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# *Construct Validation Studies of the Minnesota Importance Questionnaire*

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# Construct Validation Studies of the Minnesota Importance Questionnaire

## Summary

This Bulletin reports studies on the construct validity of the Minnesota Importance Questionnaire (MIQ). The design of these studies was based on Proposition III of the *Theory of Work Adjustment* which relates the need variable to the variables of reinforcement level and satisfaction. From this theoretical relationship, a set of hypotheses was derived, the empirical confirmation of which would constitute evidence for the construct validity of the MIQ scale being studied. To investigate these hypotheses, it was necessary to obtain measurements of satisfaction and reinforcement level on dimensions paralleling those of the MIQ scales.

The *Minnesota Satisfaction Questionnaire* (MSQ) was developed to measure satisfaction on the same twenty dimensions used in the MIQ. The MSQ, like the MIQ, consisted of 100 five-response-choice-items scoring on 20 scales. The items of the MSQ were mainly items of the MIQ rewritten as "satisfaction" items. The MSQ was administered to 1,793 employed individuals. MSQ scales were generally found to have lower means and higher variabilities than the corresponding MIQ scales. The MSQ scales generally had higher reliabilities than did the MIQ scales. Like the MIQ, the scale intercorrelations of the MSQ were somewhat higher than desired but with sufficient reliable specific variance to be interpreted as relatively unique dimensions. Factor analysis of the MSQ scales yielded two factors interpretable as satisfaction with the "job" and with the "boss."

Since the MIQ and MSQ used similar items and a similar format and were administered at the same time, it was necessary to determine whether they were measuring different variables (i.e., needs vs. satisfactions). Median intercorrelation between any two scales, one from each instrument, was .13. Correlations between parallel scales ranged from .42 to —.11, with a median of .19. Highest correlation between non-parallel scales was .31. A factor analysis of the two instruments yielded two need factors and two satisfaction factors with very little overlap. Study of the curvilinear relationships between parallel MIQ and MSQ scales showed that a maxi-

mum of only about 19% of the variance in satisfaction scores could be predicted from a knowledge of need scores. These results indicated that the MIQ and the MSQ measure independent systems of variables, even when administered at the same time.

Reinforcement level, the third variable required for the construct validity studies, was determined by a judging procedure. Need and satisfaction data had previously been obtained for 19 job-groups of employees, no group being less than 30 individuals. Five judges then ranked the 19 jobs in terms of comparative reinforcement level accorded workers in the respective jobs, using an alternation ranking procedure. This procedure was followed for each dimension represented in the MIQ. However, inter-job comparisons of reinforcement level were not possible for four dimensions: Company Policies and Practices, Co-workers, Supervision—Human Relations and Supervision—Technical. For these dimensions, reinforcement level was unique to the particular company, co-workers, or supervisor, and was not reflected in variability among jobs. Thus, data on reinforcement level (and therefore, data for the construct validity studies) were available for only 16 of the 20 dimensions represented in the MIQ: Ability Utilization, Achievement, Activity, Advancement, Authority, Compensation, Creativity, Independence, Moral Values, Recognition, Responsibility, Security, Social Service, Social Status, Variety and Working Conditions.

The data were analyzed in two ways. The major analysis consisted of a study of satisfaction scores for groups cross-classified by need and reinforcement level, viz., high-need-high-reinforcement, high-need-low-reinforcement, low-need-high-reinforcement, and low-need-low-reinforcement. Expectations from the *Theory of Work Adjustment* concerning the data included the following: (1) that the variability of satisfaction scores for the high-need groups would be larger than that of the low-need groups; (2) that satisfaction scores would be highest for the high-need-high-reinforcement group and lowest for the high-need-low-reinforcement group; and (3) that the high-need-low-reinforcement group would have lower satisfaction scores than the low-need-low-reinforcement group. The analysis showed good evidence of construct validity for the Ability Utilization, Advancement and Variety scales, some evidence of construct validity for Authority, Achievement, Creativity and Responsibility, and little evidence of construct validity for Activity, Compensation, Independence, Moral Values, Recognition, Security, Social Service, Social Status, and Working Conditions.

In a secondary analysis, the frequency distribution of high- and low-reinforcement groups classified by need level were compared. The theoretical expectations for this analysis were (1) that the two distributions would differ, and (2) that a larger proportion of individuals would be found for the high-need than for the low-need classification in the high-reinforcement group, and the reverse of this (i.e., a higher proportion in the low-need than in the high-need classification) for the low-reinforcement group. This analysis showed good evidence of construct validity for the Ability Utilization, Achievement, Advancement, Authority, Compensation, Creativity, Independence, Responsibility, and Social Service scales, and to a lesser extent, the Variety scale. No evidence of construct validity was obtained for the Activity, Moral Values, Recognition, Security, Social Status, and Working Conditions scales.

The combined findings from the two analyses support the construct validity of ten of the sixteen scales studied: Ability Utilization, Achievement, Advancement, Authority, Compensation, Creativity, Independence, Responsibility, Social Service and Variety. Little evidence was obtained for the construct validity of the Activity, Moral Values, Recognition, Security, Social Status and Working Conditions scales of the MIQ. The latter result might be attributed to the invalidity of these MIQ scales as measures of needs, or to inaccurate ranking of reinforcement level and/or inadequate measurement of satisfaction on these dimensions, as well. These validity studies, however, do support Proposition III of the *Theory of Work Adjustment,* in that satisfaction on several dimensions has been shown to be a function of the correspondence between need and reinforcement.

# Introduction

Bulletin XVI of the *Minnesota Studies in Vocational Rehabilitation* series[1] reports on the development of the Minnesota Importance Questionnaire (MIQ) as a measure of vocational needs. The MIQ was developed for use in the Work Adjustment Project, as part of the instrumentation required for the study of the relationships among vocational needs, job reinforcers and job satisfactions. Theoretical relationships linking these three sets of variables (or constructs) are among those outlined in Bulletin XV of the series, entitled, *A Theory of Work Adjustment.*[2] The *Theory of Work Adjustment* presently serves as the research framework for several studies currently being conducted in the Work Adjustment Project.

The *Theory* states that job satisfaction is a function of the correspondence between an individual's need set and the reinforcers present on the job. The implications of this proposition for vocational counseling are clear: if satisfaction can be shown to be functionally related to need-reinforcer correspondence, the prediction of job satisfaction in various kinds of jobs might be possible. Thus, a knowledge of a counselee's measured needs, and the Occupational Reinforcer Patterns (ORPs) of jobs he has considered entering would be useful in counseling with the individual.

The use of the MIQ in vocational counseling rests on the realization of several objectives currently being pursued in the Work Adjustment Project. First, the MIQ must be validated, to support the assertion that it measures the theoretical construct "needs." Secondly, certain psychometric properties of the MIQ (e.g., score distribution, scale independence) must be improved if it is to be used in individual diagnosis. Thirdly, it must be shown that it is possible to develop ORPs which are useful in the differential prediction of job satisfaction. Finally, it must be demonstrated that the correspondence between needs and reinforcers has implications for job satisfaction. This Bulletin is concerned primarily with the first of these problems, namely the validation of the scales of the MIQ.

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[1] Weiss, D. J., Dawis, R. V., England, G. W. and Lofquist, L. H. *Minnesota studies in vocational rehabilitation, XVI. The measurement of vocational needs.* Industrial Relations Center, University of Minnesota, 1964.

[2] Dawis, R. V., England, G. W. and Lofquist, L. H. *Minnesota studies in vocational rehabilitation, XV. A theory of work adjustment.* Industrial Relations Center, University of Minnesota, 1964.

## Types of validity

*Technical Recommendations for Psychological Tests and Diagnostic Techniques*[3] of the American Psychological Association defines four basic types of validity:

1. **Content validity** consists of a demonstration that the items in a questionnaire sample the dimensions which it is presumed the questionnaire is measuring.

2. **Concurrent validity** is demonstrated by the relationship of the dimensions of a questionnaire to a criterion which is measured at the same point in time as the questionnaire measurements were taken.

3. **Predictive validity** is demonstrated by the ability of the questionnaire to predict a criterion at some future point in time.

4. **Construct validity** is demonstrated by the ability of the questionnaire to support predictions made from a theoretical framework.

Bulletin XVI presented data which showed that the MIQ scales were internally consistent and measured relatively unique dimensions. This can be interpreted as evidence of some **content** validity for these scales. However, content validity for the MIQ should include a demonstration that the range of vocational needs is sampled adequately, besides showing that the items defining a dimension represent an adequate sampling of the dimension.

The **concurrent** validity of MIQ scales would be demonstrated by evidence that MIQ scores were related to scores on a criterion of vocational needs, or on some other validated measure of vocational needs, obtained at the same point in time. Since neither a suitable external criterion nor a validated measure of vocational needs was available, this approach to validation was not feasible.

Likewise, demonstration of **predictive** validity for the MIQ would rest on the availability of an external criterion. Since such a criterion was lacking, studies of predictive validity for the MIQ could not be attempted.

**Construct** validity, on the other hand, seemed to be a feasible approach to the validation of the MIQ. Construct validation is ap-

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[3] *Technical recommendations for psychological tests and diagnostic techniques.* Supplement to *Psychological Bulletin*, 1954, *51*, no. 2, part 2.

propriate when a questionnaire is to be used to "infer the degree to which the individual possesses some trait or quality (construct) presumed to be reflected in test performance."[4] The feasibility of this approach was enhanced by the availability of the *Theory of Work Adjustment*. According to the APA *Technical Recommendations:*[5]

Construct validity is evaluated by investigating what psychological qualities a test measures, i.e., by demonstrating that certain explanatory constructs account to some degree for performance on the test. To examine construct validity requires both logical and empirical attack. Essentially, in studies of construct validity we are validating the theory underlying the test. The validation procedure involves two steps. First, the investigator inquires: From this theory, what predictions would we make regarding the variation of scores from person to person or occasion to occasion? Second, he gathers data to confirm these predictions.

### The approach to construct validity

In Bulletin XVI, occupational differences and employment status differences in MIQ scores were interpreted as evidence of construct validity for several of the MIQ scales. This interpretation was based on observed differences which appeared to be consistent with expectations stemming from the *Theory of Work Adjustment.*

With regard to employment status differences, the *Theory* states that vocational needs develop as the result of experience in the work environment. Thus, a group of employed persons would be expected to have higher need scores, on the average, than a group of persons with little or no employment experience. Furthermore, need scores for the pre-employment group were expected to be more variable (i.e., less consistent) than those of the employed group. Analysis of available data supported these predictions.

Concerning occupational differences, the *Theory* implies that different occupations have different reinforcer systems and that individuals tend to maximize their satisfaction (or minimize their dissatisfaction) at work. Therefore, a given occupation should attract individuals with similar need patterns, and different occupational groups (of individuals) should differ in their need patterns. The data on occupational differences presented in Bulletin XVI supported these predictions. Thus, the findings on occupational and

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[4] Ibid., page 13.

[5] Ibid., page 14.

employment status differences were advanced as evidence of construct validity for the MIQ. However, the validity of the MIQ as a measure of needs cannot rest on this evidence alone.

The studies reported in this Bulletin were designed to provide additional and more substantial evidence of construct validity for the MIQ. They were based on Proposition III of the *Theory of Work Adjustment* which specifies the relationships among three variables: need, reinforcement and satisfaction.[6] Working from this proposition, it was possible to state certain expectations concerning data on need, reinforcement and satisfaction. If the expectations were fulfilled by the data, this would be evidence that the need measure was valid. To obtain the requisite data, however, a measure of reinforcement and a measure of satisfaction were needed to parallel the need scale, i.e., all three measures should pertain to the same dimension. In the validity studies reported here, reinforcement was estimated rather than measured. However, measures of satisfaction were developed to parallel the 20-scale MIQ. The development and psychometric characteristics of these measures, collectively called the Minnesota Satisfaction Questionnaire (MSQ) are described in the succeeding section.

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*Op. cit.*, page 10.

# The Minnesota Satisfaction Questionnaire

The Minnesota Satisfaction Questionnaire (MSQ) was constructed to measure job satisfaction on the same 20 dimensions represented in the Minnesota Importance Questionnaire (MIQ). To make the MSQ correspond as closely as possible to the MIQ, the MIQ items were used as the basis for writing MSQ items. MSQ items were thus, for the most part, MIQ items rewritten as "satisfaction" items.

## Description

The MSQ, like the MIQ, consists of 100 items.[7] Each item refers to an aspect of reinforcement in the work environment. The respondent is directed to ask himself: "On my present job, this is how I feel about (the item) . . . ." Five response alternatives are presented for each item: "Very Dissatisfied; Dissatisfied; Neither (dissatisfied nor satisfied); Satisfied; Very Satisfied." For scoring purposes, these alternatives are weighted 1 to 5 respectively.

Like the MIQ, each MSQ scale consists of five items. Thus, scale scores can vary from 5 to 25. The items also appear in blocks of 20, with items constituting a given scale appearing at 20-item intervals. Since the same 20 need-reinforcer dimensions were used for the instruments, the MSQ scales were sequenced in an order different from that used in the MIQ, to decrease the similarity between the two instruments when they are administered at the same time.

Following, in alphabetical order, is a list of the MSQ scales. The scale names are the same as those used in the MIQ. The item following the scale name is the satisfaction item which correlated highest with scale score, for a group of 1,793 employed individuals.

1. **Ability utilization.** The chance to do something that makes use of my abilities.

2. **Achievement.** The feeling of accomplishment I get from the job.

3. **Activity.** Being able to keep busy all the time.

4. **Advancement.** The chances for advancement on this job.

5. **Authority.** The chance to tell other people what to do.

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[7] A copy of the MSQ appears in the Appendix. Robert E. Carlson, formerly of the Work Adjustment Project staff, assisted in the writing of the items.

6. **Company policies and practices.** The way company policies are put into practice.

7. **Compensation.** My pay and the amount of work I do.

8. **Co-workers.** The way my co-workers get along with each other.

9. **Creativity.** The chance to try my own methods of doing the job.

10. **Independence.** The chance to work alone on the job.

11. **Moral values.** Being able to do things that don't go against my conscience.

12. **Recognition.** The praise I get for doing a good job.

13. **Responsibility.** The freedom to use my own judgment.

14. **Security.** The way my job provides for steady employment.

15. **Social service.** The chance to do things for other people.

16. **Social status.** The chance to be "somebody" in the community.

17. **Supervision—human relations.** The way my boss handles his men.

18. **Supervision—technical.** The competence of my supervisor in making decisions.

19. **Variety.** The chance to do different things from time to time.

20. **Working conditions.** The working conditions.

On eleven scales the MSQ item which correlated most highly with scale score is the "satisfaction" counterpart of the "need" item which correlated most highly with scale score on the MIQ. These scales are: Ability Utilization, Achievement, Activity, Advancement, Authority, Company Policies and Practices, Independence, Security, Social Service, Social Status, and Working Conditions.

**Data collection**

The MSQ was completed by 1,793 employees from four different organizations,[8] as part of employee attitude studies administered by

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[8] These organizations included two companies in the food distribution industry, one company in the food processing industry, and one large general medical and surgical hospital.

the Industrial Relations Center. The MIQ was administered to these individuals at the same time (1,348 of them comprising the two-firm sample reported on in Bulletin XVI). Table 1 shows some descriptive characteristics of the total MSQ sample. Median reported age for the group was 34, with a range of 16 to 69. Median number of years in the company was 4, with a maximum of 40. The highest reported number of years in an occupation was 46, while the median was 4. The largest group of workers was the nonskilled blue-collar group.

**Table 1. Descriptive characteristics of MSQ development sample**
**(N = 1,793)**

| Characteristic | N | % |
|---|---|---|
| Age | | |
| Less than 30 | 689 | 38 |
| 30-44 | 681 | 38 |
| 45 and over | 403 | 23 |
| Education | | |
| Less than 12 years | 385 | 21 |
| 12 years completed | 860 | 48 |
| 12-15 years | 324 | 18 |
| 16 years and over | 203 | 11 |
| Number of years in company | | |
| 1 or less | 350 | 20 |
| 2-5 | 661 | 37 |
| More than 5 | 762 | 42 |
| Number of years in occupation | | |
| 1 or less | 336 | 19 |
| 2-5 | 656 | 37 |
| More than 5 | 781 | 44 |
| Occupations | | |
| Unskilled blue-collar | 790 | 44 |
| Skilled blue-collar | 20 | 1 |
| Unskilled white-collar | 334 | 19 |
| Skilled white-collar | 483 | 27 |
| Managerial | 152 | 8 |
| Sex | | |
| Male | 1,265 | 71 |
| Female | 526 | 29 |
| Source | | |
| Company 1 | 306 | 17 |
| Company 2 | 1,101 | 61 |
| Company 3 | 186 | 10 |
| Company 4 | 200 | 11 |

Note: Where percentages do not total 100, the remainder represents missing or unclassifiable data.

## Results

**Level and variability.** Means and standard deviations of scores on the 20 MSQ scales are listed in Table 2. The highest means occurred on the Moral Values and Security scales (20.9 and 20.8, respectively), while Advancement had the lowest mean (16.3). Advancement had the most variability (5.09), and Moral Values was the least variable scale (2.87). Half the means were below 18.9, while the standard deviations averaged 3.90.

Since the MSQ and the MIQ are similar in format and items, and since both questionnaires were administered at the same time, it is interesting to compare these results with those obtained on the MIQ. Using the total MIQ development sample as the basis for comparison (Bulletin XVI, Table 9, p. 25), the MSQ means are found to be generally lower than MIQ means, and MSQ variabilities are generally higher. Only 4 MIQ scales had means of 18.9 or less, compared with 10 MSQ scales. MIQ means were higher than the corresponding MSQ means on 13 of the 20 scales. The means were equal or nearly equal on Moral Values, Responsibility, Social Service and Variety. MSQ means were higher than MIQ means on Activity, Authority, Independence and Social Status.

