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ABSTRACT
        Two forms of the Minnesota Importance Questionnaire
(MIQ), the multiple rank order form and the paired comparison form,
were compared in terms of psychometric characteristics and user
reactions. The MIQ forms were randomly administered to 290 subjects
on two different occasions resulting in a complete crossing of
order-by-form. The results of analysis of variance of absolute
differences between first and second administration scores for the
order-by-form groups, correlated t-tests between first and second
administration within groups, and the analysis of scale score
stability and profile stability within and between groups,
demonstrate that the level of scores and shape of the score profiles
for the ranked form are similar to those of the paired form.
Subjects' reactions to the two MIQ forms were found to differ, with
two-thirds of the subjects preferring the ranked form. Further
research exploring the comparability of the ranked form and paired
form is proposed. (Author)

A Comparison of Multiple Rank Order and Paired Comparison Forms

of the Minnesota Importance Questionnaire

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2

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Fisher, Weiss, and Dawis (1968), in an investigation of the comparability of

the Likert and paired comparison techniques of scaling multivariate attitudes,

noted the lack of research comparing different scaling methods. Of the available

studies, investigators have primarily studied the psychometric comparability of

various scaling methods (for a review of the research see Fisher et al., 1968).

However, investigators have not systematically studied the preferences and sub-

jective reactions of test users to the different scaling formats. Although

psychometric characteristics and relationships between scale scores scaled by

different techniques are necessary in comparability studies, they are not suf-

ficient to gain acceptance within the test consumer community for the various

methods of scaling and concomitant instrumentation. Users of tests are concerned

with the subjective reactions of their clientele to different methods of scaling.

The Work Adjustment Project has investigated several different techniques

of scaling vocational needs: dichotomous summative scaling, multipoint summative

scaling (Likert), and paired comparison scaling (Gay, Weiss, Hendel, Dawis, and

Lofquist, 1971). Of the three techniques, the paired comparison method was

chosen as the technique for scaling vocational needs. Several studies (Weiss,

Dawis, England, and Lofquist, 1964; Fisher et al., 1968) have demonstrated that

paired comparison scaling was an improvement over the other two techniques

because paired comparison scaling resulted in lower scale intercorrelations and

increased variability of the scale scores with no loss in the internal consis-

tency of the scales. The research on scaling and vocational needs resulted in

the current 1967 revision of the Minnesota Importance Questionnaire (MIQ), which has two sections--a paired comparison section of 190 items and an absolute judgment section of 20 items.

Several characteristics of the MIQ paired comparison format have resulted in complaints from test users. Although no pair of need statements is repeated among the 190 pairs, users have complained about the repetitiveness of the pairings. Since many users feel the paired comparison section is repetitive and laborious, the time involved in the task is a focus of complaints. Finally, the forced choice characteristics of paired comparison scaling results in criticism. Some users feel "trapped" by an either-or choice between two alternatives that may be equally attractive or unattractive.

To answer these criticisms the Work Adjustment Project has developed a ranked form of the MIQ. The technique used to scale the 20 vocational needs is known either as the method of multiple rank orders or balanced incomplete blocks (Gulliksen and Tucker, 1961; Gulliksen, 1964). The method of multiple rank orders provides all the essential information supplied by the method of paired comparison. The ranked method as used with the MIQ presents vocational need statements in blocks of five statements which are to be ranked within blocks, whereas the paired method presents the vocational need statements in pairs. Implicit in the ranking of five vocational need statements are ten paired comparisons. Therefore, the ranked responses can be converted to paired comparison responses. Thus, the ranked method reduces the number of judgments required, thereby reducing the length of the instrument and consequent administration time. The reduction in time achieved by this method, in contrast to the paired comparison method, is apparent when one compares the 105 responses required by the ranked method with the 190 responses required by paired comparison. In addition, the multiple rank order method produces a shorter MIQ. The ranked format requires 105 lines to present the need statements to be ranked while the paired comparison

format requires 380 lines in the current MIQ. Finally, the objection to the forced choice characteristic of the paired comparison method is alleviated through the process of ranking the vocational need statements.

