0.06
2	0.39	22	0.01	42	1.15	62	0.51
3	0.75	23	1.03	43	1.38	63	0.19
4	0.39	24	1.22	44	0.77	64	0.18
5	0.70	25	-0.14	45	1.57	65	1.22
6	0.69	26	1.12	46	1.24	66	1.24
7	-0.28	27	0.43	47	0.74	67	1.26
8	1.20	28	0.64	48	0.16	68	1.32
9	1.54	29	1.64	49	0.71	69	1.15
10	0.73	30	1.46	50	0.81	70	0.92
11	0.96	31	0.30	51	0.91	71	0.88
12	1.19	32	3.21	52	0.86	72	1.14
13	1.48	33	0.34	53	0.87	73	0.85
14	1.14	34	-0.91	54	-0.25	74	0.79
15	1.15	35	1.08	55	0.81	75	0.53
16	1.09	36	0.55	56	0.98	76	2.00
17	0.67	37	1.42	57	0.89	77	-0.63
18	-0.47	38	0.73	58	0.50	78	-0.33
19	0.74	39	-0.96	59	0.95		
20	0.73	40	0.87	60	0.88		

*SRA_{15} derived from this sample.

Range = -0.96 to 3.21 or 4.17

Mean = 59.28/78 or 0.76

$$\text{Ratio} = \frac{\text{range}}{\text{mean}} = \frac{4.17}{0.76} = 5.48$$

APPENDIX L

COMBINED GROUP WEIGHTS FOR ALL OSU ITEMS

COMBINED GROUP AA'*

Item No.	Item Weight
1	1.97
2	1.90
3	1.69
4	2.41
5	1.01
6	0.98
7	1.90
8	1.31
9	0.75
10	2.00

*OSU_{6A} derived from this sample.

GROUP AA'

Range = 0.75 to 2.41 or 1.66

Mean = 15.92/10 or 1.59

$$\text{Ratio} = \frac{\text{range}}{\text{mean}} = \frac{1.66}{1.59} = 1.04$$

COMBINED GROUP BC**

Item No.	Item Weight
1	1.26
2	1.18
3	1.34
4	1.09
5	1.35
6	0.66
7	1.01
8	0.86
9	0.55
10	1.10

**OSU_{6B} derived from this sample

GROUP BC

Range = 0.55 to 1.35 or 0.80

Mean = 10.40/10 or 1.04

$$\text{Ratio} = \frac{\text{range}}{\text{mean}} = \frac{0.80}{1.04} = 0.77$$

APPENDIX M

COMMON ITEMS OF SHORT FORMS*

I. ITEMS FOUND COMMON BETWEEN THE VARIOUS FORMS

A. Items common to Jones SRA_{19} and Cheek's SRA_{15}.

12, 17, 24, and 29.

B. Items common to Jones SRA_{15} and Cheek's SRA_{15}.

24 and 29.

C. Items common to Jones SRA_{19} and Jones SRA_{15}.

1, 24, 29, 30, 32, 34, and 56.

D. Items common to Jones OSU_{6A} and Cheek's OSU_{6}.

1, 2, 4, 7, and 10.

E. Items common to Jones OSU_{6B} and Cheek's OSU_{6}.

1, 2, 4, 8, and 10.

F. Items common to Jones OSU_{6A} and Jones OSU_{6B}.

1, 2, 4, 7, and 10.

*Being excessive in length two studies of Cheek's are excluded here: the SRA_{53} and the OSU_{9}.