**Table 2. Means and standard deviations of MSQ scales, for total group (N = 1,793)**

| Scale | Mean | Standard Deviation |
|---|---|---|
| 1. Ability Utilization | 18.7 | 4.43 |
| 2. Achievement | 20.0 | 3.25 |
| 3. Activity | 20.5 | 2.96 |
| 4. Advancement | 16.3 | 5.09 |
| 5. Authority | 17.9 | 3.49 |
| 6. Company Policies and Practices | 17.5 | 4.78 |
| 7. Compensation | 17.4 | 4.89 |
| 8. Co-workers | 19.8 | 3.43 |
| 9. Creativity | 18.3 | 4.17 |
| 10. Independence | 19.6 | 3.29 |
| 11. Moral Values | 20.9 | 2.87 |
| 12. Recognition | 17.3 | 4.68 |
| 13. Responsibility | 19.0 | 3.35 |
| 14. Security | 20.8 | 3.09 |
| 15. Social Service | 20.2 | 3.13 |
| 16. Social Status | 18.0 | 3.34 |
| 17. Supervision—Human Relations | 18.4 | 4.83 |
| 18. Supervision—Technical | 18.8 | 4.13 |
| 19. Variety | 19.0 | 4.22 |
| 20. Working Conditions | 18.3 | 4.66 |

Comparison of scale standard deviations for the two questionnaires shows that MSQ variabilities were lower on Activity, Authority, Independence, Moral Values, Security, Social Service, and Social Status, and higher on the other thirteen scales.

In general, then, scores on the MSQ were lower and variabilities higher than scores on the MIQ.

Reliability. Hoyt ANOVA internal consistency reliability coefficients for each of the MSQ scales are shown in the diagonal of Table 3. These coefficients represent the *proportion* of total interindividual score variance which can be reliably attributed to individual differences among the respondents.

Table 3 shows that all the MSQ scales had high reliabilities. The least reliable scales were Moral Values and Security, with 81% reliable variance ($r = .90$) and the most reliable scale was Advancement with 94% of the variance reliable ($r = .97$). The median reliability was .88, and five scales had Hoyt reliability coefficients of .90 or greater.

The reliabilities obtained for the MSQ were generally higher than those obtained on the MIQ.[9] Median reliability and both the highest and lowest reliabilities were higher on the MSQ. MSQ reliabilities were lower on the following scales: Achievement, Authority, Independence, Moral Values, Security, Social Service and Social Status. These scales, with the exception of Achievement, were the ones whose variabilities were lower on the MSQ than on the MIQ.

Covariation. Table 3 also shows MSQ scale intercorrelations. The highest correlation was between Supervision—Technical and Supervision—Human Relations ($r = .86$). The lowest correlations among the scales were between Compensation and Authority (.21), and between Co-workers and Compensation. The median correlation was .45, with about one-fourth of the scales correlating .52 or higher and one-fourth correlating .38 or lower. All scales correlated positively with each other.

The median scale intercorrelation of MSQ scales was slightly lower than the median for MIQ scales (.50) reported in Bulletin XVI. In addition, the 75th percentile for MSQ scale intercorrelations was lower than that for MIQ scales (.60). The MIQ, however, had more

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[9] See *Minnesota studies in vocational rehabilitation, XVI. The measurement of vocational needs, op. cit.* Table 10, page 26.

**Table 3, Hoyt reliability coefficients and intercorrelations of MSQ scales, for total group (N = 1,793)**

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Ability Utilization | 92[a] | | | | | | | | | | | | | | | | | | | |
| 2. Achievement | 68 | 84 | | | | | | | | | | | | | | | | | | |
| 3. Activity | 47 | 61 | 85 | | | | | | | | | | | | | | | | | |
| 4. Advancement | 59 | 53 | 36 | 94 | | | | | | | | | | | | | | | | |
| 5. Authority | 50 | 47 | 38 | 46 | 88 | | | | | | | | | | | | | | | |
| 6. Company Policies and Practices | 46 | 51 | 38 | 57 | 36 | 89 | | | | | | | | | | | | | | |
| 7. Compensation | 30 | 35 | 29 | 46 | 21 | 48 | 92 | | | | | | | | | | | | | |
| 8. Co-workers | 35 | 46 | 32 | 38 | 35 | 40 | 23 | 85 | | | | | | | | | | | | |
| 9. Creativity | 66 | 66 | 46 | 59 | 58 | 51 | 27 | 43 | 88 | | | | | | | | | | | |
| 10. Independence | 45 | 53 | 47 | 35 | 40 | 36 | 25 | 33 | 50 | 84 | | | | | | | | | | |
| 11. Moral Values | 40 | 58 | 48 | 35 | 36 | 42 | 26 | 46 | 48 | 47 | 81 | | | | | | | | | |
| 12. Recognition | 51 | 62 | 37 | 58 | 45 | 56 | 38 | 40 | 60 | 36 | 39 | 93 | | | | | | | | |
| 13. Responsibility | 68 | 72 | 52 | 57 | 65 | 51 | 30 | 47 | 78 | 57 | 51 | 60 | 82 | | | | | | | |
| 14. Security | 44 | 55 | 45 | 45 | 36 | 53 | 45 | 38 | 41 | 43 | 49 | 42 | 49 | 81 | | | | | | |
| 15. Social Service | 57 | 66 | 52 | 46 | 48 | 41 | 28 | 41 | 57 | 45 | 50 | 43 | 61 | 43 | 88 | | | | | |
| 16. Social Status | 58 | 56 | 42 | 53 | 60 | 47 | 32 | 38 | 56 | 41 | 44 | 51 | 58 | 41 | 52 | 82 | | | | |
| 17. Supervision—Human Relations | 43 | 51 | 34 | 52 | 35 | 59 | 31 | 42 | 53 | 35 | 38 | 65 | 53 | 46 | 34 | 38 | 90 | | | |
| 18. Supervision—Technical | 47 | 55 | 37 | 55 | 37 | 56 | 32 | 44 | 53 | 38 | 44 | 64 | 54 | 45 | 39 | 41 | 86 | 87 | | |
| 19. Variety | 66 | 61 | 55 | 53 | 43 | 43 | 27 | 32 | 63 | 50 | 41 | 46 | 61 | 39 | 51 | 50 | 40 | 43 | 88 | |
| 20. Working Conditions | 35 | 42 | 34 | 44 | 29 | 48 | 32 | 34 | 36 | 32 | 38 | 36 | 38 | 36 | 36 | 36 | 39 | 39 | 39 | 90 |

Note: decimal points omitted.

[a] Bold-face number in diagonal is proportion of total variance that is reliable (Hoyt analysis-of-variance reliability coefficient).

scale intercorrelations which were low. There were 18 correlations below .20 among MIQ scales, but none for the MSQ.

Factorial composition. The intercorrelations of Table 3 were factor analyzed using the Kaiser criterion for number of factors to extract, a principle components solution and Varimax rotation. The results are presented in Table 4. Two factors were extracted from about 50% of the total variance. Factor I accounted for 57% of the common variance and Factor II represented 43% of the common variance. Those scales loading highest on Factor I, and therefore defining the factor, were Responsibility, Achievement, Ability Utilization, Creativity and Social Service. Factor II was defined by the two Supervision scales, Company Policies and Practices, and Recognition. Advancement, Co-workers, Security, and Working Conditions had about equal loadings on both factors.

The structure of the two factors suggests that Factor I represents satisfaction with the "intrinsic" aspects of reinforcement at

**Table 4. Varimax factor matrix of MSQ scales, for total group (N = 1,793)**

| | Factors | | | |
|---|---|---|---|---|
| Scale | I | II | Communality | SMC[a] |
| 1. Ability Utilization | .71 | .33 | .61 | .64 |
| 2. Achievement | .73 | .42 | .71 | .72 |
| 3. Activity | .62 | .24 | .44 | .48 |
| 4. Advancement | .47 | .56 | .54 | .58 |
| 5. Authority | .62 | .25 | .44 | .52 |
| 6. Company Policies and Practices | .36 | .65 | .55 | .55 |
| 7. Compensation | .25 | .43 | .24 | .34 |
| 8. Co-workers | .39 | .41 | .32 | .34 |
| 9. Creativity | .70 | .42 | .66 | .70 |
| 10. Independence | .59 | .25 | .41 | .42 |
| 11. Moral Values | .54 | .34 | .41 | .47 |
| 12. Recognition | .42 | .64 | .59 | .60 |
| 13. Responsibility | .76 | .40 | .74 | .75 |
| 14. Security | .45 | .46 | .41 | .47 |
| 15. Social Service | .70 | .25 | .54 | .53 |
| 16. Social Status | .64 | .33 | .51 | .54 |
| 17. Supervision—Human Relations | .20 | .85 | .77 | .78 |
| 18. Supervision—Technical | .26 | .83 | .75 | .77 |
| 19. Variety | .68 | .29 | .55 | .57 |
| 20. Working Conditions | .35 | .42 | .30 | .32 |
| Contribution of factor | 6.02 | 4.47 | 10.49 | |
| Proportion of common variance | .57 | .43 | 1.00 | |

[a] Estimated communalities: squared multiple correlation coefficients.

work, that is, with the work itself. Factor II appears to be a supervision factor, relating to aspects "extrinsic" to the work itself. It would seem that for this group of workers work satisfaction is composed primarily of satisfaction with the "job" and with the "boss."

A comparison of the structure of job satisfaction and of vocational needs, as derived from measurements on the MSQ and MIQ respectively (see Bulletin XVI, Table 11, p. 28) shows little similarity in factor structure or pattern. The only similarity between the two factor matrices is that in both cases the Recognition scales loaded above .40 on the two factors extracted. The factors extracted from the two instruments appear to be quite different.

The median communality for the MSQ scales was .54. With a median reliability of .88, this suggests that, on the average, more than 30% of the total variance in scale scores was reliable specific variance which uniquely measured a dimension not measured by other scales. This finding is similar to that on the MIQ.[10]

## Evaluation

The data available on the MSQ suggest that it is adequate as a research instrument. Scale reliabilities are quite high. Scale means and variabilities indicate adequate discrimination potential. Like the MIQ, the MSQ scale intercorrelations are somewhat higher than desired, but considered in relation to the reliabilities, there generally is sufficient unique variance in the scales for interpretive purposes. The variations in observed summary statistics between the MSQ and the MIQ suggest that they measure different kinds of variables. However, since they were developed with similar items, using similar formats, and were administered to respondents at the same time, one may question whether they in fact measure different dimensions. The studies reported in the following section bear on this question.

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[10] Ibid., page 28.

# Relationships Between the MSQ and the MIQ

To determine whether the MSQ and the MIQ measured different variables, i.e. satisfaction and needs, the following analyses were carried out: (1) linear intercorrelations of MSQ and MIQ scores; (2) factor analysis of the intercorrelations between the two questionnaires; (3) tests of curvilinearity for relationships between parallel scales on the satisfaction and need instruments. These analyses were based on 1,755 of the 1,793 individuals in the MSQ development sample, for whom usable data on both MSQ and MIQ were available.

## Intercorrelations

Table 5 shows the product-moment correlation coefficients of MSQ and MIQ scales for the total group. The correlations ranged from —.11, for the correlation between the Compensation scales on the two questionnaires, to .42, for the correlation between the Social Service scales of the two instruments. The median correlation was .13, with about one-fourth of the scales correlating .09 or less, and one-fourth correlating .19 or greater. The highest correlation between different scales was .31, between the MSQ Moral Values scale and the MIQ Achievement scale.

The linear correlations between parallel scales on the two instruments appear in the diagonal of the table. They ranged from .42 (Social Service) to —.11 (Compensation). The lowest correlation between similarly named scales was .02 for the Advancement scales and —.02 for Working Conditions. The median correlation between parallel scales was about .19.

Table 5 shows that, in general, there is little linear relationship between the two instruments, since the highest correlation between two sets of scales accounts for only about 16% of common variance. Thus, the MSQ and the MIQ, even though similar in item-wording and format, and administered at the same time, appear to measure two sets of variables which are not highly linearly related.

## Factor analysis

To determine whether the scales (variables) would cluster into two clusters, corresponding to each of the questionnaires, the intercorrelations among the 40 (MSQ and MIQ) scales were factor analyzed. The results of this analysis appear in Table 6.

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Table 5. Linear intercorrelations of MSQ and MIQ scales (N = 1,755)

| MSQ Scales | MIQ Scales[a] | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 1. Ability utilization | 16 | 22 | 21 | 05 | 11 | 12 | 08 | 17 | 12 | 08 | 18 | 12 | 19 | 12 | 23 | 12 | 12 | 19 | 10 | 07 |
| 2. Achievement | 23 | 29 | 27 | 10 | 12 | 16 | 09 | 19 | 18 | 06 | 22 | 10 | 24 | 16 | 27 | 10 | 18 | 21 | 14 | 10 |
| 3. Activity | 23 | 27 | 31 | 10 | 13 | 16 | 07 | 15 | 22 | 02 | 24 | 11 | 24 | 16 | 25 | 10 | 17 | 19 | 16 | 09 |
| 4. Advancement | 12 | 14 | 17 | 02 | 15 | 09 | −04 | 11 | 11 | 03 | 13 | −01 | 18 | 05 | 20 | 08 | 08 | 13 | 06 | 01 |
| 5. Authority | 16 | 18 | 14 | 11 | 26 | 12 | 07 | 10 | 22 | 03 | 14 | 07 | 26 | 08 | 22 | 13 | 10 | 14 | 11 | 05 |
| 6. Company policies and practices | 13 | 16 | 21 | 03 | 14 | 04 | −02 | 13 | 11 | 04 | 15 | −01 | 17 | 11 | 21 | 12 | 12 | 16 | 05 | 04 |
| 7. Compensation | 02 | 09 | 13 | −08 | 04 | 02 | −11 | 13 | 06 | 04 | 11 | 05 | 05 | 10 | 15 | 06 | 08 | 11 | 06 | 03 |
| 8. Co-workers | 20 | 22 | 19 | 13 | 12 | 14 | 09 | 22 | 19 | 02 | 16 | 06 | 20 | 11 | 22 | 08 | 13 | 14 | 18 | 08 |
| 9. Creativity | 18 | 22 | 20 | 08 | 22 | 12 | 07 | 12 | 26 | 04 | 18 | 09 | 29 | 06 | 25 | 11 | 11 | 17 | 15 | 01 |
| 10. Independence | 18 | 24 | 21 | 10 | 12 | 17 | 15 | 15 | 23 | 20 | 21 | 15 | 21 | 14 | 18 | 08 | 18 | 18 | 15 | 12 |
| 11. Moral Values | 27 | 31 | 27 | 17 | 10 | 24 | 14 | 20 | 21 | 01 | 39 | 10 | 24 | 18 | 26 | 05 | 21 | 22 | 21 | 13 |
| 12. Recognition | 13 | 12 | 20 | 02 | 11 | 06 | −01 | 10 | 12 | 07 | 15 | −05 | 16 | 03 | 17 | 08 | 07 | 10 | 11 | 02 |
| 13. Responsibility | 18 | 21 | 21 | 09 | 18 | 14 | 09 | 17 | 22 | 06 | 19 | 09 | 28 | 10 | 23 | 10 | 14 | 17 | 15 | 06 |
| 14. Security | 18 | 22 | 22 | 08 | 10 | 14 | 07 | 15 | 16 | 03 | 19 | 06 | 16 | 25 | 18 | 09 | 19 | 20 | 14 | 12 |
| 15. Social service | 19 | 27 | 21 | 10 | 14 | 16 | 08 | 20 | 17 | 01 | 20 | 09 | 21 | 13 | 42 | 09 | 14 | 19 | 11 | 10 |
| 16. Social status | 17 | 22 | 20 | 08 | 17 | 14 | 09 | 14 | 18 | 06 | 20 | 10 | 21 | 10 | 25 | 18 | 12 | 17 | 10 | 06 |
| 17. Supervision—Human relations | 18 | 17 | 21 | 09 | 12 | 10 | 04 | 14 | 14 | 03 | 13 | 02 | 17 | 09 | 17 | 10 | 16 | 17 | 13 | 07 |
| 18. Supervision—Technical | 19 | 18 | 23 | 10 | 12 | 12 | 04 | 17 | 14 | 08 | 15 | 03 | 17 | 12 | 20 | 10 | 15 | 18 | 16 | 10 |
| 19. Variety | 19 | 24 | 25 | 08 | 17 | 16 | 08 | 14 | 18 | 10 | 19 | 12 | 23 | 10 | 24 | 10 | 15 | 19 | 14 | 06 |
| 20. Working conditions | 12 | 15 | 17 | 04 | 14 | 09 | −02 | 10 | 08 | 05 | 13 | 02 | 17 | 10 | 20 | 11 | 07 | 12 | 08 | −02 |

Note: decimal points omitted.

[a] MIQ scales are in the same order as MSQ scales.