The purpose of this study is to investigate the comparability of the MIQ multiple rank order form with the MIQ paired comparison form in terms of both psychometric characteristics and user reactions. Two questions were investigated: a) Do the multiple rank order scale scores differ from paired comparison scale scores?; and b) What form do users prefer and why?

Method

Subjects. The subjects in this study were 290 undergraduates at the University of Minnesota enrolled in an introductory psychology course. All subjects received points toward their final course grade for participating in the study.

Instruments. The instruments used were two forms of the Minnesota Importance Questionnaire (MIQ). One form employs the multiple rank orders method (ranked form) and the other form employs the method of paired comparison (paired form) in scaling the same 20 dimensions.

The paired form is the 1967 revision of the MIQ designed to measure 20 vocational need dimensions. This form consists of a comparative judgment section, in which each of the vocational need statements is paired with every other statement yielding 190 pairs, and an absolute judgment section composed of the 20 vocational need statements. In the comparative judgment section the subjects choose the statement of each pair which represents the more important characteristic of their ideal job. In the absolute judgment the subjects indicate whether or not each of the 20 need dimensions is important or not important in their ideal job.

The ranked form consists of a comparative judgment section, with 21 blocks of five vocational need statements each, and an absolute judgment section

identical to the absolute judgment section of the paired form. In the multiple rank order method, only certain numbers of statements can be ranked in blocks of a given size and result in complete paired comparison data. For blocks of 5 statements, 21 statements are required. Therefore, a 21st statement was added to the 20 statements in the comparative judgment section. The 21st statement, representing the dimension of autonomy, was "I could plan my work with little supervision." For purposes of comparability between MIQ forms, the autonomy need dimension is not scored. In the comparative judgment section subjects rank the need statements with respect to their relative importance in their ideal job.

An important index on the MIQ is the total circular triad (TCT) score. The maximum number of TCTs for the paired form is 385. While theoretically, the maximum number of triads for the ranked form is 385, a number of these triads are within the ranking blocks and therefore cannot be made circular. Thus, the distribution of TCTs for random responding differs between the forms. The distribution for the paired form has a mean of 333 and standard deviation of 15.8 whereas for the ranked form it has a mean of 280 and standard deviation of 29. Consequently, TCT scores of 254 and 193 were chosen as the maximum allowable for a valid profile for the paired and ranked forms, respectively.

Procedure. The MIQ forms were administered to the 290 subjects on two different occasions. The time between testing was 48 hours. At the first testing (Time 1) subjects were randomly administered either the paired or the ranked form. At the second testing (Time 2) subjects were again randomly given either the paired or the ranked form. This experimental design (see Figure 1) resulted in a complete crossing of the order in which the instruments were administered to the subjects.

Insert Figure 1 about here

The order-by-form design resulted in four groups: Time 1 paired form and

Time 2 paired form (group PP; N = 73); Time 1 paired form and Time 2 ranked form (group PR; N = 67); Time 1 ranked form and Time 2 paired form (group RP; N = 73) and Time 1 ranked form and Time 2 paired form (group RR; N = 77). After the second testing, subjects in groups PR and RP were asked to indicate which form they preferred and why they preferred that form. All subjects were also requested to indicate on their booklets the time they began and the time they completed their questionnaires.

Analysis. Four different statistical analyses were carried out to investigate the accuracy with which the multiple rank order method scales the 20 need dimensions. The criterion utilized to assess accuracy was the paired comparison method of scaling the same 20 need dimensions. The four analyses explored both group and individual differences in scale scores resulting from the two methods.