**Table 6. Varimax factor matrix of combined MSQ and MIQ scales (N = 1,755)**

| Scale | I | II | III | IV | Communality | SMC[a] |
|---|---|---|---|---|---|---|
| **MSQ** | | | | | | |
| 1. Ability utilization | 77 | 08 | 04 | 07 | 61 | 65 |
| 2. Achievement | 82 | 14 | 02 | 16 | 71 | 73 |
| 3. Activity | 64 | 16 | 05 | 03 | 44 | 50 |
| 4. Advancement | 64 | 00 | 06 | 37 | 55 | 59 |
| 5. Authority | 68 | 03 | 16 | 00 | 48 | 57 |
| 6. Company policies and practices | 56 | 04 | 05 | 49 | 56 | 57 |
| 7. Compensation | 38 | 02 | —02 | 38 | 27 | 38 |
| 8. Co-workers | 49 | 13 | 06 | 26 | 33 | 37 |
| 9. Creativity | 80 | 03 | 15 | 12 | 68 | 71 |
| 10. Independence | 61 | 15 | 08 | 03 | 40 | 47 |
| 11. Moral values | 60 | 24 | 00 | 14 | 44 | 54 |
| 12. Recognition | 62 | —01 | 06 | 45 | 59 | 61 |
| 13. Responsibility | 85 | 06 | 10 | 10 | 74 | 76 |
| 14. Security | 56 | ˙16 | —02 | 32 | 44 | 50 |
| 15. Social service | 74 | 14 | 02 | —01 | 57 | 60 |
| 16. Social status | 70 | 08 | 10 | 08 | 52 | 56 |
| 17. Supervision—human relations | 48 | 07 | 07 | 71 | 74 | 78 |
| 18. Supervision—technical | 51 | 10 | 07 | 68 | 73 | 77 |
| 19. Variety | 72 | 09 | 10 | 05 | 54 | 58 |
| 20. Working conditions | 46 | 04 | 07 | 29 | 30 | 34 |
| **MIQ** | | | | | | |
| 1. Ability utilization | 14 | 72 | 21 | 03 | 58 | 62 |
| 2. Achievement | 20 | 77 | 25 | —01 | 70 | 73 |
| 3. Activity | 19 | 52 | 33 | 12 | 43 | 50 |
| 4. Advancement | 01 | 69 | 22 | —03 | 52 | 59 |
| 5. Authority | 12 | 08 | 80 | 02 | 66 | 63 |
| 6. Company policies and practices | 09 | 80 | 03 | —02 | 64 | 65 |
| 7. Compensation | 01 | 62 | 22 | —09 | 44 | 49 |
| 8. Co-workers | 10 | 65 | 11 | 10 | 45 | 53 |
| 9. Creativity | 16 | 41 | 61 | —03 | 56 | 60 |
| 10. Independence | 01 | 10 | 47 | 04 | 23 | 34 |
| 11. Moral values | 19 | 64 | 07 | 02 | 45 | 50 |
| 12. Recognition | 03 | 49 | 41 | —12 | 43 | 48 |
| 13. Responsibility | 20 | 40 | 70 | —01 | 69 | 70 |
| 14. Security | 06 | 74 | —03 | 06 | 56 | 57 |
| 15. Social service | 25 | 56 | 26 | 04 | 44 | 59 |
| 16. Social status | 05 | 14 | 62 | 06 | 42 | 46 |
| 17. Supervision—human relations | 07 | 77 | 04 | 07 | 61 | 65 |
| 18. Supervision—technical | 11 | 71 | 19 | 09 | 57 | 61 |
| 19. Variety | 07 | 46 | 46 | 06 | 43 | 46 |
| 20. Working conditions | 00 | 71 | —04 | 03 | 50 | 52 |
| Contribution of factor | 8.60 | 7.22 | 3.05 | 2.09 | 20.97 | |
| Proportion of common variance | .41 | .34 | .14 | .10 | 1.00 | |

Note: decimal points omitted for factor loadings and communalities.
[a] Estimated communalities: squared multiple correlation coefficients.

Four orthogonal factors, accounting for about 50% of the total variance, were extracted from the matrix of intercorrelations. The first factor, which accounted for about 41% of the common variance, had all 20 MSQ scales loading .38 or greater on it. Six MSQ scales also loaded on Factor IV. MSQ scales, in general, had low loadings on Factors II and III. The majority loaded less than .10 on these two factors. The MSQ scale loading highest on these two factors was Moral Values, which loaded .24 on Factor II.

On the other hand, MIQ scales loaded primarily on Factors II and III, and not on Factors I and IV. Seventeen MIQ scales loaded .40 or higher on Factor II, and seven on Factor III. The highest loading by an MIQ scale on the satisfaction factors (I and IV) was .25 for the MIQ Social Service scale, on Factor I. The majority of MIQ scale loadings on Factors I and IV were .10 or less.

These results show that the common variation among MSQ and MIQ scales can be resolved into four factors. Two of these factors are clearly satisfaction factors, and the other two are clearly need factors. This lends further support to the conceptual and measurement distinction between needs and satisfactions as linearly independent systems.

## Curvilinear relationships

To determine further if measured needs and satisfactions were related in some form other than the linear, the relationships between parallel scales on the two questionnaires were tested for curvilinearity. The test involved the computation of the correlation ratio (eta), and the comparison of eta and r (the linear correlation coefficient) according to McNemar's formula.[11] For this analysis, the regression of the MSQ on the MIQ was the relationship investigated (i.e., satisfaction was the dependent variable used in computing eta), since the focus of this Bulletin is on satisfaction as a function of variation in need level. To obtain stable dependent variable means, MIQ scores were grouped into intervals with at least 30 observations in each interval.

The results of this analysis are shown in Table 7. Linear correlations (r) between parallel need and satisfaction scales were significant (p≤.05) on 17 of the 20 scales. The r's were *not* significantly

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[11] McNemar, Q. *Psychological statistics* (third edition), New York: Wiley, 1962. Pages 275-278.

Table 7. Test for curvilinearity of relationships between parallel MSQ and MIQ scales (N = 1,755)

| Scale | r | eta | Significance of Curvilinearity | | |
| | | | F | degrees of freedom | p* |
|---|---|---|---|---|---|
| 1. Ability utilization | .16 | .18 | 1.65 | 8,1745 | |
| 2. Achievement | .29 | .31 | 3.36 | 7,1746 | .01 |
| 3. Activity | .31 | .32 | 0.94 | 11,1742 | |
| 4. Advancement | .02 | .15 | 4.37 | 9,1744 | .001 |
| 5. Authority | .26 | .32 | 4.29 | 14,1739 | .001 |
| 6. Company policies and practices | .04 | .12 | 3.15 | 8,1745 | .01 |
| 7. Compensation | —.11 | .25 | 9.60 | 10,1743 | .001 |
| 8. Co-workers | .22 | .23 | 0.98 | 9,1744 | |
| 9. Creativity | .26 | .28 | 2.08 | 11,1742 | .05 |
| 10. Independence | .20 | .26 | 3.07 | 15,1738 | .001 |
| 11. Moral values | .39 | .43 | 6.28 | 9,1744 | .001 |
| 12. Recognition | —.05 | .14 | 2.72 | 12,1741 | .01 |
| 13. Responsibility | .28 | .30 | 2.32 | 11,1742 | .01 |
| 14. Security | .25 | .28 | 3.42 | 7,1746 | .01 |
| 15. Social service | .42 | .44 | 2.81 | 10,1743 | .01 |
| 16. Social status | .18 | .20 | 1.53 | 13,1740 | |
| 17. Supervision—human relations | .16 | .18 | 1.77 | 8,1745 | |
| 18. Supervision—technical | .18 | .19 | 0.45 | 9,1744 | |
| 19. Variety | .14 | .17 | 1.51 | 11,1742 | |
| 20. Working conditions | —.02 | .16 | 5.01 | 9,1744 | .001 |

* Probability of error in rejecting null hypothesis of no deviation from linearity of means on the dependent variable, if $p \leq .05$.

different from zero for Advancement, Company Policies and Practices and Working Conditions. Eta coefficients (correlation ratio), indicating the magnitude of the total (linear and/or curvilinear) relationship between two variables were statistically significant for all 20 scales. Maximum relationship was observed on the Social Service scale, for which 19% of the variance in satisfaction was associated with variance in need scores.

Statistically significant ($p \leq .05$) curvilinear relationships between need and satisfaction scores were observed on 13 of the 20 scales. Those scales for which the relationships were *not* found to be curvilinear were: Ability Utilization, Activity, Co-workers, Social Status, Supervision—Human Relations, Supervision—Technical and Variety.

These results show that there were significant relationships between measured needs and satisfactions. Parallel scales on all 20 di-

mensions were significantly related either linearly or curvilinearly. However, these relationships were quite low. For the scales with the highest degree of relationship (Social Service) only about 19% of the variability in satisfaction could be predicted from a knowledge of need scores. The next highest relationship showed only about 10% of total variability as common to the two scales. Since the lowest Hoyt reliability coefficient for any of the need or satisfaction scales was .77 (on the MIQ Compensation scale) a *minimum* of .60 of satisfaction score variance was *not* covariant with need score variance. Maximum reliable variance in satisfaction scores not covariant with need score variance was 86%, for the Company Policies and Practices dimension. For this dimension, an eta coefficient of .12 (lowest of the 20 dimensions) accounted for only 1% of the variance in satisfaction scores predictable from need scores, while the maximum amount of covariation possible was 87% (the lower reliability of the pair of scales).

**Summary**

The data presented above indicate that the scales of the MSQ and the MIQ are relatively independent of each other. Linear correlations between the two sets of scales were generally low. Factor analysis yielded two factors for each questionnaire, with almost no overlap in factor loadings. Although linear and/or curvilinear relationships between parallel scales were statistically significant for all dimensions, their magnitude was quite low. In general, then, it appears that the MSQ and the MIQ do measure separate sets of variables even when administered at the same time.

# The Measurement of Reinforcement

The design of the validity studies called for: (1) MIQ and MSQ scores on groups of workers in well-defined, specific jobs; (2) a determination of reinforcement levels for the different jobs, on each reinforcement dimension.

MIQ and MSQ data were obtained for a total sample of 1,743 employees. The jobs of these employees were then coded according to the Dictionary of Occupational Titles (DOT). Only those 3-digit DOT job groups with 30 or more individuals were used in the validity studies.[12] The nineteen job groups retained for study are listed in Table 8.

Table 8. Job groups used in the MIQ validity studies

| Group | Three-digit D.O.T. codes | N |
|---|---|---|
| 1. Accountants | 0-01 | 53 |
| 2. Bookkeepers | 1-01 | 46 |
| 3. Business machine operators | 1-25 | 72 |
| 4. Buyers | 0-74 | 42 |
| 5. Engineers | 0-15, 0-17, 0-18, 0-19 | 38 |
| 6. Field representatives | ......* | 53 |
| 7. Food service workers | 2-29 | 46 |
| 8. General clerks | 1-05 | 101 |
| 9. Housekeeping aides | 2-24 | 47 |
| 10. Laborers | 8-02 | 55 |
| 11. Licensed practical nurses | 2-38 | 48 |
| 12. Managers | 0-97 | 136 |
| 13. Nursing assistants | 2-42 | 48 |
| 14. Packers | 9-68 | 105 |
| 15. Secretaries | 1-33 | 122 |
| 16. Small equipment operators | 7-73 | 46 |
| 17. Stenographers and typists | 1-37 | 33 |
| 18. Truck drivers | 7-36 | 120 |
| 19. Warehousemen | 9-88 | 206 |

* No D.O.T. code for this group. Job involves advising retail distributors in all phases of retail store operation and management.

The nineteen groups available for the validity studies included 1,417 individuals. The largest group was warehousemen (N=26), and the smallest groups were stenographers and typists (N = 33) and

[12] Exception to this rule was made for engineers (DOT 0-15, 0-17, 0-18, and 0-19) who were classified as one group.

engineers (N = 38). The groups ranged across several of the DOT first-digit code categories. Four groups were in the professional and managerial classification (DOT 0); five in clerical and sales (DOT 1); four in service (DOT 2); two in DOT 7; one in DOT 8; two in DOT 9, and none in DOT codes 3, 4, 5, and 6.

The determination of reinforcement levels for these jobs was accomplished by the following ranking procedure. First, each of the 20 reinforcement (i.e., need-satisfaction) dimensions was defined by a descriptive statement. For example, the statement describing the Achievement dimension was "The job provides a feeling of accomplishment."[13] Using these descriptions as the basis for inter-job comparison, judges could then rank the various jobs as to the relative amount of reinforcement each job provides in comparison with the other jobs.

Inter-job comparisons were not possible for 4 of the 20 reinforcement dimensions: Company Policies and Practices, Co-workers, Supervision—Human Relations and Supervision—Technical. For these dimensions, the amount of reinforcement would be unique to the particular company, co-workers, or supervisor, and would not be reflected in variability among jobs. Therefore, these four reinforcement dimensions were not used in the validity studies.

The next step involved the ranking of jobs on the basis of relative amount of reinforcement provided by the job. This was done separately for each of the remaining sixteen reinforcement dimensions. An alternation ranking procedure was used. Each of the five judges[14] was provided with a list of job titles and descriptions for the 19 job groups.[15] In addition, each judge received 16 alternation ranking sheets, one for each reinforcement dimension. Each alternation ranking sheet was identified by the name of the reinforcement dimension and the statement descriptive of the dimension. For each reinforcement dimension, the judges were asked to choose alternately, from the list of jobs, the job which offered the *most* reinforcement and the job which offered the *least* reinforcement. Once a job was chosen, it was crossed off the list and the next selections were based on the remaining jobs. This process was carried out se-

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[13] A list of the statements descriptive of the various reinforcement dimensions appears in the Appendix.

[14] The four authors, and Thomas F. Siess, of the Work Adjustment Project staff, served as the judges. All are psychology Ph.D.'s.

[15] Copies of all forms used are in the Appendix.

parately for each reinforcement dimension. The job chosen as offering the *most* reinforcement was given a rank of 1, the next most reinforcement a rank of 2, and so on, until the job considered least reinforcing was given a rank of 19.

The results of these alternation rankings are shown in Tables 9 and 10. Table 9 shows the median reinforcement level rank assigned to each job on each of the 16 reinforcement dimensions. Table 10 shows the range of assigned ranks for each job and each reinforcement dimension.

Table 9 shows that on 15 of the 16 reinforcement dimensions one job was assigned a median rank of 1, meaning that at least three of the five judges agreed on one job which provided the highest level of reinforcement among the 19 jobs used in the study. Only on the Advancement dimension did a majority of judges fail to agree on a job with highest relative level of reinforcement. Table 9 also shows that a median rank of 1 was given to the Managers on 9 reinforcement dimensions, while Engineers and Licensed Practical Nurses each received median ranks of 1 on two dimensions, and Accountants and Truck Drivers received median ranks of 1 on one dimension each.

Median ranks of 19 (the lowest possible rank) were assigned on only 7 of the 16 dimensions. Laborers received median ranks of 19 on 5 dimensions, Managers and Packers on one dimension each.

Ranges of assigned ranks (Table 10) varied from zero (perfect agreement among all judges) to 17 points out of a possible range of 18 (for Packers on the Independence dimension). The average range across all jobs for the 16 dimensions varied from 3.8 to 10.6. The most consistent judgments (smallest average range) were obtained on the Ability Utilization dimension. Other dimensions ranked relatively consistently were Responsibility, Compensation and Social Status. The dimension with the greatest variability of ranks (largest average range) was Activity. Independence and Security also had relatively high variability of rankings.

Table 9. Median reinforcement level rank for 16 reinforcement dimensions, by job

| Job | Reinforcement dimension[1] | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AU | Ach | Act | Adv | Aut | Com | Cre | Ind | MV | Rec | Res | Sec | SSe | SSt | Var | WC |
| 1. Accountants | 3 | 6 | 9 | 4 | 3 | 5 | 5 | 5 | 16 | 7 | 5 | 1 | 12 | 3 | 7 | 2 |
| 2. Bookkeepers | 8 | 9 | 8 | 5 | 8 | 9 | 9 | 4 | 15 | 10 | 11 | 4 | 15 | 7 | 13 | 5 |
| 3. Business machine operators | 12 | 13 | 5 | 11 | 13 | 11 | 13 | 4 | 6 | 11 | 14 | 10 | 17 | 11 | 16 | 9 |
| 4. Buyers | 5 | 3 | 13 | 4 | 6 | 3 | 4 | 8 | 18 | 2 | 2 | 6 | 10 | 4 | 3 | 5 |
| 5. Engineers | 2 | 1 | 7 | 3 | 4 | 3 | 1 | 6 | 14 | 3 | 5 | 3 | 13 | 2 | 3 | 3 |
| 6. Field representatives | 4 | 3 | 9 | 4 | 2 | 4 | 2 | 9 | 17 | 3 | 3 | 7 | 4 | 5 | 3 | 7 |
| 7. Food service workers | 14 | 16 | 11 | 12 | 15 | 16 | 12 | 15 | 3 | 12 | 13 | 14 | 4 | 13 | 12 | 12 |
| 8. General clerks | 12 | 18 | 15 | 7 | 14 | 18 | 16 | 11 | 10 | 16 | 18 | 16 | 14 | 16 | 13 | 10 |
| 9. Housekeeping aides | 17 | 15 | 11 | 16 | 17 | 18 | 17 | 14 | 4 | 12 | 15 | 17 | 7 | 17 | 16 | 15 |
| 10. Laborers | 19 | 18 | 18 | 19 | 19 | 15 | 17 | 11 | 5 | 18 | 18 | 19 | 17 | 19 | 14 | 17 |
| 11. Licensed practical nurses | 7 | 6 | 3 | 10 | 7 | 12 | 7 | 15 | 1 | 5 | 7 | 5 | 1 | 6 | 5 | 11 |
| 12. Managers | 1 | 2 | 1 | 4 | 1 | 1 | 3 | 11 | 19 | 1 | 1 | 4 | 6 | 1 | 1 | 1 |
| 13. Nursing assistants | 13 | 9 | 8 | 12 | 9 | 16 | 14 | 16 | 4 | 8 | 11 | 10 | 2 | 9 | 8 | 13 |
| 14. Packers | 18 | 17 | 6 | 17 | 17 | 14 | 18 | 13 | 6 | 18 | 17 | 16 | 18 | 17 | 19 | 18 |
| 15. Secretaries | 6 | 6 | 7 | 10 | 6 | 8 | 6 | 14 | 14 | 6 | 6 | 8 | 6 | 7 | 6 | 6 |
| 16. Small equipment operators | 12 | 11 | 14 | 10 | 10 | 8 | 11 | 8 | 9 | 14 | 10 | 12 | 16 | 12 | 12 | 14 |
| 17. Stenographers and typists | 10 | 11 | 10 | 7 | 11 | 13 | 12 | 12 | 11 | 10 | 11 | 9 | 10 | 11 | 14 | 7 |
| 18. Truck drivers | 14 | 12 | 15 | 17 | 11 | 6 | 10 | 1 | 7 | 13 | 9 | 11 | 14 | 12 | 10 | 13 |
| 19. Warehousemen | 17 | 15 | 16 | 16 | 14 | 10 | 15 | 13 | 8 | 17 | 16 | 13 | 15 | 16 | 15 | 18 |

[1] Reinforcement dimensions are in the same order as in Table 7, p. 20. Reinforcers CPP, Cow, SHR, ST (Company Policies and Practices, Co-workers, Supervision—Human Relations, Supervision—Technical) were not included in the validity studies (see p. 23).