The following analyses were conducted: a) between-group comparison of the absolute difference between Time 1 and Time 2 scores for each of the 20 need dimensions; b) within-group comparison of Time 1 and Time 2 mean scale scores for each need dimension; c) within-group determination of individual scale score stability between Time 1 and Time 2; and d) within-group determination of the stability of score profiles between Time 1 and Time 2. In the first analysis, groups were compared by performing a one way analysis of variance. The dependent variable was the absolute difference between a Time 1 score from a Time 2 score on the same scale. In the second analysis correlated t-tests were used to compare mean scale scores for Time 1 and Time 2, for each scale and for each group separately. In the third analysis, scale score stability was investigated by studying shifts in an individual's scale score across the 20 need dimensions. A shift was defined as a change from a Time 1 scale score to a Time 2 scale score across two points: 0 and 1.0. These points divide the scale into ranges corresponding to low or no importance (lower than 0.0), some importance (between 0.0 and 1.0) and high importance (higher than 1.0). A shift, then, would

be a change from one range to another. Scale score stability was investigated for each of the four groups separately. In the fourth analysis an individual's 20 scale scores at Time 1 were correlated with the same individual's 20 scale scores at Time 2. Again, this was done for each group separately.

Three different tabulations were made to determine which scaling format the subjects preferred, reasons for their preference, and amount of time needed to complete the two scaling format. (This analysis was done only for those subjects who took both forms of the MIQ.) In the first tabulation a 2 x 2 table cross-classifying order of administration by form preference was submitted to a chi-square test to evaluate the effects of order of administration. The second tabulation listed the results of a content analysis categorizing the reasons for the preference. In the final tabulation the average time required to complete the paired and ranked forms was calculated.

<div align="center">Results</div>

Comparison of Scale Scores

Absolute differences. Table 1 presents the results of the analysis of variance for the absolute differences between Time 1 and Time 2 scores for each of the 20 need scales.

Insert Table 1 about here

Five of the twenty F ratios were statistically significant at the .01 level and one at the .05 level. As shown in Table 2, the Student Newman-Keuls test of mean absolute differences was used to identify significant mean differences between any groups. The group differences of concern to this study, pertaining to the comparability of the paired and ranked forms, are those between the groups labeled PP, PR, and RP.

Insert Table 2 about here

Results of the analysis for the six scales of Activity, Advancement, Authority,
Moral Values, Social Service, and Social Status showed statistically significant
mean differences (p<.05) with the RP group differing from the PR and PP groups.
It should be noted, however, that the values for these mean absolute differences
were relatively small, ranging from .10 to .23. All five of these statistically
significant mean differences were in the same direction and order, with the RP
group differing from the PP and PR groups and the RP group producing the largest
mean absolute difference. Across the 20 scales the mean absolute differences for
the PP, PR, and RR groups, taken pairwise, did not differ statistically. The
statistically significant mean differences between the RP group and the PR
group may be due to an order effect of administration, that is, which form was
administered first.

Mean scale score differences. To determine the extent of scale score dif-
ferences between administration times, correlated t tests were computed between
Time 1 and Time 2 scale score means for each group. Table 3 through Table 6
show the scale means, standard deviations and correlated t tests, for each scale
and each of the four groups. The paired form test-retest mean differences
(Table 3) and the ranked form test-retest mean differences (Table 4) are very
similar in the direction, level, and pattern of differences across the 20 scales.
Only three mean differences are statistically significant for the paired test-
retest group and four mean differences are statistically significant for the
ranked test-retest group.

Insert Tables 3 and 4 about here

These test-retest mean differences for the paired and ranked forms serve as a

baseline by which to evaluate the comparability of the ranked and paired forms in the PR and RP groups, where order and form are alternated.

Examination of the level and pattern of the scale score means and standard deviations presented in Table 5 shows few differences between the paired form given first (Time 1) and the ranked form given second (Time 2), with only five mean differences being statistically significant.

Insert Table 5 about here

Although the direction of mean differences for the PR group in comparison to the PP group and RR group are opposite in direction, the mean differences are almost identical in pattern and absolute level.