**Table 10. Range of reinforcement level ranks for 16 reinforcement dimensions, by job**

| Job | AU | Ach | Act | Adv | Aut | Com | Cre | Ind | MV | Rec | Res | Sec | SSe | SSt | Var | WC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Accountants | 4 | 6 | 10 | 14 | 3 | 3 | 4 | 7 | 6 | 4 | 4 | 1 | 6 | 2 | 8 | 1 |
| 2. Bookkeepers | 9 | 6 | 13 | 6 | 6 | 9 | 9 | 7 | 15 | 6 | 5 | 10 | 13 | 3 | 12 | 6 |
| 3. Business machine operators | 4 | 7 | 10 | 14 | 9 | 5 | 8 | 10 | 7 | 5 | 9 | 3 | 4 | 3 | 11 | 7 |
| 4. Buyers | 2 | 5 | 9 | 4 | 3 | 4 | 2 | 16 | 3 | 3 | 2 | 13 | 6 | 4 | 3 | 5 |
| 5. Engineers | 3 | 4 | 9 | 5 | 3 | 2 | 1 | 9 | 14 | 5 | 2 | 3 | 4 | 3 | 4 | 2 |
| 6. Field representatives | 4 | 5 | 11 | 4 | 2 | 2 | 3 | 16 | 4 | 1 | 1 | 11 | 2 | 3 | 2 | 3 |
| 7. Food service workers | 4 | 11 | 9 | 8 | 8 | 6 | 8 | 12 | 6 | 7 | 3 | 7 | 8 | 2 | 4 | 8 |
| 8. General clerks | 6 | 7 | 12 | 7 | 4 | 6 | 2 | 9 | 4 | 10 | 5 | 11 | 13 | 14 | 8 | 6 |
| 9. Housekeeping aides | 2 | 7 | 13 | 3 | 2 | 1 | 2 | 16 | 6 | 5 | 6 | 8 | 5 | 3 | 6 | 7 |
| 10. Laborers | 2 | 3 | 4 | 6 | 5 | 5 | 8 | 2 | 7 | 2 | 8 | 4 | 10 | 1 | 7 | 3 |
| 11. Licensed practical nurses | 2 | 3 | 15 | 6 | 9 | 7 | 8 | 14 | 14 | 5 | 3 | 6 | 0 | 9 | 4 | 8 |
| 12. Managers | 2 | 3 | 9 | 4 | 0 | 0 | 3 | 18 | 0 | 1 | 0 | 11 | 2 | 0 | 0 | 0 |
| 13. Nursing assistants | 5 | 6 | 10 | 8 | 7 | 3 | 7 | 6 | 11 | 8 | 9 | 11 | 1 | 6 | 6 | 5 |
| 14. Packers | 4 | 4 | 13 | 6 | 5 | 4 | 12 | 17 | 8 | 6 | 3 | 8 | 7 | 4 | 2 | 6 |
| 15. Secretaries | 6 | 8 | 10 | 6 | 5 | 4 | 2 | 12 | 4 | 4 | 1 | 5 | 6 | 4 | 6 | 4 |
| 16. Small equipment operators | 3 | 4 | 7 | 6 | 5 | 3 | 4 | 7 | 4 | 5 | 6 | 9 | 5 | 3 | 7 | 4 |
| 17. Stenographers and typists | 2 | 7 | 14 | 12 | 7 | 4 | 9 | 10 | 5 | 7 | 5 | 7 | 3 | 7 | 8 | 3 |
| 18. Truck drivers | 6 | 9 | 6 | 5 | 8 | 4 | 5 | 7 | 6 | 10 | 4 | 14 | 10 | 8 | 7 | 7 |
| 19. Warehousemen | 3 | 4 | 12 | 8 | 7 | 8 | 7 | 7 | 10 | 6 | 2 | 6 | 8 | 4 | 9 | 5 |
| Average range | 3.8 | 5.2 | 10.3 | 5.8 | 5.2 | 4.2 | 5.5 | 10.6 | 6.3 | 5.3 | 4.1 | 7.8 | 5.9 | 4.4 | 6.0 | 4.7 |

[1] Reinforcement dimensions are in the same order as in Table 7, p. 20. Reinforcers CPP, Cow, SHR, ST (Company Policies and Practices, Co-workers, Supervision—Human Relations, Supervision—Technical) were not included in the validity studies (see p. 23).

# Methodology for the Validity Studies

## Design

The studies of construct validity for the MIQ scales reported on the following pages are based on Proposition III of the *Theory of Work Adjustment*.[16] This proposition states: "Satisfaction is a function of the correspondence between the reinforcer system of the work environment and the individual's set of needs, provided that the individual's abilities correspond with the ability requirements of the work environment."[17] Two assumptions were made for the present studies: (1) that the abilities of *employed* individuals corresponded with the ability requirements of their jobs;[18] and (2) that dissatisfaction (i.e., lower satisfaction scores) was expected *only* when need level exceeded reinforcement level, but *not* when reinforcement level exceeded need level.

Using the preceding premises, it is possible to validate each need scale through a research design which treats need as the independent variable, satisfaction as the dependent variable, and reinforcement as the moderating (or modifying) variable. This design would ask the following question: Given groups with different levels of need (i.e., "high" need level vs. "low" need level), would satisfaction scores for these groups differ if they were "exposed" to different levels of reinforcement (i.e., "high" vs. "low" reinforcement levels)? If the need scale is valid (and if Proposition III of the *Theory* is correct, and the measures of satisfaction and reinforce-

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[16] *Op. cit.*

[17] Ibid., page 10.

[18] To fulfill all conditions required by Proposition III, it would be necessary to have measures of the abilities of a sample of employees and the ability requirements for their jobs, in addition to measures of needs, reinforcement levels and satisfaction. Since ability measurements were not available for the samples in these validity studies, the condition of ability-requirement correspondence was inferred indirectly. Proposition II of the *Theory* states, in part: "Satisfactoriness is a function of correspondence between an individual's set of abilities and the ability requirements of the work environment. . ." Proposition VI states: "The probability of an individual's being forced out of the work environment is inversely related to his measured satisfactoriness." These two propositions taken together imply that the probability of an individual's being forced out of the work environment is inversely related to the correspondence between an individual's abilities and the ability requirements of the work environment. Therefore, the state of being employed (not having been forced out of the work environment) can be taken as indication of at least a minimal level of abilities-requirements correspondence. Thus, a sample of *employed* persons can be assumed to meet, at least minimally, the condition of ability-requirement correspondence specified by Proposition III.

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ment are valid), the following results should be observed in the data:

1. The variability of satisfaction scores for a group of "high-need" individuals will be greater than the variability of satisfaction scores for a group of "low-need" individuals, when both groups include individuals exposed to both high and low levels of reinforcement. This difference in satisfaction score variabilities would reflect the greater possibility of needs exceeding available reinforcers within the "high-need" group, compared with the "low-need" group.

2. The "high-need-high-reinforcement" group should have the highest satisfaction scores, and the "high-need-low-reinforcement" group should have the lowest satisfaction scores. In addition, the difference between the satisfaction scores of the "high-need-high-reinforcement" group and those of the "high-need-low-reinforcement" should be greater than the corresponding difference between the "low-need-high-reinforcement" group and the "low-need-low-reinforcement" group. Furthermore, the difference in satisfaction scores between the "high-need-high-reinforcement" group and the "high-need-low-reinforcement" group should be greater than the corresponding difference between the total "high-reinforcement" group (without regard to need level) and the total "low-reinforcement" group (also without regard to need level).

3. If reinforcement level is held constant, variation in need level should be related to variation in satisfaction. Specifically, the "high-need-low-reinforcement" group should have lower satisfaction scores than the "low-need-low-reinforcement" group.

In the validity studies, the three expectations listed above were phrased as research hypotheses and will be referred to subsequently as Hypotheses 1, 2, and 3 respectively.

### Samples

The design described above required four groups for each need scale to be validated: a "high-need-high-reinforcement" group, a "high-need-low-reinforcement" group, a "low-need-high-reinforcement" group, and a "low-need-low-reinforcement" group. These groups were drawn from the sample of 1,417 individuals whose jobs

had been ranked for reinforcement level. (See pp. 22-24.) Because of the negatively skewed distributions of the need scores, the four groups required above were selected first on the basis of reinforcement level, rather than need level, to insure that a sufficient number of individuals were drawn for each reinforcement level. The "high-reinforcement" group was defined as those job groups receiving a median rank of 1 through 5. The "low-reinforcement" group consisted of those groups receiving median ranks of 15 through 19. Groups receiving median ranks of 6 through 14 were not used in the study. This procedure was undertaken separately for each of the 16 reinforcement dimensions which were ranked.

Finally, MIQ scores for the "high-" and "low-reinforcement" groups were combined and quartiles determined for the distribution. "High need" was defined by scores equal to or higher than the third quartile score, while scores equal to or lower than the first quartile score defined "low need." Again, this was done separately for each of the 16 need dimensions paralleling the 16 reinforcement

**Table 11. Job groups for high and low reinforcement groups, and need scale cutting scores for the high and low need groups, by reinforcement dimension**

| Reinforcement dimension | Job groups | | Cutting Scores | |
|---|---|---|---|---|
| | High reinforcement group | Low reinforcement group | High need group[b] | Low need group[c] |
| Ability utilization | 1, 4, 5, 6, 12[a] | 9, 10, 14, 19 | 24 | 20 |
| Achievement | 4, 5, 6, 12 | 8, 9, 10, 14, 19 | 23 | 20 |
| Activity | 3, 11, 12 | 8, 10, 18, 19 | 22 | 19 |
| Advancement | 1, 2, 4, 5, 6, 12 | 9, 10, 14, 18, 19 | 24 | 20 |
| Authority | 1, 5, 6, 12 | 7, 9, 10, 14 | 20 | 15 |
| Compensation | 1, 4, 5, 6, 12 | 7, 8, 9, 10, 13 | 23 | 19 |
| Creativity | 1, 4, 5, 6, 12 | 8, 9, 10, 14, 19 | 22 | 19 |
| Independence | 1, 2, 3, 18 | 7, 11, 13 | 19 | 14 |
| Moral values | 7, 9, 10, 11, 13 | 1, 2, 4, 6, 12 | 24 | 20 |
| Recognition | 4, 5, 6, 11, 12 | 8, 10, 14, 19 | 22 | 19 |
| Responsibility | 1, 4, 5, 6, 12 | 8, 9, 10, 14, 19 | 21 | 18 |
| Security | 1, 2, 5, 11, 12 | 8, 9, 10, 14 | 25 | 20 |
| Social service | 6, 7, 11, 13 | 2, 3, 10, 14, 16, 19 | 22 | 20 |
| Social status | 1, 4, 5, 6, 12 | 8, 9, 10, 14, 19 | 19 | 14 |
| Variety | 4, 5, 6, 11, 12 | 3, 9, 14, 19 | 21 | 18 |
| Working conditions | 1, 2, 4, 5, 12 | 9, 10, 14, 19 | 24 | 20 |

[a] Numbers refer to the list of job groups in the first column of Table 8, p. 22.
[b] Seventy-fifth percentile of need scale score distribution for combined high and low reinforcement groups.
[c] Twenty-fifth percentile of need scale score distributions for combined high and low reinforcement groups.

dimensions mentioned above. The job groups constituting "high-" and "low-reinforcement" groups and the MIQ cutting scores for "high-" and "low-need" groups are shown for each dimension in Table 11.

# Results

## Analysis of satisfaction scores

This section discusses, scale by scale, the results of an analysis based on the research design described above. The data are satisfaction scores for groups cross-classified by need and reinforcement level.

**Ability Utilization.** Table 11 shows that five job groups constituted the high-reinforcement group for the Ability Utilization dimension: accountants, buyers, engineers, field representatives and managers. The low-reinforcement group for this dimension was composed of four job groups: housekeeping aides, laborers, packers and warehousemen. For these combined nine job groups, the high-need group consisted of those individuals who scored 24 or higher on the MIQ Ability Utilization scale. The low-need group included those with scores of 20 or less.

Table 12 shows means and variances of satisfaction scores for the high- and low-need groups, for the high- and low-reinforcement groups, and for the four need-reinforcement group combinations resulting from the cross-classification of need and reinforcement. The variance ratio comparing variances of the high-need and low-need groups yields a test of the first hypothesis. For this scale the

**Table 12. Means and variances of satisfaction scores for Ability Utilization scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 203 | 18.6 | 35.27 |
| 2. Low need | 285 | 17.8 | 15.16 |
| 3. High need, high reinforcement | 120 | 21.0 | 17.32 |
| 4. High need, low reinforcement | 83 | 15.1 | 40.88 |
| 5. Low need, high reinforcement | 83 | 19.8 | 7.55 |
| 6. Low need, low reinforcement | 202 | 16.9 | 15.94 |
| 7. High reinforcement | 203 | 20.5 | 13.65 |
| 8. Low reinforcement | 285 | 16.4 | 23.76 |

Variance ratio
    group 1 vs. group 2: $F(202, 284) = 2.33$ ($p \leq .01$)
F-tests of mean differences
    group 3 vs. group 4: $F(1, 201)$   = 69.25 ($p \leq .001$)
    group 5 vs. group 6: $F(1, 283)$   = 41.80 ($p \leq .001$)
    group 4 vs. group 6: $F(1, 283)$   =  8.24 ($p \leq .01$)
    group 7 vs. group 8: $F(1, 486)$   = 102.95 ($p \leq .001$)

variance ratio was statistically significant and in the predicted direction, thus supporting Hypothesis 1.

Hypothesis 2 specifies that the high-need-high-reinforcement group should have the highest mean satisfaction score, and the high-need-low-reinforcement group the lowest mean satisfaction score. The data for the Ability Utilization scale support this hypothesis. Mean satisfaction score was 21.0 for the high-need-high-reinforcement group, and 15.1 for the high-need-low-reinforcement group. Furthermore, the difference in mean satisfaction score between the high-need-high-reinforcement and high-need-low-reinforcement groups (5.9 points) was larger than the corresponding difference between (1) the low-need-high-reinforcement and low-need-low-reinforcement groups (2.9 points), and (2) the high-reinforcement and low-reinforcement groups (4.1 points).

Hypothesis 3 refers to the relationship between need and satisfaction when reinforcement is held constant. For this hypothesis, the relevant comparison is between mean satisfaction scores for the high-need-low-reinforcement group and the low-need-low-reinforcement group. An F-test of this difference yielded a value of 8.24, which was significant at the .01 level.

The results obtained for the Ability Utilization scale were in accordance with expectations. Satisfaction for the high-need group was more variable than the low-need group; the high-need-high-reinforcement group expressed the most satisfaction with the ability utilization in their jobs, and the high-need-low-reinforcement group expressed the least; and the high-need-low-reinforcement group was significantly less satisfied than the low-need-low-reinforcement group.

**Achievement.** For the Achievement dimension, buyers, engineers, field representatives and managers composed the high-reinforcement group, while general office clerks, housekeeping aides, laborers, packers, and warehousemen composed the low-reinforcement group. The high-need group was defined by a score of 23 on the MIQ Achievement scale, and the low-need group included those with scores of 20 or less.

The means and variances of satisfaction scores on the Achievement dimension for the various groups are listed in Table 13. The variance of satisfaction scores for the high-need group was greater than that of the low-need group. The variance ratio of 1.62 was statistically significant at the .01 level, thus supporting Hypothesis 1.

**Table 13. Means and variances of satisfaction scores for Achievement scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need ........................................................... | 282 | 20.6 | 13.73 |
| 2. Low need ........................................................... | 311 | 18.9 | 8.47 |
| 3. High need, high reinforcement ........................ | 115 | 21.8 | 9.46 |
| 4. High need, low reinforcement ......................... | 167 | 19.7 | 15.07 |
| 5. Low need, high reinforcement ........................ | 81 | 20.5 | 4.08 |
| 6. Low need, low reinforcement ......................... | 230 | 18.4 | 8.89 |
| 7. High reinforcement ........................................ | 196 | 21.2 | 7.61 |
| 8. Low reinforcement ........................................ | 397 | 19.0 | 11.91 |

Variance ratio
  group 1 vs. group 2: $F(281, 310) = 1.62$ ($p \leq .01$)
F-tests of mean differences
  group 3 vs. group 4: $F(1, 280) = 22.26$ ($p \leq .001$)
  group 5 vs. group 6: $F(1, 309) = 40.60$ ($p \leq .001$)
  group 4 vs. group 6: $F(1, 395) = 15.47$ ($p \leq .001$)
  group 7 vs. group 8: $F(1, 591) = 64.88$ ($p \leq .001$)

The high-need-high-reinforcement group had a mean satisfaction score of 21.8, which was the highest of the four cross-classified groups. However, the high-need-low-reinforcement group did not have the lowest average satisfaction score, as predicted.

In addition, the mean difference between the high-need-high-reinforcement and the high-need-low-reinforcement groups was 2.1 points; the mean difference between the low-need-high-reinforcement and the low-need-low-reinforcement groups was 2.1 points; and the mean difference between the high- and low-reinforcement groups was 2.2 points. These data do not support Hypothesis 2.

The data also do not support Hypothesis 3, since the mean satisfaction score for the high-need-low-reinforcement group was greater than that for the low-need-low-reinforcement group.

The results for the Achievement scale support Hypothesis 1, and partially support Hypothesis 2, in that the high-need-high-reinforcement group was the most satisfied group. These results indicate some evidence of construct validity for this MIQ scale.

**Activity.** The high-reinforcement group for this dimension included business machine operators, licensed practical nurses and managers. The low-reinforcement group consisted of general office clerks, laborers, truck drivers and warehousemen. For this dimension the high-need group was defined by scores of 22 or higher on

the MIQ Activity scale and the low-need group by scores of 19 or less. Table 14 summarizes the data for the Activity dimension.

Table 14 shows that the variance of satisfaction scores for the high-need group was significantly greater than that of the low-need group, thereby supporting Hypothesis 1. However, no difference in mean satisfaction score was observed between the high-need-high-reinforcement group and the high-need-low-reinforcement group. This finding does not conform to expectations.