Changing the order of administration, with the ranked form first and paired form second, results in frequent and large differences in level and pattern of mean scale scores and standard deviations, as shown in Table 6. Ten of the mean differences are statistically significant.

Insert Table 6 about here

The directional pattern of the mean differences does not replicate the results obtained with the paired form first and ranked form second; rather, it confirms the observation that the comparability of the ranked form with the paired form is confounded by the order in which the forms were administered. Although these results differ considerably from the baseline PP and RR groups, the mean differences are still small in terms of the scale score range of eight scale units.

Scale score stability. To determine whether scale score differences from Time 1 to Time 2 would result in a different interpretation of the individual's reinforcer preferences, scale score shifts were tabulated separately for the four groups in a 3 x 3 table, as shown in Table 7.

For each group, scale score stability is indicated by the diagonal cells running from the upper left corner to the lower right corner in the table. Inspection of Table 7 shows very similar scale score stability across all four groups. The sum of the diagonal percentages is: for group PP, 77.7%; for group RR, 78.4%; for group PR, 72.5%; and for group RP, 70.2%. These results demonstrate that the use of the ranked form in comparison to the paired form results in similar interpretations of reinforcer preferences.

Profile stability. The range and median values of profile stability coefficients for the four groups are shown in Table 8.

The median stability coefficients are: .92 for the PP group; .91 for the PR group; .86 for the RP group; and .92 for the RR group. The lowest profile stability coefficient was zero for the PP group, and the highest coefficient was .99, for both the PP and RR groups. These results show that the ranked form profiles are as stable as the paired form profiles over a 48 hour test-retest interval. Also, these results indicate that the shape of an individual's profile is the same whether scaled by the paired comparison method or the multiple rank order method.

Other Findings Concerning the Scaling Format

Table 9 shows the chi-square analysis of the cross-classification order of administration by the form preference.

Regardless of order of administration, more subjects preferred the ranked form over the paired form. However, proportionately more subjects preferred the

paired form when it was administered second than preferred it when it was administered first. Although there was an order effect ($X^2 = 9.41$, p<.005), two-thirds of the subjects preferred the ranked form.

Table 10 presents a content analysis of the reasons given for the subject's preference for either the multiple rank order or paired comparison form.

Insert Table 10 about here

The 67% who preferred the ranked form were about evenly divided in the reasons they gave for their preference. Of this group approximately 57% stated that the ranked format of ranking five need statements was more acceptable than the forced choice format of the paired form. The other 43% chose the ranked form because they found the paired form repetitive and boring. The 33% who preferred the paired form found the forced choice format to their liking, stating that it was easier to judge between two need statements than to rank five need statements.

Table 11 presents the means, standard deviations, and range of the time required to complete the two forms.

Insert Table 11 about here

The completion times were computed only for Time 1 by combining the PP and PR groups for the paired form completion time and the RR and RP groups for the ranked form completion time. Subjects completed the ranked form in approximately one-half the time required to complete the paired form. Since the range of completion times overlapped for the paired and ranked forms, some subjects completed the paired form in less time than some subjects needed to complete the rank form. The mean completion times for the ranked form was 16½ minutes, and for the paired form, 28 minutes.

Summary and Conclusions

The multiple rank order form of the MIQ was compared with the paired comparison form of the MIQ in terms of the psychometric characteristics of score level and profile shape and in terms of subject preference for scaling format. To test the hypothesis that the levels of scale scores generated by the two forms are similar, an analysis of variance was performed on the absolute differences between Time 1 and Time 2 scores, with Student Newman-Keuls tests of pair-wise group mean differences and correlated t tests of mean differences between Time 1 and Time 2 scale score means for each group. Since multiple F and t tests were run, a base rate indicating the number of statistically significant differences (SSDs) to expect by chance and test-retest was established from the number of SSDs found in the correlated t tests of mean differences for the paired form (Time 1 vs. Time 2) and the ranked form (Time 1 vs. Time 2). These multiple t tests resulted in three and four SSDs for the paired and ranked forms, respectively. Using four SSDs as the base rate, the results of the analysis of variance (showing six SSDs) and correlated t tests for paired form (Time 1), ranked form (Time 2), of five SSDs, and for ranked form (Time 1), paired form (Time 2), of ten SSDs, were taken as supporting the comparability of forms. Although SSDs were found above the base rate level, it was found that these score differences would not affect subsequent interpretations of individual reinforcer preferences. The results of the scale score stability analysis support this conclusion, with 72.5% of the scale scores stable across time for group PR and 70.2% for group RP in comparison with 77.7% for group PP and 78.4% for group RR. To test the hypothesis that the ranked and paired methods of scaling result in similar shape of score profiles, subjects' scale scores were correlated across administrations. Median profile stability coefficients for the PR group and RP group (.92 and .86, respectively) indicate that the ranked and paired profiles are similar. To test the hypothesis that subjects prefer

the ranked scaling format, subjects in the PR and RP groups were asked to indicate their preferences. The results showed that 67% of the subjects preferred the ranked scaling format.

Additional results of this study suggest the following conclusions: (a) The ranked form profiles are as stable as the paired form profiles over a 48 hour test-retest interval; (b) The ranked form completion time is one-half the completion time for the paired form; (c) Subjects preferred the ranked form for two reasons: the ranked format allowed them to express their degree of preference, and the paired format was repetitive and boring; and (d) In the analysis of psychometric comparability and subject preference, an order-by-form effect was observed.

This order-by-form effect could be due to the testing context. Several factors of the testing context could have contributed to the effect. First, some subjects may have been relatively unmotivated to respond meaningfully to the MIQ forms because of the large group test setting and the nature of the incentive for participation, i.e., experimental points. For these subjects, the real reward for participation might have been the speedy completion of testing. Second, since subjects' testing time varied with MIQ form, those receiving the ranked form left the testing session early while other subjects receiving the paired form had to plod on. Third, completing different forms at Time 1 may have set different expectations for Time 2. Subsequent studies should consider these factors as potentially contaminating. How this order-by-form effect confuses the results can only be investigated through a replication of the study.

In summary, there is a strong similarity between the paired comparison method and multiple rank order method of scaling and, not surprisingly, between the corresponding paired and ranked forms of the MIQ. The finding of comparability in level of scale score and shape of profile between the two forms of the MIQ is a strong but not necessarily a sufficient condition to consider the

ranked form as an alternative form to the paired form. Further research is needed to investigate the effect of the multiple rank order method of scaling on the total circular triad, and stimulus circular triad scores, and on the internal consistency and factor structure of measured vocational needs.

References

Fisher, S. T., Weiss, D. J., & Dawis, R. V. A comparison of Likert and
pair comparisons techniques in multivariate attitude scaling. <u>Educational
and Psychological Measurement</u>, 1968, <u>28</u>, 81-94.

Gay, E. G., Weiss, D. J., Hendel, D. D., Dawis, R. V., & Lofquist, L. H.
Manual for the Minnesota Importance Questionnaire. <u>Minnesota Studies in
Vocational Rehabilitation</u>, 1971, XXVIII.

Gulliksen, H. Intercultural studies of attitudes. In N. Frederiksen &
H. Gulliksen (Eds.), <u>Contributions to mathematical psychology</u>. New York:
Holt, Rinehart and Winston, 1964.

Gulliksen, H., & Tucker, L. R. A general procedure for obtaining paired
comparisons from multiple rank orders. <u>Psychometrika</u>, 1961, <u>26</u>, 173-183.

Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H. The measurement
of vocational needs. <u>Minnesota Studies in Vocational Rehabilitation</u>, 1964,
XVI.