**Table 14. Means and variances of satisfaction scores for Activity scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need .......................................................................................... | 191 | 21.9 | 9.80 |
| 2. Low need .......................................................................................... | 272 | 19.8 | 6.42 |
| 3. High need, high reinforcement ............................. | 76 | 21.9 | 13.77 |
| 4. High need, low reinforcement ............................. | 115 | 21.9 | 7.28 |
| 5. Low need, high reinforcement ............................. | 97 | 20.8 | 4.17 |
| 6. Low need, low reinforcement ............................. | 175 | 19.2 | 6.78 |
| 7. High reinforcement ................................................. | 173 | 21.3 | 8.63 |
| 8. Low reinforcement .............................................. | 290 | 20.3 | 8.65 |

Variance ratio
    group 1 vs. group 2: $F(190, 271) = 1.53$ ($p \le .01$)
F-tests of mean differences
    group 3 vs. group 4: $F(1, 189) = 0.00$
    group 5 vs. group 6: $F(1, 270) = 26.76$ ($p \le .001$)
    group 4 vs. group 6: $F(1, 288) = 70.27$ ($p \le .001$)
    group 7 vs. group 8: $F(1, 461) = 13.14$ ($p \le .001$)

It will be recalled that the average range of ranks assigned for the Activity dimension was relatively large, in comparison with the average ranges for most other scales. (See Table 10, p. 26.) The judges varied from 4 to as many as 15 ranks in the rankings assigned to the different jobs along a "reinforcement-by-activity" dimension. In view of this relative lack of agreement among the judges, it was thought that the non-significant finding for the high-need groups might have been due to the use of poorly-defined high- and low-reinforcement groups. To improve the composition of these groups, it was decided to include only those job groups with median ranks of 1, 2, or 3 in the high-reinforcement group, and those with median ranks of 17, 18, or 19 in the low-reinforcement group. Thus, only licensed practical nurses and managers were included in the high-reinforcement group and only laborers in the low-reinforce-

ment group. The summary data on the Activity scale for these newly constituted "reinforcement" groups are shown in Table 15.

Using the extreme reinforcement groups, the variance comparison was again statistically significant, but in the direction opposite from that predicted.

Table 15. Means and variances of satisfaction scores for Activity scale, using extreme reinforcement groups, by need and reinforcement groups

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 61 | 22.8 | 5.83 |
| 2. Low need | 60 | 19.6 | 11.40 |
| 3. High need, high reinforcement | 54 | 23.0 | 6.02 |
| 4. High need, low reinforcement | 7 | 21.9 | 3.81 |
| 5. Low need, high reinforcement | 39 | 21.0 | 4.42 |
| 6. Low need, low reinforcement | 21 | 16.8 | 12.96 |
| 7. High reinforcement | 93 | 22.2 | 6.21 |
| 8. Low reinforcement | 28 | 18.1 | 15.40 |

Variance ratio
group 1 vs. group 2: $F_{(59, 60)} = 1.96$ ($p \leq .01$)
F-tests of mean differences
group 3 vs. group 4: $F_{(1, 59)} = 1.35$
group 5 vs. group 6: $F_{(1, 58)} = 33.35$ ($p \leq .01$)
group 4 vs. group 6: $F_{(1, 26)} = 12.33$ ($p \leq .01$)
group 7 vs. group 8: $F_{(1, 119)} = 43.62$ ($p \leq .001$)

Within the high-need group, the mean satisfaction scores were 23.0 for the high-reinforcement group, and 21.9 for the low-reinforcement group. This mean difference of 2.1, while in the predicted direction, was not statistically significant. For this second analysis, however, the high-need-high-reinforcement group did obtain the highest mean satisfaction score, but the lowest mean satisfaction score did not occur for the high-need-low-reinforcement group.

Thus, even with further refinement of the high- and low-reinforcement groups, most of the expected differences were not observed.

**Advancement.** Six job groups composed the high-reinforcement group for the Advancement dimension: accountants, bookkeepers, buyers, engineers, field representatives, and managers. The low-reinforcement group was comprised of housekeeping aides, laborers, packers, truck drivers, and warehousemen. An MIQ Advancement scale score of 24 or higher defined the high-need group. The low-need group was defined by a score of 20 or less.

The findings for the Advancement dimension are shown in Table 16. The variance of satisfaction scores for the high-need group was greater than that of the low-need group. The variance ratio, statistically significant at the .01 level, supports Hypothesis 1.

**Table 16. Means and variances of satisfaction scores for Advancement scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 336 | 15.8 | 35.44 |
| 2. Low need | 304 | 16.5 | 20.16 |
| 3. High need, high reinforcement | 175 | 18.1 | 28.91 |
| 4. High need, low reinforcement | 161 | 13.4 | 31.54 |
| 5. Low need, high reinforcement | 80 | 19.0 | 9.43 |
| 6. Low need, low reinforcement | 224 | 15.6 | 21.07 |
| 7. High reinforcement | 255 | 18.4 | 22.92 |
| 8. Low reinforcement | 385 | 14.7 | 26.54 |

Variance ratio
    group 1 vs. group 2: $F(335, 303) = 1.75$ (p $\leqq$ .01)
F-tests of mean differences
    group 3 vs. group 4: $F(1, 344) = 61.58$ (p $\leqq$ .001)
    group 5 vs. group 6: $F(1, 302) = 43.08$ (p $\leqq$ .001)
    group 4 vs. group 6: $F(1, 383) = 17.64$ (p $\leqq$ .001)
    group 7 vs. group 8: $F(1, 638) = 81.08$ (p $\leqq$ .001)

The mean satisfaction score of the high-need-high-reinforcement group was 18.1 and the high-need-low-reinforcement group obtained a mean satisfaction score of 13.4. While this 4.7-point difference was statistically significant at the .001 level, the high-need-high-reinforcement group did not have the highest mean satisfaction score among the four cross-classified groups. This was obtained by the low-need-high-reinforcement group with a mean satisfaction score of 19.0. However, this difference of 0.9 points between the two high-reinforcement groups was not statistically significant.

The mean difference of 4.7 points between the high-need groups was greater than the mean difference of 3.4 points between the low-need groups and the mean difference of 3.7 points between reinforcement groups. These findings generally support Hypothesis 2.

In accordance with Hypothesis 3, the mean difference of 2.2 points between the two low-reinforcement groups was statistically significant at the .001 level, and in the predicted direction.

Thus, except for the finding that the high-need-high-reinforcement group did not obtain the highest mean satisfaction score, the

results for the Advancement scale are in accordance with predictions.

**Authority.** For the Authority dimension, the high-reinforcement group included accountants, engineers, field representatives, and managers. In the low-reinforcement group were food service workers, housekeeping aides, laborers, and packers. The high-need group was defined by a score of 20 or greater on the MIQ Authority scale. The low-need group included those with scores of 15 or less. Table 17 shows the data pertaining to this dimension.

As shown in Table 17, the variance of satisfaction-with-authority scores for the high-need group was 16.18, and that of the low-need group was 11.57. The variance ratio of 1.40 was significant at the .05 level, thus supporting Hypothesis 1.

**Table 17. Means and variances of satisfaction scores for Authority scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 191 | 20.2 | 16.18 |
| 2. Low need | 176 | 16.8 | 11.57 |
| 3. High need, high reinforcement | 150 | 21.1 | 9.10 |
| 4. High need, low reinforcement | 41 | 16.7 | 27.46 |
| 5. Low need, high reinforcement | 46 | 18.8 | 8.48 |
| 6. Low need, low reinforcement | 130 | 16.2 | 10.92 |
| 7. High reinforcement | 196 | 20.6 | 9.88 |
| 8. Low reinforcement | 171 | 16.3 | 14.81 |

Variance ratio
 group 1 vs. group 2: $F(190, 175) = 1.40$ $(p \leqslant .05)$
F-tests of mean differences
 group 3 vs. group 4: $F(1, 189) = 36.95$ $(p \leqslant .001)$
 group 5 vs. group 6: $F(1, 174) = 24.89$ $(p \leqslant .001)$
 group 4 vs. group 6: $F(1, 169) = 0.62$
 group 7 vs. group 8: $F(1, 365) = 136.04$ $(p \leqslant .001)$

The highest mean satisfaction score was 21.1, and it belonged to the high-need-high-reinforcement group. While the lowest mean satisfaction score was obtained by the low-need-low-reinforcement group, the difference between the means of the two low-reinforcement groups was not statistically significant.

Mean satisfaction score difference between the two high-need groups was 4.4 points. This mean difference was statistically significant and greater than that between the low-need groups (2.6 points). The difference between the high-need groups was only

slightly larger than that between high- and low-reinforcement groups (4.3 points).

In general, then, these results show some confirmation of the theoretical expectations. The satisfaction score variance of the high-need group was larger than that of the low-need group. In addition, the high-need-high-reinforcement group was the most satisfied group, and reinforcement had a greater effect for the high-need groups than it did for the low-need groups.

**Compensation.** The following five job groups were included in the high-reinforcement group for the Compensation dimension: accountants, buyers, engineers, field representatives, and managers. The low-reinforcement group included food service workers, general office clerks, housekeeping aides, laborers, and nursing assistants. The high-need group was defined by MIQ Compensation scale scores of 23 or greater. The low-need group was defined by scores of 19 or less. The pertinent validation data for the Compensation scale are shown in Table 18.

As predicted, the variance of satisfaction scores for the high-need group was greater than that of the low-need group. The variance ratio was statistically significant, confirming Hypothesis 1.

The highest mean satisfaction score for the four cross-classified groups was 18.7, but it was obtained by the low-need-low-reinforce-

Table 18. Means and variances of satisfaction scores for Compensation scale, by need and reinforcement groups

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 172 | 15.5 | 30.06 |
| 2. Low need | 172 | 17.8 | 22.48 |
| 3. High need, high reinforcement | 92 | 15.6 | 25.38 |
| 4. High need, low reinforcement | 80 | 15.2 | 35.76 |
| 5. Low need, high reinforcement | 67 | 18.7 | 18.86 |
| 6. Low need, low reinforcement | 105 | 17.2 | 24.12 |
| 7. High reinforcement | 159 | 16.9 | 24.73 |
| 8. Low reinforcement | 185 | 16.3 | 29.90 |

Variance ratio
    group 1 vs. group 2: $F_{(171, 171)} = 1.34$ ($p \leq .05$)
F-tests of mean differences
    group 3 vs. group 4: $F_{(1, 170)} = 0.52$
    group 5 vs. group 6: $F_{(1, 170)} = 3.98$ ($p \leq .05$)
    group 4 vs. group 6: $F_{(1, 183)} = 5.75$ ($p \leq .05$)
    group 7 vs. group 8: $F_{(1, 342)} = 1.02$

ment group. In addition, the difference between mean satisfaction scores for the two high-need groups was not statistically significant.

For the Compensation dimension, these results which were contrary to expectations could not be attributed to high variability in the ranking of jobs according to reinforcement level. The average range of assigned ranks for this dimension was relatively small (see Table 10). However, it was still possible that, even with high agreement on reinforcement-level rankings, the job groups selected for high- and low-reinforcement groups were not far enough apart on the Compensation-reinforcement dimension to yield the necessary contrast in satisfaction. The data were therefore re-analyzed for only those job groups with median ranks of 1, 2, or 3 for the high-reinforcement group and 17, 18, or 19 for the low-reinforcement group. The revised high-reinforcement group then consisted of buyers, engineers, and managers, while the new low-reinforcement group included general office clerks and housekeeping aides.

The result of the second analysis for the Compensation scale data are summarized in Table 19. The comparison of variances between need groups yielded a non-significant result. The variance for the high-need group was 27.43, and that of the low-need group was 21.81. The highest mean satisfaction score (18.8) belonged to the low-need-high-reinforcement group. However, the mean satisfaction score for the high-need-high-reinforcement group was 1.8 points

**Table 19. Means and variances of satisfaction scores for Compensation scale, using extreme reinforcement groups, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 106 | 14.3 | 27.43 |
| 2. Low need | 179 | 17.6 | 21.81 |
| 3. High need, high reinforcement | 57 | 15.2 | 24.24 |
| 4. High need, low reinforcement | 49 | 13.4 | 30.04 |
| 5. Low need, high reinforcement | 103 | 18.8 | 15.87 |
| 6. Low need, low reinforcement | 76 | 15.9 | 24.92 |
| 7. High reinforcement | 160 | 17.5 | 21.87 |
| 8. Low reinforcement | 125 | 14.9 | 28.14 |

Variance ratio
  group 1 vs. group 2: $F_{(105, 178)} = 1.26$
F-tests of mean differences
  group 3 vs. group 4: $F_{(1, 104)} = 4.20$ ($p \leq .05$)
  group 5 vs. group 6: $F_{(1, 177)} = 22.48$ ($p \leq .001$)
  group 4 vs. group 6: $F_{(1, 123)} = 6.63$ ($p \leq .01$)
  group 7 vs. group 8: $F_{(1, 283)} = 19.89$ ($p \leq .001$)

higher than that of the high-need-low-reinforcement group. This difference was statistically significant at the .05 level, and in the predicted direction.

Although a statistically significant difference was found for the high-need groups, other findings did not support expectations. The difference in means was larger for the low-need groups than for the high-need groups. Little evidence for the construct validity of the MIQ Compensation scale is to be found in these results.

**Creativity.** The high-reinforcement group for the Creativity dimension included accountants, buyers, engineers, field representatives, and managers. The low-reinforcement group included general office clerks, housekeeping aides, laborers, packers, and warehousemen. The cutting score on the MIQ Creativity scale for the high-need group was 22, and for the low-need group, 19. Table 20 summarizes the validation data for this scale.

**Table 20. Means and variances of satisfaction scores for Creativity scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 220 | 19.2 | 28.95 |
| 2. Low need | 260 | 16.5 | 12.75 |
| 3. High need, high reinforcement | 117 | 21.5 | 15.61 |
| 4. High need, low reinforcement | 103 | 16.6 | 31.57 |
| 5. Low need, high reinforcement | 31 | 19.2 | 10.27 |
| 6. Low need, low reinforcement | 229 | 16.2 | 12.07 |
| 7. High reinforcement | 148 | 21.0 | 15.35 |
| 8. Low reinforcement | 332 | 16.3 | 18.09 |

Variance ratio
    group 1 vs. group 2: $F(219, 259) = 2.27 \ (p \leq .01)$
F-tests of mean differences
    group 3 vs. group 4: $F(1, 118) = 61.38 \ (p \leq .001)$
    group 5 vs. group 6: $F(1, 258) = 23.42 \ (p \leq .001)$
    group 4 vs. group 6: $F(1, 330) = 0.84$
    group 7 vs. group 8: $F(1, 478) = 131.76 \ (p \leq .001)$

The variance of the satisfaction scores for the high-need group was 28.95, and that of the low-need group was 12.75. The F-value of the variance ratio was 2.27 which was statistically significant well beyond the .01 level. The highest mean satisfaction score was obtained by the high-need-high-reinforcement group, as predicted. The lowest mean was obtained by the low-need-low-reinforcement

group. The mean difference between high-need groups was 4.9 points which was statistically significant at the .001 level. Between low-need groups, the mean difference was 3.0 points. The mean difference between the low-reinforcement groups was not statistically significant.

These results follow several of the predictions. Not only was the variance of satisfaction scores greater for the high-need group, compared with the low-need group, but the high-need-high-reinforcement group had the highest mean satisfaction score among the four groups, and the differential effect of high- or low-reinforcement on satisfaction was greater for the high-need groups than for those with relatively low need levels. These findings, therefore, indicate some construct validity for the MIQ Creativity scale.

**Independence.** The high-reinforcement group for the Independence dimension consisted of accountants, bookkeepers, business machine operators, and truck drivers. The low-reinforcement group for this dimension included food service workers, licensed practical nurses, and nursing assistants. MIQ Independence scale scores of 19 or higher defined the high-need group. Scores of 14 or less defined the low-need group.

The results for the Independence scale are shown in Table 21. The variance ratio for the high-need and low-need groups yielded an F-value of 1.08 which was not statistically significant. Further-

**Table 21. Means and variances of satisfaction scores for Independence scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 145 | 20.9 | 11.66 |
| 2. Low need | 114 | 18.5 | 12.62 |
| 3. High need, high reinforcement | 105 | 21.2 | 12.12 |
| 4. High need, low reinforcement | 40 | 20.1 | 9.86 |
| 5. Low need, high reinforcement | 63 | 18.9 | 10.31 |
| 6. Low need, low reinforcement | 51 | 18.0 | 15.28 |
| 7. High reinforcement | 168 | 20.3 | 12.67 |
| 8. Low reinforcement | 91 | 18.9 | 13.93 |

Variance ratio
  group 1 vs. group 2: $F_{(113, 144)} = 1.08$
F-tests of mean differences
  group 3 vs. group 4: $F_{(1, 143)} = 3.01$
  group 5 vs. group 6: $F_{(1, 112)} = 2.75$
  group 4 vs. group 6: $F_{(1, 89)} = 8.14$ ($p \leq .01$)
  group 7 vs. group 8: $F_{(1, 257)} = 9.17$ ($p \leq .01$)

more, the variance of the low-need group was greater than that of the high-need group, which was contrary to the prediction. The high-need-high-reinforcement group had the highest mean satisfaction score (21.2), but the difference in mean satisfaction scores between the two high-need groups was not statistically significant. The lowest mean satisfaction score, 18.0, was obtained by the low-need-low-reinforcement group. These results in general do not support the hypotheses.

Since variability in the ranking of jobs according to reinforcement level was highest for the Independence dimension (see Table 10, p. 26), the non-significant findings might be attributable to this disagreement among the judges in defining the high- and low-reinforcement groups. Therefore, the same procedure previously utilized for the Activity and Compensation scales was carried out for the Independence scale.

The data were re-analyzed using truck drivers as the high-reinforcement group (median rank of 1, range of 7) and nursing assistants as the low-reinforcement group (median rank of 16, range of 6). The nursing assistants were used because no job groups obtained median ranks of 17, 18, or 19.

The results of this second analysis are shown in Table 22. The variance ratio between need groups yielded an F-value of 1.01 which was not statistically significant. The highest mean satisfac-

Table 22. Means and variances of satisfaction scores for Independence scale, using extreme reinforcement groups, by need and reinforcement groups

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 46 | 21.9 | 8.07 |
| 2. Low need | 57 | 19.9 | 8.15 |
| 3. High need, high reinforcement | 36 | 22.2 | 7.45 |
| 4. High need, low reinforcement | 10 | 20.5 | 8.72 |
| 5. Low need, high reinforcement | 36 | 20.3 | 6.97 |
| 6. Low need, low reinforcement | 21 | 19.2 | 9.76 |
| 7. High reinforcement | 72 | 21.3 | 8.04 |
| 8. Low reinforcement | 31 | 19.6 | 9.51 |

Variance ratio
    group 1 vs. group 2: $F_{(56, 45)} = 1.01$
F-tests of mean differences
    group 3 vs. group 4: $F_{(1, 44)} = 3.10$
    group 5 vs. group 6: $F_{(1, 55)} = 2.40$
    group 4 vs. group 6: $F_{(1, 29)} = 1.23$
    group 7 vs. group 8: $F_{(1, 101)} = 7.20$ ($p \leqslant .01$)

tion score was obtained by the high-need-high-reinforcement group. However, the mean differences between the two high-need groups and between the two low-need groups were not statistically significant. This second analysis failed to improve on the generally negative results obtained in the first analysis for the Independence scale. The data, therefore, do not demonstrate construct validity for the MIQ Independence scale.