Footnote

17

SECOND
ADMINISTRATION
(Time 1)

FORM	Paired Comparison	Multiple Rank Order
Paired Comparison	Group PP N = 73	Group PR N = 67
Multiple Rank Order	Group RP N = 73	Group RR N = 77

FIRST
ADMINISTRATION
(Time 1)

Figure 1. Experimental design (Abbreviations: P = Paired Comparison Form and R = Multiple Rank Order Form

Table 1

Analysis of Variance of Absolute Differences Between Time 1 and Time 2 Scores for Four Groups, by Scale

Source	SS	MS	F	p	Source	SS	MS	F	p
	Ability Utilization					Moral Values			
Between	.084	.028	.291	.832	Between	2.521	.840	3.858	.010
Within	27.418	.096			Within	62.284	.218		
Total	27.502				Total	64.805			
	Achievement					Recognition			
Between	.450	.150	1.505	.214	Between	.358	.119	1.089	.354
Within	28.519	.100			Within	31.347	.110		
Total	28.969				Total	31.705			
	Activity					Responsibility			
Between	2.455	.818	7.174	<.001	Between	.605	.202	1.977	.118
Within	32.622	.114			Within	29.191	.102		
Total	35.077				Total	29.796			
	Advancement					Security			
Between	1.705	.568	5.677	.001	Between	.751	.250	2.505	.059
Within	28.633	.100			Within	28.569	.100		
Total	30.338				Total	29.319			
	Authority					Social Service			
Between	1.166	.389	3.123	.026	Between	1.475	.492	4.297	.006
Within	35.578	.124			Within	32.731	.114		
Total	36.743				Total	34.206			

Table 1 (cont.)

Source	SS	MS	F	p	Source	SS	MS	F	p
Company Policies/Practices					Social Status				
Between	.504	.168	2.177	.098	Between	1.641	.547	4.574	.004
Within	22.683	.079			Within	34.203	.120		
Total	23.187				Total	35.844			
Compensation					Supervision-Human Relations				
Between	.593	.198	2.430	.065	Between	.367	.122	1.388	.247
Within	23.274	.081			Within	25.223	.088		
Total	23.867				Total	25.590			
Co-workers					Supervision-Technical				
Between	.398	.133	1.712	.165	Between	.226	.075	.891	.446
Within	22.188	.078			Within	24.204	.085		
Total	22.587				Total	24.430			
Creativity					Variety				
Between	.502	.167	2.053	.107	Between	.311	.104	1.125	.339
Within	23.310	.082			Within	26.315	.092		
Total	23.812				Total	26.626			
Independence					Working Conditions				
Between	.613	.204	1.035	.377	Between	.447	.150	1.644	.179
Within	56.429	.197			Within	25.935	.091		
Total	57.042				Total	26.382			

Note. df = 3, 286.

Table 2

Newman-Keuls Test of Mean Absolute
Difference Between Any Two Groups, by Scale

Scale	Rank			
	1	2	3	4
	Mean Absolute Difference			
Ability Utilization	.340 (PP)	.346 (RR)	.376 (PR)	.377 (RP)
Achievement	.312 (PP)	.357 (RR)	.404 (RP)	.410 (PR)
Activity	.325 (RR)	.332 (PP)	.439 (PR)	.548 (RP)
Advancement	.269 (RR)	.351 (PR)	.364 (PP)	.481 (RP)
Authority	.308 (PP)	.410 (RR)	.431 (PR)	.482 (RP)
Company Policies/ Practices	.310 (RR)	.341 (PP)	.404 (RP)	.408 (PR)
Compensation	.316 (PP)	.327 (RR)	.358 (PR)	.432 (RP)
Co-workers	.290 (RR)	.333 (PP)	.363 (PR)	.388 (RP)
Creativity	.318 (RR)	.323 (PP)	.399 (PR)	.408 (RP)
Independence	.402 (PR)	.421 (PP)	.421 (RR)	.519 (RP)
Moral Values	.400 (PP)	.416 (RR)	.515 (PR)	.632 (RP)
Recognition	.355 (PP)	.368 (RR)	.378 (PR)	.445 (RP)
Responsibility	.308 (PP)	.327 (RR)	.387 (PR)	.422 (RP)
Security	.317 (RR)	.359 (PP)	.410 (RP)	.451 (PR)
Social Service	.323 (RR)	.369 (PP)	.431 (PR)	.511 (RP)
Social Status	.340 (PP)	.388 (RR)	.421 (PR)	.543 (RP)
Supervision-Human Relations	.336 (RR)	.344 (PP)	.396 (RP)	.422 (PR)
Supervision-Technical	.292 (RR)	.343 (RP)	.348 (PP)	.367 (PR)
Variety	.330 (RR)	.381 (PR)	.406 (PP)	.411 (RP)
Working Conditions	.322 (RR)	.337 (PP)	.406 (RP)	.409 (PR)

Note. Differences between underlined mean absolute differences are not statistically significant at $p < .05$. Abbreviations: P = paired comparison and R = multiple rank order.

Table 3

Time 1 and Time 2 Score Means and Standard
Deviations for the Paired Comparison Form, by Scale

| Scale | Mean | | | | Standard Deviation | | |
	Time 1	Time 2	Difference	t^a	Time 1	Time 2	Difference
AU	1.47	1.46	.01	.11	.59	.57	.44
Ach	1.51	1.48	.03	.65	.56	.54	.39
Act	-.11	-.15	.04	.69	.78	.87	.46
Adv	.99	1.04	-.05	.95	.83	.90	.45
Au	-.44	-.42	-.02	.42	.85	.97	.39
CPP	.89	.94	-.05	.98	.68	.79	.43
Com	.41	.52	-.11	2.32*	.81	.88	.40
Cow	.66	.72	-.06	1.07	.73	.69	.43
Cre	1.07	1.16	-.09	1.82	.77	.78	.44
Ind	-.15	-.12	-.03	.40	.75	.81	.55
MV	1.48	1.64	-.16	2.69**	1.11	1.15	.50
Rec	.82	.83	-.01	.28	.68	.82	.46
Res	.97	1.00	-.03	.56	.71	.77	.42
Sec	.72	.84	-.12	2.20*	.83	.94	.46
SSe	.97	1.05	-.08	1.44	.93	.92	.47
SSt	-.18	-.21	.03	.50	1.01	1.09	.44
SHR	.37	.42	-.05	.99	.76	.78	.41
ST	.27	.36	-.09	1.66	.67	.73	.45
Var	.29	.19	.10	1.58	.78	.81	.50
WC	.68	.72	-.04	.94	.61	.80	.45

[a]Correlated t test, df = 72.

*p<.05.

**p<.01.

Table 4

Time 1 and Time 2 Score Means and Standard
Deviations for the Multiple Rank Order Form, by Scale

Scale	Mean			t^a	Standard Deviation		
	Time 1	Time 2	Difference		Time 1	Time 2	Difference
AU	1.81	1.86	-.05	.92	.60	.58	.45
Ach	1.79	1.72	.07	1.52	.65	.62	.46
Act	.02	.02	.00	.00	.87	.89	.44
Adv	.94	.95	-.01	.34	.74	.73	.37
Au	-.50	-.49	-.01	.26	.80	.85	.53
CPP	.46	.50	-.04	.84	.68	.65	.40
Com	.39	.49	-.10	2.37*	.74	.72	.40
Cow	.77	.79	-.02	.41	.68	.65	.36
Cre	1.21	1.23	-.02	.47	.68	.66	.41
Ind	-.08	-.13	.05	.70	.93	.93	.62
MV	.93	1.14	-.21	3.30**	1.06	1.17	.55
Rec	.73	.87	-.14	2.67*	.86	.90	.46
Res	1.16	1.19	-.03	.58	.75	.75	.43
Sec	.65	.72	-.07	1.36	.83	.98	.41
SSe	1.19	1.25	.06	1.10	.91	.94	.44
SSt	-.17	-.23	.06	.98	1.13	1.10	.50
SHR	.23	.31	-.08	1.67	.64	.70	.43
ST	-.01	.10	-.11	2.54*	.63	.63	.38
Var	.66	.62	.04	.78	.87	.91	.41
WC	.78	.81	-.03	.55	.70	.61	.41

Note. N = 77.