**Moral Values.** The job groups included in the high-reinforcement group for the Moral Values dimension were food service workers, housekeeping aides, laborers, licensed practical nurses, and nursing assistants. The low-reinforcement group on this dimension included accountants, bookkeepers, buyers, field representatives, and managers. The high-need group was defined by scores of 24 and above on the MIQ Moral Values scale. The low-need group included scores of 20 or less. The validation data for this scale are summarized in Table 23.

Table 23. Means and variances of satisfaction scores for Moral Values scale, by need and reinforcement groups

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 174 | 22.6 | 8.08 |
| 2. Low need | 246 | 19.8 | 8.91 |
| 3. High need, high reinforcement | 69 | 21.8 | 10.71 |
| 4. High need, low reinforcement | 105 | 23.1 | 5.86 |
| 5. Low need, high reinforcement | 125 | 19.1 | 10.62 |
| 6. Low need, low reinforcement | 121 | 20.4 | 6.25 |
| 7. High reinforcement | 194 | 20.1 | 12.38 |
| 8. Low reinforcement | 226 | 21.7 | 7.75 |

Variance ratio
    group 1 vs. group 2: $F_{(245, 173)} = 1.10$
F-tests of mean differences
    group 3 vs. group 4: $F_{(1, 172)} = 7.20$ ($p \leq .01$)
    group 5 vs. group 6: $F_{(1, 244)} = 14.69$ ($p \leq .001$)
    group 4 vs. group 6: $F_{(1, 224)} = 63.14$ ($p \leq .001$)
    group 7 vs. group 8: $F_{(1, 418)} = 26.95$ ($p \leq .001$)

Table 23 shows that the variance of satisfaction scores for the low-need group was greater than that of the high-need group, although the variance ratio was not statistically significant. The high-need-low-reinforcement group was the most satisfied group, and the low-need-high-reinforcement group was the least satisfied. The mean difference between the two high-need groups was statistically

significant. The corresponding difference between the two low-need groups was also statistically significant. Both mean differences were in the direction opposite to that predicted.

Since there was much variability in ranking jobs according to reinforcement level for this dimension, the data were re-analyzed using the procedure utilized for the Activity, Compensation, and Independence dimensions. For this re-analysis, licensed practical nurses and food service workers comprised the high-reinforcement group. The low-reinforcement group included managers, buyers, and field representatives. The results of the re-analysis are shown in Table 24.

Table 24. Means and variances of satisfaction scores for Moral Values scale, using extreme reinforcement groups, by need and reinforcement groups

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 101 | 22.8 | 6.78 |
| 2. Low need | 130 | 20.2 | 11.17 |
| 3. High need, high reinforcement | 32 | 22.8 | 6.24 |
| 4. High need, low reinforcement | 69 | 22.8 | 7.12 |
| 5. Low need, high reinforcement | 42 | 18.9 | 20.21 |
| 6. Low need, low reinforcement | 88 | 20.8 | 5.87 |
| 7. High reinforcement | 74 | 20.6 | 17.70 |
| 8. Low reinforcement | 157 | 21.7 | 7.38 |

Variance ratio
    group 1 vs. group 2: $F(129, 100) = 1.65$ ($p \leqslant .01$)
F-tests of mean differences
    group 3 vs. group 4: $F(1, 99) = 0.00$
    group 5 vs. group 6: $F(1, 128) = 9.70$ ($p \leqslant .01$)
    group 4 vs. group 6: $F(1, 155) = 24.29$ ($p \leqslant .001$)
    group 7 vs. group 8: $F(1, 229) = 5.77$ ($p \leqslant .05$)

Using these revised reinforcement groups, the variance ratio for the high- vs. low-need groups was statistically significant, but with the low-need group the more variable. Mean satisfaction scores were identical for the two high-need groups. The difference between the means of the two low-need groups was statistically significant, but contrary to expectation. The mean difference between the high-need-low-reinforcement group and the low-need-low-reinforcement group was statistically significant, but again in the direction opposite to that predicted by Hypothesis 3. Construct validity for the Moral Values scale of the MIQ has not been demonstrated.

**Recognition.** For this dimension, the high-reinforcement group consisted of buyers, engineers, field representatives, licensed practical nurses, and managers. The low-reinforcement group included general office clerks, laborers, packers, and warehousemen. The MIQ cutting score for the high-need group was 22 and that for the low-need group was 19. The validation data for the Recognition scale are summarized in Table 25.

**Table 25. Means and variances of satisfaction scores for Recognition scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|-------|---|------|----------|
| 1. High need | 216 | 16.6 | 32.52 |
| 2. Low need | 253 | 17.5 | 18.27 |
| 3. High need, high reinforcement | 85 | 18.3 | 27.84 |
| 4. High need, low reinforcement | 131 | 15.5 | 32.70 |
| 5. Low need, high reinforcement | 103 | 19.7 | 11.67 |
| 6. Low need, low reinforcement | 150 | 16.0 | 17.30 |
| 7. High reinforcement | 188 | 19.1 | 19.33 |
| 8. Low reinforcement | 281 | 15.8 | 24.44 |

Variance ratio
group 1 vs. group 2: $F(215, 252) = 1.78$ ($p \leqslant .01$)
F-tests of mean differences
group 3 vs. group 4: $F(1, 214) = 13.11$ ($p \leqslant .001$)
group 5 vs. group 6: $F(1, 251) = 55.24$ ($p \leqslant .001$)
group 4 vs. group 6: $F(1, 279) = 0.59$
group 7 vs. group 8: $F(1, 467) = 54.68$ ($p \leqslant .001$)

Table 25 shows that the variance of satisfaction scores was 32.52 for the high-need group and 18.27 for the low-need group. The variance ratio of 1.78 was statistically significant at the .01 level, and in the predicted direction, thereby confirming Hypothesis 1.

The highest mean satisfaction score was 19.7 for the low-need-high-reinforcement group. The lowest mean satisfaction score was obtained by the high-need-low-reinforcement group, as predicted. However, this mean was not significantly different from the mean satisfaction score for the low-need-low-reinforcement group. Varying reinforcement levels yielded differential results for the high-need groups (a mean difference of 2.8 points, significant at the .001 level), but the differential effect of reinforcement level was greater for the low-need groups (mean difference of 3.7 points, also significant at the .001 level).

These results for the Recognition scale do not bear out most of the predictions. There is, therefore, little evidence for the construct validity of the MIQ Recognition scale.

**Responsibility.** The job groups for the high-reinforcement group on the Responsibility dimension were accountants, buyers, engineers, field representatives, and managers. The low-reinforcement group included general office clerks, housekeeping aides, laborers, packers, and warehousemen. The high-need group included scores on the MIQ Responsibility scale of 21 or higher. The low-need group included those with scores of 18 or less. The validation data for the responsibility scale are shown in Table 26.

**Table 26. Means and variances of satisfaction scores for Responsibility scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 280 | 20.3 | 13.99 |
| 2. Low need | 266 | 17.4 | 8.35 |
| 3. High need, high reinforcement | 162 | 21.5 | 9.68 |
| 4. High need, low reinforcement | 118 | 18.6 | 15.16 |
| 5. Low need, high reinforcement | 34 | 19.3 | 6.89 |
| 6. Low need, low reinforcement | 232 | 17.1 | 7.98 |
| 7. High reinforcement | 196 | 21.1 | 9.85 |
| 8. Low reinforcement | 350 | 17.6 | 10.86 |

Variance ratio
  group 1 vs. group 2: $F(279, 265) = 1.67 \ (p \leqslant .01)$
F-tests of mean differences
  group 3 vs. group 4: $F(1, 278) = 51.49 \ (p \leqslant .001)$
  group 5 vs. group 6: $F(1, 264) = 20.37 \ (p \leqslant .001)$
  group 4 vs. group 6: $F(1, 348) = 16.50 \ (p \leqslant .001)$
  group 7 vs. group 8: $F(1, 544) = 146.27 \ (p \leqslant .001)$

As Table 26 shows, the variance of satisfaction scores was 13.99 for the high-need group and 8.35 for the low-need group. The variance ratio of 1.67 was significant beyond the .01 level. The highest mean satisfaction score was 21.5, for the high-need-high-reinforcement group, in accordance with expectations. The lowest mean satisfaction score was 17.1 for the low-need-low-reinforcement group. The difference in mean satisfaction scores between the high-need groups was 2.9 points. For the low-need groups, this difference was 2.2 points. These mean differences conform to predictions. However, the difference in means between the high-need groups

was smaller than that between reinforcement groups (groups 7 and 8), which is contrary to expectation.

The data relative to Hypothesis 3 do not support that hypothesis, since the difference between the means of the low-reinforcement groups was not in the predicted direction.

The results obtained in this analysis support several, but not all, of the theoretical expectations. There is, therefore, some evidence of construct validity for the MIQ Responsibility scale.

**Security.** Accountants, bookkeepers, engineers, licensed practical nurses, and managers constituted the high-reinforcement group on the Security dimension. The low-reinforcement group was composed of general office clerks, housekeeping aides, laborers, and packers. High-need individuals were those with scores of 25, the highest possible score on the MIQ scale. Low-need individuals were those with scores of 20 or less. The validation data are summarized in Table 27.

**Table 27. Means and variances of satisfaction scores for Security scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 184 | 21.6 | 10.30 |
| 2. Low need | 190 | 19.6 | 10.33 |
| 3. High need, high reinforcement | 95 | 22.3 | 6.81 |
| 4. High need, low reinforcement | 89 | 20.9 | 13.13 |
| 5. Low need, high reinforcement | 103 | 20.4 | 6.89 |
| 6. Low need, low reinforcement | 87 | 18.6 | 12.75 |
| 7. High reinforcement | 198 | 21.3 | 7.71 |
| 8. Low reinforcement | 176 | 19.8 | 14.18 |

Variance ratio
group 1 vs. group 2: $F(189, 183) = 1.00$
F-tests of mean differences
group 3 vs. group 4: $F(1, 182) = 8.66 \ (p \le .01)$
group 5 vs. group 6: $F(1, 188) = 21.12 \ (p \le .01)$
group 4 vs. group 6: $F(1, 174) = 17.82 \ (p \le .001)$
group 7 vs. group 8: $F(1, 372) = 20.67 \ (p \le .001)$

Table 27 shows that the variance ratio between need groups was not statistically significant. Mean satisfaction score was highest for the high-need-high-reinforcement group, but lowest for the low-need-low-reinforcement group. The difference in mean satisfaction scores was 1.4 between the high-need groups and 1.8 between the

low-need groups. Comparison of the two low-reinforcement groups shows the difference in the mean satisfaction scores to be opposite to that predicted.

These results show little evidence for the construct validity of the MIQ Security scale.

**Social Service.** The high-reinforcement group for the Social Service dimension included licensed practical nurses, nursing assistants, field representatives, and food service workers. The low-reinforcement group was comprised of bookkeepers, business machine operators, laborers, packers, small equipment operators, and warehousemen. Individuals with MIQ Social Service scale scores of 22 or higher were included in the high-need group. Scores of 20 or less defined the low-need group. Table 28 shows the pertinent data.

**Table 28. Means and variances of satisfaction scores for Social Service scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|-------|-----|------|----------|
| 1. High need | 219 | 22.0 | 9.65 |
| 2. Low need | 442 | 18.9 | 8.85 |
| 3. High need, high reinforcement | 100 | 23.2 | 5.37 |
| 4. High need, low reinforcement | 119 | 21.0 | 10.93 |
| 5. Low need, high reinforcement | 74 | 20.3 | 12.46 |
| 6. Low need, low reinforcement | 368 | 18.6 | 7.67 |
| 7. High reinforcement | 174 | 22.0 | 10.44 |
| 8. Low reinforcement | 487 | 19.2 | 9.47 |

Variance ratio
    group 1 vs. group 2: $F_{(418, 441)} = 1.09$
F-tests of mean differences
    group 3 vs. group 4: $F_{(1, 217)} = 34.47$ $(p \leqslant .001)$
    group 5 vs. group 6: $F_{(1, 440)} = 21.09$ $(p \leqslant .001)$
    group 4 vs. group 6: $F_{(1, 485)} = 58.90$ $(p \leqslant .001)$
    group 7 vs. group 8: $F_{(1, 659)} = 104.24$ $(p \leqslant .001)$

As Table 28 shows, the variance of satisfaction scores was 9.65 for the high-need group and 8.85 for the low-need group. The variance ratio of 1.09 was in the predicted direction, but not statistically significant. Mean satisfaction score was 23.2 for the high-need-high-reinforcement group and 21.0 for the high-need-low-reinforcement group. The mean difference of 2.2 points was statistically significant (at the .001 level) and in the predicted direction. The low-need-high-reinforcement group's mean was 20.3 and that of the low-need-

low-reinforcement group was 18.6. The 1.7-point difference in means was also statistically significant. However, the difference in mean satisfaction scores between the high-need groups was smaller than that between reinforcement groups (groups 7 and 8).

These results imply some construct validity for the MIQ Social Service scale.

**Social Status.** For the Social Status dimension, the job groups in the high-reinforcement group were accountants, buyers, engineers, field representatives, and managers. The low-reinforcement group included general office clerks, housekeeping aides, laborers, packers, and warehousemen. The cutting scores were 19 for the high-need group and 14 for the low-need group. Results of the analysis for the Social Status scale are shown in Table 29.

**Table 29. Means and variances of satisfaction scores for Social Status scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 221 | 18.5 | 12.39 |
| 2. Low need | 255 | 17.4 | 10.58 |
| 3. High need, high reinforcement | 88 | 19.8 | 9.70 |
| 4. High need, low reinforcement | 133 | 17.6 | 12.37 |
| 5. Low need, high reinforcement | 93 | 18.7 | 8.06 |
| 6. Low need, low reinforcement | 162 | 16.7 | 10.60 |
| 7. High reinforcement | 181 | 19.2 | 9.12 |
| 8. Low reinforcement | 295 | 17.1 | 11.59 |

Variance ratio
  group 1 vs. group 2: $F(220, 254) = 1.17$
F-tests of mean differences
  group 3 vs. group 4: $F(1, 119) = 21.99$ ($p \leq .001$)
  group 5 vs. group 6: $F(1, 253) = 26.57$ ($p \leq .001$)
  group 4 vs. group 6: $F(1, 293) = 5.90$ ($p \leq .05$)
  group 7 vs. group 8: $F(1, 474) = 47.33$ ($p \leq .001$)

Table 29 shows that the obtained variance ratio of 1.17 between need groups was not statistically significant, although the high-need group had the larger variance. The highest mean satisfaction score, 19.8, was obtained for the high-need-high-reinforcement group. The lowest mean satisfaction score was 16.7, for the low-need-low-reinforcement group. The difference in mean satisfaction scores between the high-need groups was 2.2 points, and between the low-need groups it was 2.0 points. Between reinforcement groups, the mean difference was 2.1 points.

These results imply some, if limited, construct validity for the MIQ Social Status scale.

**Variety.** For this dimension the high-reinforcement group included buyers, engineers, field representatives, licensed practical nurses, and managers. The low-reinforcement group included business machine operators, housekeeping aides, packers, and warehousemen. The high-need group was defined by MIQ Variety scale scores of 21 or higher; the low-need group by scores of 18 or less. Table 30 shows the validation data.

**Table 30. Means and variances of satisfaction scores for Variety scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 263 | 18.8 | 29.33 |
| 2. Low need | 219 | 18.4 | 13.02 |
| 3. High need, high reinforcement | 112 | 21.4 | 11.50 |
| 4. High need, low reinforcement | 151 | 16.8 | 33.66 |
| 5. Low need, high reinforcement | 79 | 20.0 | 9.68 |
| 6. Low need, low reinforcement | 140 | 17.5 | 12.71 |
| 7. High reinforcement | 191 | 20.8 | 11.13 |
| 8. Low reinforcement | 291 | 17.2 | 23.64 |

Variance ratio
    group 1 vs. group 2: $F(262, 218) = 2.25$ ($p \leq .01$)
F-tests of mean differences
    group 3 vs. group 4: $F(1, 261) = 55.66$ ($p \leq .001$)
    group 5 vs. group 6: $F(1, 217) = 28.95$ ($p \leq .001$)
    group 4 vs. group 6: $F(1, 289) = 1.72$
    group 7 vs. group 8: $F(1, 480) = 83.52$ ($p \leq .001$)

Table 30 shows that the variance of satisfaction scores for the high-need group was 29.33 and variance for the low-need group was 13.02. The variance ratio of 2.25 was significant beyond the .01 level.

The highest mean satisfaction score was 21.4 for the high-need-high-reinforcement group. The high-need-low-reinforcement group had the lowest mean satisfaction score. The mean difference was greater for the high-need groups than for the low-need groups. These results agree with Hypothesis 2. The high-need-low-reinforcement group was less satisfied than the low-need-low-reinforcement group. However, this difference (predicted by Hypothesis 3) was not statistically significant.

In general, these results imply construct validity for the Variety scale of the MIQ.

**Working Conditions.** Five job groups were included in the high-reinforcement group on this dimension: accountants, bookkeepers, buyers, engineers, and managers. The low-reinforcement group included housekeeping aides, laborers, packers, and warehousemen. Only those with MIQ Working Conditions scale scores of 24 or 25 were included in the high-need group. The low-need group included those with scores of 20 or less. Table 31 summarizes the validation data.

**Table 31. Means and variances of satisfaction scores for Working Conditions scale, by need and reinforcement groups**

| Group | N | Mean | Variance |
|---|---|---|---|
| 1. High need | 192 | 17.1 | 29.89 |
| 2. Low need | 319 | 18.4 | 17.78 |
| 3. High need, high reinforcement | 68 | 18.3 | 33.86 |
| 4. High need, low reinforcement | 124 | 16.4 | 26.69 |
| 5. Low need, high reinforcement | 164 | 19.4 | 18.18 |
| 6. Low need, low reinforcement | 155 | 17.4 | 15.32 |
| 7. High reinforcement | 232 | 19.1 | 22.90 |
| 8. Low reinforcement | 279 | 17.0 | 20.52 |

Variance ratio
    group 1 vs. group 2: $F(191, 318) = 1.68 \ (p \leqq .01)$
F-tests of mean differences
    group 3 vs. group 4: $F(1, 190) = 5.59 \ (p \leqq .05)$
    group 5 vs. group 6: $F(1, 317) = 21.57 \ (p \leqq .001)$
    group 4 vs. group 6: $F(1, 277) = 3.11$
    group 7 vs. group 8: $F(1, 509) = 26.82 \ (p \leqq .001)$

Table 31 shows that the variance of satisfaction scores was 29.89 for the high-need group and 17.78 for the low-need group. The variance ratio of 1.68, statistically significant at the .01 level, supports Hypothesis 1.

However, the results obtained with mean scores on the satisfaction-with-working-conditions dimension do not support predictions. The highest satisfaction mean was obtained by the low-need-high-reinforcement group. The difference between satisfaction means for the high-need groups was 1.9 points, which was slightly less than that for the low-need groups (2.0 points). While the high-need-low-reinforcement group had the lowest mean satisfaction score (16.4), this mean was not significantly different from that of the low-need-low-reinforcement group (17.4).

These results yield little evidence for the construct validity of the MIQ Working Conditions scale.

*In general,* the data presented above show good evidence of construct validity for the Ability Utilization, Advancement, and Variety scales. Some evidence of construct validity was observed for Authority, Achievement, Creativity and Responsibility. Little evidence of construct validity was obtained for Activity, Compensation, Independence, Moral Values, Recognition, Security, Social Service, Social Status, and Working Conditions.

### Frequency distribution analysis

The preceding analysis utilized predictions derived from the *Theory* which involved three variables: need, satisfaction and reinforcement. Where the predictions were borne out, construct validity may be inferred for measures of the three variables and the theoretical system relating the three variables. That is, the validation of a given need scale implicitly validates the measurement of satisfaction, the judges' ratings of reinforcement levels and the proposition from the *Theory of Work Adjustment* on which the construct validity analysis was based.

Since the predictions were generally upheld on seven of the sixteen scales, the results reported above have supported the proposition of the *Theory* from which they were derived. It can be concluded that there is evidence to support the proposition that satisfaction is a function of the correspondence between needs and reinforcement on the job. There also is evidence to demonstrate directly the construct validity of these seven MIQ scales, and indirectly the construct validity of the seven parallel MSQ scales.

But what can be concluded for those MIQ scales wherein the predictions were not substantiated? One can not, with the present evidence, conclude that the measurement of needs for these scales is inaccurate, since the fault might also lie in the measurement of satisfaction or in the judgments of reinforcement level.

To reduce the sources of error in the validation process from three variables to two, a frequency distribution analysis was carried out using only the need and reinforcement variables, based on the following rationale:

Since dissatisfaction is presumed to result in one's leaving the dissatisfying work environment, then workers who remain in their

jobs may be presumed to be at least minimally satisfied. For these (at least minimally satisfied) workers, the theorized relationship between need and reinforcement level should result in the following observations: One would expect to find a larger proportion of high-need individuals than low-need individuals within a high-reinforcement group. This would occur because high-need individuals more than low-need individuals presumably would seek the high-reinforcement jobs. Furthermore, the greater proportion of high-need than low-need workers in the high-reinforcement jobs would result, in part, from an elevation in need score (for some individuals) because of exposure to "high" reinforcement. On the other hand, for the low-reinforcement group, the proportion of high-need individuals should be smaller than the proportion of low-need individuals. This would be expected since high-need individuals presumably would not seek low-reinforcement jobs or would leave such jobs because the amount of reinforcement in the job did not meet their "high" need.

These expectations, derived from the *Theory of Work Adjustment,* do not involve the measurement of satisfaction. Thus, differences in evidence of construct validity between this analysis and the previous analysis might be attributed to the measurement (or mis-measurement) of job satisfaction. However, if the results of this analysis do not bear out the predictions outlined above, the measurement of either need or reinforcement could be at fault.

The data for this analysis were derived from the data used in the previous analysis. It will be recalled that, in the previous analysis, the high-reinforcement and low-reinforcement groups for a given scale were combined into a total group. High-need and low-need groups were defined by the scores on the 75th and 25th percentiles of the MIQ score distribution for the *total* group. As a result, the cutting scores for the high- and low-need groups were the same for the high- and low-reinforcement groups.

The data of interest in this analysis were the frequencies (number of persons) for high-, middle-, or low-need groups within the high-reinforcement and low-reinforcement groups separately. These frequencies were tabulated in a 2 by 3 contingency table for each of the 16 MIQ scales involved in the study. One dimension of the contingency table was "reinforcement: high or low" and the other was "need: high, middle or low." The value of the chi-square test of independence was computed for each contingency table. Table

32 presents the results of this analysis for the 16 MIQ scales, with the cell frequencies converted to percentages. These percentages represent the percent of the reinforcement group in a given need subgroup.

**Table 32. Percentage of individuals in high, middle and low need groups, by reinforcement dimension and reinforcement group**

| Reinforcement Dimensions | N | Need Group | | | Chi-square[a] | p[b] |
|---|---|---|---|---|---|---|
| | | High | Middle | Low | | |
| 1. Ability Utilization | | | | | | |
| High reinforcement | 322 | 37.3 | 37.0 | 25.8 | | |
| Low reinforcement | 413 | 20.1 | 30.9 | 48.9 | 46.19 | .001 |
| 2. Achievement | | | | | | |
| High reinforcement | 269 | 42.8 | 27.1 | 30.1 | | |
| Low reinforcement | 514 | 32.5 | 22.8 | 44.7 | 16.07 | .001 |
| 3. Activity | | | | | | |
| High reinforcement | 256 | 29.7 | 32.4 | 37.9 | | |
| Low reinforcement | 482 | 23.9 | 39.8 | 36.3 | 4.77 | |
| 4. Advancement | | | | | | |
| High reinforcement | 368 | 47.6 | 30.7 | 21.7 | | |
| Low reinforcement | 533 | 30.2 | 27.8 | 42.0 | 44.77 | .001 |
| 5. Authority | | | | | | |
| High reinforcement | 280 | 53.6 | 30.0 | 16.4 | | |
| Low reinforcement | 253 | 16.2 | 32.4 | 51.4 | 101.21 | .001 |
| 6. Compensation | | | | | | |
| High reinforcement | 322 | 28.6 | 50.6 | 20.8 | | |
| Low reinforcement | 297 | 26.9 | 37.7 | 35.4 | 17.70 | .001 |
| 7. Creativity | | | | | | |
| High reinforcement | 322 | 36.3 | 54.0 | 9.6 | | |
| Low reinforcement | 514 | 20.0 | 35.4 | 44.6 | 113.75 | .001 |
| 8. Independence | | | | | | |
| High reinforcement | 291 | 36.1 | 42.3 | 21.6 | | |
| Low reinforcement | 142 | 28.2 | 35.9 | 35.9 | 10.12 | .01 |
| 9. Moral Values | | | | | | |
| High reinforcement | 244 | 28.3 | 20.5 | 51.2 | | |
| Low reinforcement | 330 | 31.8 | 31.5 | 36.7 | 13.87 | .001 |
| 10. Recognition | | | | | | |
| High reinforcement | 317 | 26.8 | 40.7 | 32.5 | | |
| Low reinforcement | 467 | 28.1 | 39.8 | 32.1 | 0.13 | |
| 11. Responsibility | | | | | | |
| High reinforcement | 322 | 50.3 | 39.1 | 10.6 | | |
| Low reinforcement | 514 | 23.0 | 31.9 | 45.1 | 121.59 | .001 |

[a] Value of the chi-square test of independence of classification, with 2 degrees of freedom.
[b] Probability of error in rejection of null hypothesis of independent classifications, if p ≤ .05.

Table 32 (Continued)

| Reinforcement Dimensions | N | Need Group | | | Chi-square[a] | p[b] |
|---|---|---|---|---|---|---|
| | | High | Middle | Low | | |
| 12. Security | | | | | | |
| High reinforcement | 321 | 29.6 | 38.3 | 32.1 | | |
| Low reinforcement | 308 | 28.9 | 43.8 | 27.3 | 2.41 | |
| 13. Social Service | | | | | | |
| High reinforcement | 195 | 51.3 | 10.8 | 37.9 | · | |
| Low reinforcement | 530 | 22.5 | 8.1 | 69.4 | 63.53 | .001 |
| 14. Social Status | | | | | | |
| High reinforcement | 322 | 27.3 | 43.8 | 28.9 | | |
| Low reinforcement | 514 | 25.9 | 42.6 | 31.5 | 0.67 | |
| 15. Variety | | | | | | |
| High reinforcement | 317 | 35.3 | 39.7 | 24.9 | | |
| Low reinforcement | 430 | 35.1 | 32.3 | 32.6 | 6.45 | .05 |
| 16. Working Conditions | | | | | | |
| High reinforcement | 315 | 21.6 | 26.3 | 52.1 | | |
| Low reinforcement | 413 | 30.0 | 32.4 | 37.5 | 15.65 | .001 |

[a] Value of the chi-square test of independence of classification, with 2 degrees of freedom.
[b] Probability of error in rejection of null hypothesis of independent classifications, if $p \leq .05$.

Ability Utilization. For this scale 37.3% of the high-reinforcement group were high-need individuals, compared with 25.8% in the low-need group. On the other hand, only 20.1% of the low-reinforcement group were high-need individuals, and 48.9% were in the low-need classification. The value of chi-square computed for this contingency table was 46.19 which, with 2 degrees of freedom, was significant beyond the .001 level, indicating that the need and reinforcement dimensions are not independent for the Ability Utilization scale.

These results are in accordance with the prediction made above and therefore can be taken as evidence for the construct validity of this MIQ scale. Furthermore, these results are in agreement with the results of the previous analysis for this scale.

Achievement. The results presented in Table 32 for this scale show that the proportion of individuals in the high-need-high-reinforcement category was greater than that in the low-need-high-reinforcement category. In addition, the high-need-low-reinforcement group was proportionately smaller than the low-need-low-reinforcement group. The relationship between the need and rein-

forcement classifications was statistically significant at the .001 level.

These results add support to the previously obtained evidence of construct validity for the MIQ Achievement scale. With these frequency data, more confidence can be placed in the construct validity of the MIQ Achievement scale.

**Activity.** For the high-reinforcement group on this scale, 29.7% were in the high-need category and 37.9% in the low-need category. Similar percentages were observed for the low-reinforcement group. The value of chi-square for this scale was not statistically significant.

These results do not conform to the predictions made. They thus confirm previous results which failed, for the most part, to support expectations. Construct validity has not, therefore, been demonstrated for this scale.

**Advancement.** The results of the frequency distribution analysis for the Advancement scale support the predictions made. Need and reinforcement were related, as indicated by a chi-square value of 44.77 (p < .001). In the high-reinforcement group, 47.6% had "high" need, and 21.7% had "low" need. For the low-reinforcement group this pattern of proportions was reversed. The low-need sub-group comprised 42.0% of the group and the high-need sub-group included only 30.2%.

Since these results were in accordance with predictions, they strengthen the previously observed evidence for the construct validity of the Advancement scale.

**Authority.** In the high-reinforcement group for this scale, 53.6% had "high" need compared with 16.4% with "low" need. For the low-reinforcement group, only 16.2% were in the high-need category and 51.4% were in the low-need category. The relationship between need and reinforcement classifications yielded a chi-square value of 101.21 which was significant well beyond the .001 level of statistical significance.

These results are in strong agreement with expectations. As such they lend additional support to the evidence of construct validity which was previously obtained for the MIQ Authority scale.

**Compensation.** For the Compensation scale, the chi-square value obtained for the test of independence of classifications was 17.70, which was significant at the .001 level, thereby supporting the hypothesized relationship. In the high-reinforcement group 28.6%

had "high" need and 20.8% had "low" need. For the low-reinforcement group the pattern was reversed, with 26.9% of the sample classified as "high" need and 35.4% as "low" need.

These results are consistent with the predictions, and therefore support an interpretation of construct validity. However, previously obtained results generally were contrary to expectation. These inconsistent findings may imply some defect in the measurement of satisfaction for the Compensation dimension.

**Creativity.** On this scale, Table 32 shows that 36.3% of the high-reinforcement group had "high" need while only 9.6% had "low" need. In the low-reinforcement group the pattern of proportions was reversed. The high-need sub-group included only 20.0% whereas the low-need sub-group included 44.6%. The chi-square test yielded a value of 113.75 which was significant well beyond the .001 level.

These results are in agreement with expectations and strengthen the evidence of construct validity obtained for the Creativity scale in the previous analysis.

**Independence.** The results of this analysis for the Independence scale followed expectations. The chi-square test of independence of classification yielded a value of 10.12 which was significant at $p = .01$. In the high-reinforcement group the high-need category included a greater proportion than the low-need category (36.1% vs. 21.6%). These percentages were reversed for the low-reinforcement group in which 28.2% were classified as having "high" need and 35.9% as having "low" need.

These results imply some construct validity for the Independence scale and lend support to the previously obtained minimal evidence of validity for this scale. The difference in results between this analysis and the previous analysis suggests that the satisfaction-with-independence scale of the MSQ needs improvement.

**Moral Values.** The results of the analysis for the Moral Values scale are shown in Table 32. The chi-square test of independence yielded a value of 13.87 which, with 2 degrees of freedom, was significant at the .01 level. Although the relationship between the two classifications was significant, the results did not follow the predictions. For the high-reinforcement group 28.3% were classified in the high-need category and 51.2% in the low-need category. This finding was contrary to expectations. The results for the low-re-

inforcement group showed 31.8% with "high" need and 36.7% with "low" need.

The failure of the present analysis to achieve predicted results agrees with that of the previous analysis. As a result, it can not be concluded that there is any evidence of construct validity for the MIQ Moral Values scale.

**Recognition.** Findings for the Recognition scale did not conform to the predictions. The value of the chi-square test was not statistically significant, indicating no relationship between need classification and the reinforcement classification.

These results agree with the generally negative results obtained in the previous analysis. Thus, present measurement with the MIQ Recognition scale must be considered questionable.

**Responsibility.** The results for this scale strongly confirmed predictions. The chi-square value of 121.59 was the largest obtained on any scale and was significant well beyond the .001 level. In the high-reinforcement group, 50.3% were in the high-need sub-group while only 10.6% were in the low-need sub-group. In the low-reinforcement group, the pattern of proportions was reversed, with 23.0% classified as having "high" need and 45.1% in the "low" need category.

Since these results confirmed the predictions, they add to the evidence of construct validity for the MIQ Responsibility scale which was obtained in the previous analysis.

**Security.** For the Security scale no relationship was observed between the need and reinforcement dimensions. The chi-square value of 2.41 was not significant at the .05 level. This finding agrees with the generally negative findings in the previous analysis. As a result, use of the MIQ Security scale as a measure of needs should await further evidence of its validity.

**Social Service.** For the Social Service scale, 51.3% of the high-reinforcement group were in the high-need sub-group and 37.9% were in the low-need sub-group. In the low-reinforcement group the pattern of proportions was reversed, with 22.5% in the high-need sub-group and 69.4% in the low-need sub-group. The chi-square value of 63.53 was significant beyond the .001 level.

These results support construct validity for the MIQ Social Service scale and strengthen the slight evidence of construct validity previously obtained.

**Social Status.** For this scale, the chi-square value of 0.67 was not statistically significant, indicating independence between the classifications of need and reinforcement. This result fails to support the theoretical expectations.

Previous analysis found only minimal evidence of validity for this scale. Therefore, measurement with the MIQ Social Status scale should be interpreted with extreme caution.

**Variety.** For the high-reinforcement group on this scale, 35.3% were classified in the high-need category and 24.9% in the low-need category, thereby agreeing with expectations. For the low-reinforcement group, the corresponding percentages were 35.1% and 32.6%. While these latter percentages did not conform with expectations, the chi-square value for the test of independence of classification was 6.45. This value is significant at the .05 level, indicating a relationship between need and reinforcement (which was predicted).

These findings, combined with the much better evidence from the previous analysis, demonstrate construct validity for the MIQ Variety scale.

**Working Conditions.** For the Working Conditions scale, the value of the chi-square test was significant at the .001 level. In the high-reinforcement group 21.6% were classified as having "high" need and 52.1% were in the low-need category. In the low-reinforcement group the results followed a similar pattern with 30.0% in the high-need sub-group and 37.5% in the low-need sub-group. These results do not conform to the expectations.

The results of this analysis generally agree with those of the three-variable analysis. Evidence of validity has not been found for the MIQ Working Conditions scale.

### Summary and Implications

Analysis of satisfaction scores for groups cross-classified by need and reinforcement levels yielded evidence of construct validity for seven of the sixteen MIQ scales which were studied. These scales were: Ability Utilization, Achievement, Advancement, Authority, Creativity, Responsibility and Variety. There was little or no evidence of construct validity for the remaining nine scales: Activity, Compensation, Independence, Moral Values, Recognition, Security, Social Service, Social Status and Working Conditions.

Evidence of construct validity was obtained from the frequency distribution analysis for ten scales of the MIQ: Ability Utilization, Achievement, Advancement, Authority, Compensation, Creativity, Independence, Responsibility, Social Service, and, to a lesser extent, Variety. Using the frequency distribution approach, no evidence of construct validity was obtained for Activity, Moral Values, Recognition, Security, Social Status, and Working Conditions.

Since the satisfaction score analysis used, as its variables, need, reinforcement and satisfaction, and the frequency distribution analysis involved only need and reinforcement, the differences in findings from the two analyses may indicate inadequate measurement of satisfaction for the Compensation and Independence scales. For these two scales the results of the two-variable analysis agreed with predictions whereas results of the three-variable analysis did not.

In summary, then, these studies support the construct validity of ten of the sixteen MIQ scales studied. These scales are: Ability Utilization, Achievement, Advancement, Authority, Compensation, Creativity, Independence, Responsibility, Social Service and Variety. Little evidence was obtained for the construct validity of the Activity, Moral Values, Recognition, Security, Social Status and Working Conditions scales of the MIQ. This dearth of evidence might be due to inaccurate rankings by the judges of reinforcement levels on these dimensions, to inadequate measurement of satisfaction, as well as to the invalidity of these MIQ scales as measures of needs. Finally, the results support Proposition III of the *Theory of Work Adjustment*, in that satisfaction on several dimensions has been shown to be a function of correspondence between need and reinforcement.

The preceding findings have several implications for the refinement of the MIQ as a measure of vocational needs, especially for those scales for which adequate evidence of construct validity is lacking:

1. Improved measures or estimates of reinforcement level and/or improved satisfaction scales could be used in future validity studies. Several methods are available for improving the reinforcement-level measures, such as (a) through the use of a larger number of competent judges in the alternation ranking procedure, or (b) through direct on-the-job observation and assessment of reinforcement level (e.g., by ratings of employees, supervisors, job analysts,

or trained observers). The improvement of satisfaction scales might be achieved through the use of tenure and behavior outcomes (e.g., complaints, grievances, reasons for quitting) as validation criteria for these scales, in addition to improvements in item content and format to increase reliability in these scales.

2. The item content of the invalid scales could be re-written in the light of the present experience, and these new scales then validated.

3. The invalid scales could be eliminated as representing dimensions for which the MIQ format is inappropriate or unsuitable, and other scales representing new dimensions substituted in their place.

4. A new format could be adopted for the MIQ with the objective of improving scale reliability, increasing the range of obtained scores and improving their distribution, and lowering interscale correlation. This new instrument would then have to be validated anew.

5. Other types of validity studies could be (and should be) conducted, such as: (a) concurrent validity studies with other measures of vocational needs; (b) studies with clinical groups (i.e., groups diagnosed by clinical or counseling psychologists, on the basis of clinical data, as having "high" or "low" needs); and (c) predictive studies, using MIQ scores as predictors and subsequent behavior (e.g., vocational choice) as the criterion.

# APPENDIX

## Forms Used in the Study

# university of minnesota

# industrial relations center
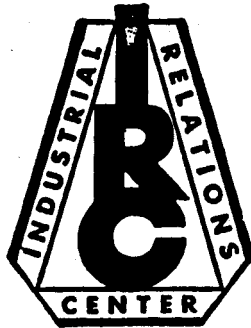
# satisfaction questionnaire

*The purpose of this questionnaire is to give you a chance to tell* **how you feel about your present job,** *what things you are* **satisfied** *with and what things you are* **not satisfied** *with.*

*On the basis of your answers and those of thousands of other individuals throughout the nation, we hope to get a better understanding of the things individuals* **like and dislike about their jobs.**

*On the following pages you will find statements about your* **present** *job.*

- *Read each statement carefully.*

- *Decide* **how satisfied you feel about the aspect of your job** *described by the statement.*

   *Keeping the statement in mind:*

   —*if you feel that your job gives you* **more than you expected,** *check the box under "Very Sat." (Very Satisfied);*

   —*if you feel that your job gives you* **what you expected,** *check the box under "Sat." (Satisfied);*

   —*if you* **cannot make up your mind** *whether or not the job gives you what you expected, check the box under "N" (Neither Satisfied nor Dissatisfied).*

   —*if you feel that your job gives you* **less than you expected,** *check the box under "Dissat." (Dissatisfied);*

   —*if you feel that your job gives you* **much less than you expected,** *check the box under "Very Dissat." (Very Dissatisfied).*

- *Remember: Keep the statement in mind when deciding* **how satisfied you feel about that aspect of your job.**

- *Do this for* **all** *statements. Please answer* **every** *item.*

**Be frank and honest.** *Give a true picture of your feelings about your* **present job.**

*Ask yourself: How satisfied am I with this aspect of my job?*

*Very Sat. means I am very satisfied with this aspect of my job.*

*Sat. means I am satisfied with this aspect of my job.*

*N means I can't decide whether I am satisfied or not with this aspect of my job.*

*Dissat. means I am dissatisfied with this aspect of my job.*

*Very Dissat. means I am very dissatisfied with this aspect of my job.*

## On my present job, this is how I feel about . . .

| | Very Dissat. | Dissat. | N | Sat. | Very Sat. |
|---|---|---|---|---|---|
| 1. The chance to be of service to others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. The chance to try out some of my own ideas. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Being able to do the job without feeling it is morally wrong. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. The chance to work by myself. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. The variety in my work. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. The chance to have other workers look to me for direction. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. The chance to do the kind of work that I do best. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. The social position in the community that goes with the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. The policies and practices toward employees of this company. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. The way my supervisor and I understand each other. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. My job security. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. The amount of pay for the work I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. The working conditions (heating, lighting, ventilation, etc.) on this job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. The opportunities for advancement on this job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. The technical "know-how" of my supervisor. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. The spirit of cooperation among my co-workers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. The chance to be responsible for planning my work. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. The way I am noticed when I do a good job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. Being able to see the results of the work I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. The chance to be active much of the time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. The chance to be of service to people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. The chance to do new and original things on my own. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. Being able to do things that don't go against my religious beliefs. | | | | | |
| 24. The chance to work alone on the job. | ☐ | ☐ | ☐ | ☐ | ☐ |

*Ask yourself: How **satisfied** am I with this aspect of my job?*
*Very Sat. means I am very satisfied with this aspect of my job.*
*Sat. means I am satisfied with this aspect of my job.*
*N means I can't decide whether I am satisfied or not with this aspect of my job.*
*Dissat. means I am dissatisfied with this aspect of my job.*
*Very Dissat. means I am very dissatisfied with this aspect of my job.*

## On my present job, this is how I feel about . . .

| | Very Dissat. | Dissat. | N | Sat. | Very Sat. |
|---|---|---|---|---|---|
| 25. The chance to do different things from time to time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. The chance to tell other workers how to do things. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. The chance to do work that is well suited to my abilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. The chance to be "somebody" in the community. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. Company policies and the way in which they are administered. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30. The way my boss handles his men. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. The way my job provides for a secure future. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. The chance to make as much money as my friends. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. The physical surroundings where I work. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. The chances of getting ahead on this job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. The competence of my supervisor in making decisions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. The chance to develop close friendships with my co-workers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37. The chance to make decisions on my own. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38. The way I get full credit for the work I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39. Being able to take pride in a job well done. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40. Being able to do something much of the time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41. The chance to help people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42. The chance to try something different. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 43. Being able to do things that don't go against my conscience. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44. The chance to be alone on the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 45. The routine in my work. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 46. The chance to supervise other people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 47. The chance to make use of my best abilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 48. The chance to "rub elbows" with important people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 49. The way employees are informed about company policies. | ☐ | ☐ | ☐ | ☐ | ☐ |

*Ask yourself: How satisfied am I with this aspect of my job?*

*Very Sat. means I am very satisfied with this aspect of my job.*

*Sat. means I am satisfied with this aspect of my job.*

*N means I can't decide whether I am satisfied or not with this aspect of my job.*

*Dissat. means I am dissatisfied with this aspect of my job.*

*Very Dissat. means I am very dissatisfied with this aspect of my job.*

---

## On my present job, this is how I feel about . . .

| | Very Dissat. | Dissat. | N | Sat. | Very Sat. |
|---|---|---|---|---|---|
| 50. The way my boss backs his men up (with top management). | ☐ | ☐ | ☐ | ☐ | ☐ |
| 51. The way my job provides for steady employment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 52. How my pay compares with that for similar jobs in other companies. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 53. The pleasantness of the working conditions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 54. The way promotions are given out on this job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 55. The way my boss delegates work to others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 56. The friendliness of my co-workers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 57. The chance to be responsible for the work of others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 58. The recognition I get for the work I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 59. Being able to do something worthwhile. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 60. Being able to stay busy. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 61. The chance to do things for other people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 62. The chance to develop new and better ways to do the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 63. The chance to do things that don't harm other people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 64. The chance to work independently of others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 65. The chance to do something different every day. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 66. The chance to tell people what to do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 67. The chance to do something that makes use of my abilities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 68. The chance to be important in the eyes of others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 69. The way company policies are put into practice. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 70. The way my boss takes care of complaints brought to him by his men. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 71. How steady my job is. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 72. My pay and the amount of work I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 73. The physical working conditions of the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 74. The chances for advancement on this job. | ☐ | ☐ | ☐ | ☐ | ☐ |

*Ask yourself: How satisfied am I with this aspect of my job?*

*Very Sat. means I am very satisfied with this aspect of my job.*

*Sat. means I am satisfied with this aspect of my job.*

*N means I can't decide whether I am satisfied or not with this aspect of my job.*

*Dissat. means I am dissatisfied with this aspect of my job.*

*Very Dissat. means I am very dissatisfied with this aspect of my job.*

## On my present job, this is how I feel about . . .

| | Very Dissat. | Dissat. | N | Sat. | Very Sat. |
|---|---|---|---|---|---|
| 75. The way my boss provides help on hard problems. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 76. The way my co-workers are easy to make friends with. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 77. The freedom to use my own judgment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 78. The way they usually tell me when I do my job well. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 79. The chance to do my best at all times. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 80. The chance to be "on the go" all the time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 81. The chance to be of some small service to other people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 82. The chance to try my own methods of doing the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 83. The chance to do the job without feeling I am cheating anyone. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 84. The chance to work away from others. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 85. The chance to do many different things on the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 86. The chance to tell others what to do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 87. The chance to make use of my abilities and skills. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 88. The chance to have a definite place in the community. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 89. The way the company treats its employees. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 90. The personal relationship between my boss and his men. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 91. The way layoffs and transfers are avoided in my job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 92. How my pay compares with that of other workers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 93. The working conditions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 94. My chances for advancement. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 95. The way my boss trains his men. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 96. The way my co-workers get along with other other. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 97. The responsibility of my job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 98. The praise I get for doing a good job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 99. The feeling of accomplishment I get from the job. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 100. Being able to keep busy all the time. | ☐ | ☐ | ☐ | ☐ | ☐ |

# JOB DESCRIPTIONS FOR REINFORCER RANKINGS

1. **Accountant:** Devises, installs and supervises operation of general-accounting budget, and cost systems. Supervises subordinates engaged in maintenance of accounts and records. Balances books periodically, and prepares statements for administrative officers, showing items, such as receipts, disbursements, expenses and profit and accounts and records for administrative officers.

2. **Bookkeeper:** Keeps complete and systematic set of records of business transactions of establishment, examining and recording transactions in record books and on forms. Balances books and compiles reports at regular intervals to show receipts, expenditures, accounts payable, accounts receivable, profit or loss, and many other items pertinent to the operation of a business. Calculates wages of employees from plant records or time cards, and makes up checks or draws cash from bank for payment of wages.

3. **Business Machine Operator:** Operates billing machines, adding machines, calculating machines, key punches, mailing machines, card sorters, etc.

4. **Buyer:** Purchases commodities in open market for chain of stores. May specialize in buying certain groups of staple goods, such as drugs or canned goods.

5. **Field Representative:** Guides retail distributors in setting up training programs, suggesting methods and techniques of operation. Advises retail distributors in all phases of store operation and management.

6. **Food Service Worker:** Portions food in accordance with diets in a hospital under the directions of a dietitian. Weighs out proper amounts of specified foods, and may perform some cooking as directed. Places food on dishes and on trays to be delivered to patients. May wash and scour equipment used, such as mixers, fruit-juice reamers, carts, pantry shelves, and refrigerator compartments.

7. **Engineer:** Designates persons who meet the educational, experience, or legal qualifications established by engineering schools or licensing authorities for the fields of professional engineering. Includes chemical, electrical, industrial and mechanical engineers.

8. **General Clerk:** A classification title for clerical jobs, requiring little or no previous training, which involve the performance of routine clerical duties, such as addressing envelopes, keeping simple records, gathering and delivering messages, and assisting in operating office machines, and which may require the ability to do simple typing.

9. **Housekeeping Aide:** Performs cleaning duties in a hospital ward, such as mopping floors, cleaning windows, woodwork, and furniture, and dusting rugs. Attends to patients' plants and flowers. May 'serve patients' meals and remove empty trays and dishes. Seldom performs any personal service for patient.

10. **Laborer:** Performs general work in warehouse, office building and in construction. Assists skilled and semi-skilled workers, by doing cleanup work, lifting, pulling, pushing, etc.

11. **Licensed Practical Nurse:** Performs any combination of the following housekeeping and nursing duties, applying knowledge acquired primarily through practical experience. Changes bed linens, bathes patients, and otherwise tends to their personal appearance and comfort. Takes and records patients' pulse and temperature and performs other services as prescribed by physician, such as administering medicines and giving in-

jections. Prepares meals for the members of families who are not ill and performs other housekeeping duties.

12. **Manager:** This classification includes top executives from the company president through personnel managers and division managers and department heads.

13. **Nursing Assistant:** Assist professional nursing staff in hospitals by performing routine or less skilled tasks in the care of patients. Bathes and dresses patients. Answers call bells. Makes beds. Serves food and nourishment. Assists patients in walking. Gives alcohol rubs and performs other services. Cleans rooms and equipment. Does not possess training and experience required for professional status.

14. **Packer:** Packs finished or wrapped products in cardboard or wooden boxes, cartons, kegs, or other containers preparatory to shipment or storage. Folds, stacks, or arranges articles in container, using excelsior, waste paper, or other material to prevent breakage or damage. May close and seal containers with glue or gummed tape. May weigh articles and inspect them for size, color, defects, or other characteristics, and keep a record of articles packed.

15. **Secretary:** Performs general office work in relieving executives and other company officials of minor executive and clerical duties. Takes dictation, using shorthand or uses a stenotype machine. Transcribes dictation or the recorded information reproduced on a transcribing machine. Makes appointments for executive and reminds him of them. Interviews people coming into office, directing to other workers those who do not warrant seeing the executive. Answers and makes phone calls. Handles personal and important mail, writing routine correspondence on own initiative. May supervise other clerical workers.

16. **Small Equipment Operator:** Drives a small truck powered by electric batteries, used for hauling heavy materials in and about a warehouse or other establishment. Controls starting or stopping and forward or backward motion of truck by manipulating levers. Steers truck by means of a steering bar or wheel. If truck is equipped with a lift platform, controls lifting mechanism by manipulating a lever. May load and unload truck or hand trucks towed by it. May maintain equipment.

17. **Stenographer and Typist:** Takes dictation in shorthand of correspondence, reports, and other matter and transcribes dictated material, writing it out in long hand or using a typewriter. May be required to be versed in the technical language and terms used in a particular profession. May perform a variety of related clerical duties. May take dictation on a stenotype machine, or may transcribe information from a sound-producing machine.

18. **Truck Driver:** Drives a heavy truck for transporting or delivering merchandise, including cases of canned and bottle goods, fresh meat, fruit and produce, or other articles that are heavy or delivered in large quantities to retail outlets or to wholesalers. Usually loads and unloads truck, frequently assisted by one or more truck-driver helpers. May make mechanical repairs to truck. May be required to know the location of street in a certain section of the city, in the entire city, or in the surrounding towns.

19. **Warehouseman:** Hand-trucks, carries, pushes, or rolls merchandise and materials about a warehouse, usually between loading platform and storage bins. Stacks or otherwise stores merchandise or material in bins or on shelves. May load and unload trucks or railroad freight cars. May operate a freight elevator to transport freight or passengers to storage department of warehouse. May sweep floors, straighten materials, or otherwise tidy warehouse. May weigh materials. May mark identifying information on articles.

# Reinforcer Ranking Instructions

1. At the top of each page there is the name of a reinforcer and a brief description of how it might exist in a job setting.

2. In the left hand column of each sheet there are listed the jobs to be ranked.

3. Please study the list of jobs and determine which job offers the most reinforcement with the named reinforcer. Cross this job title off the list and write the number of the job title on the top line in the right hand column, marked "highest."

4. Study the remaining job titles. Decide which one offers the least reinforcement with the named reinforcer. Cross this job title off the list and write the number of the job title on the bottom line in the right hand column, marked "lowest."

5. Now select the job offering the highest reinforcement from the remaining job titles. Cross it off the left-hand-list and write its number on the "next highest" line on the right-hand list.

6. Then select the job offering the least of the named reinforcer from the remaining group. Cross it off the left-hand-list and write its number on the "next lowest" line on the right-hand-list.

7. Repeat this process, alternating between highest and lowest until all jobs are crossed off the list.

8. Do this for each of the sixteen pages, each time considering the jobs in relation to the reinforcer named and described at the top of the page.

## Reinforcer Alternation Ranking Form

Reinforcer: _____

Illustrative item: _____

| Jobs to be ranked | Ranks |
|---|---|
| **No.    Job title** | |
| 1. Accountants | Highest _____ |
| 2. Bookkeepers | Next highest _____ |
| 3. Business Machine Operators | Next highest _____ |
| 4. Buyers | Next highest _____ |
| 5. Field Representatives | Next highest _____ |
| 6. Food Service Workers | Next highest _____ |
| 7. Engineers | Next highest _____ |
| 8. General Clerks | Next highest _____ |
| 9. Housekeeping Aides | Next highest _____ |
| 10. Laborers | Remaining job _____ |
| 11. Licensed Practical Nurses | Next lowest _____ |
| 12. Managers | Next lowest _____ |
| 13. Nursing Assistants | Next lowest _____ |
| 14. Packers | Next lowest _____ |
| 15. Secretaries | Next lowest _____ |
| 16. Small Equipment Operators | Next lowest _____ |
| 17. Stenographers and Typists | Next lowest _____ |
| 18. Truck Drivers | Next lowest _____ |
| 19. Warehousemen | Lowest _____ |

# Reinforcer Descriptions

**Ability utilization:** The job makes use of the full range and extent of the worker's abilities.

**Achievement:** The job provides a feeling of accomplishment.

**Activity:** The job allows the worker to keep busy all the time.

**Advancement:** The job provides opportunities for advancement.

**Authority:** The job allows the worker to tell people what to do.

**Compensation:** (Please rank jobs on the basis of the amount of monetary compensation they provide).

**Creativity:** The job allows the worker to try out some of his own ideas.

**Independence:** The job allows the worker to work alone.

**Moral values:** The job allows the worker to do the job without feeling it is morally wrong.

**Recognition:** The job allows the worker to get recognition for the work he does.

**Responsibility:** The job allows the worker to make decisions on his own.

**Security:** The job provides for steady employment.

**Social Service:** The job allows the worker to do things for other people.

**Social status:** The job allows the worker to be "somebody" in the community.

**Variety:** The job allows the worker to do something different every day.

**Working conditions:** The job has good working conditions.