[a]Correlated t-test, df = 76.

*$\underline{p}$<.05.

**$\underline{p}$<.01.

Table 5

Score Means and Standard Deviations for the Paired Comparison
Form (Time 1) and Multiple Rank Order Form (Time 2), by Scale

Scale	Mean			t^a	Standard Deviation		
	Time 1	Time 2	Difference		Time 1	Time 2	Difference
AU	1.42	1.45	-.03	.45	.59	.63	.49
Ach	1.61	1.63	-.02	.30	.68	.62	.53
Act	-.20	-.26	.06	.80	.80	.82	.55
Adv	1.14	1.01	.13	2.19*	.82	.79	.45
Au	-.41	-.59	.18	2.83**	.80	.76	.52
CPP	.96	.72	.24	4.57**	.58	.57	.44
Com	.58	.58	.00	.00	.90	.89	.47
Cow	.87	.77	.10	1.85	.67	.75	.46
Cre	.98	1.09	-.11	1.76	.61	.74	.48
Ind	-.31	-.34	.03	.44	.84	.87	.59
MV	1.43	1.38	.05	.53	1.16	1.40	.72
Rec	.87	.78	.09	1.40	.80	.79	.51
Res	.99	.96	.03	.60	.62	.69	.50
Sec	.56	.57	-.01	.04	.82	.94	.57
SSe	1.00	.86	.14	2.21*	.91	.91	.53
SSt	-.08	-.16	.08	1.22	1.11	1.11	.54
SHR	.50	.31	.19	3.06**	.68	.60	.51
ST	.43	.35	.08	1.51	.65	.67	.45
Var	.17	.12	.05	1.03	.73	.65	.46
WC	.84	.85	-.01	.09	.74	.67	.52

Note. N = 67.

[a]Correlated t·test, df = 66.

*p<.05.

**p<.01.

Table 6

Score Means and Standard Deviations for the Multiple Rank
Order Form (Time 1) and Paired Comparison Form (Time 2), by Scale

| Scale | Mean | | | t^a | Standard Deviation | | |
	Time 1	Time 2	Difference		Time 1	Time 2	Difference
AU	1.73	1.64	.09	1.57	.51	.52	.49
Ach	1.86	1.64	.22	3.82**	.63	.54	.49
Act	.33	-.11	.44	7.13**	.86	.82	.53
Adv	1.17	1.14	.03	.50	.75	.74	.63
Au	-.31	-.38	.07	.95	.93	.84	.64
CPP	.67	.85	-.18	3.27**	.51	.57	.48
Com	.67	.79	-.12	1.98	.70	.72	.52
Cow	.85	.77	.08	1.37	.60	.61	.50
Cre	1.17	1.03	.14	2.51*	.58	.64	.49
Ind	-.06	-.27	.21	2.77*	1.08	.81	.66
MV	1.11	1.38	-.27	3.02**	1.03	1.22	.79
Rec	.90	.79	.11	1.68	.89	.88	.56
Res	1.23	.95	.28	4.74**	.76	.73	.51
Sec	1.02	.92	.10	1.59	.84	.67	.54
SSe	1.05	1.08	-.03	.33	.94	.91	.67
SSt	.02	-.24	.26	3.46**	1.06	1.05	.64
SHR	.40	.40	.00	.02	.54	.61	.50
ST	.21	.20	.01	.15	.73	.61	.47
Var	.47	.26	.21	3.71**	.77	.71	.49
WC	.97	.79	.18	3.03**	.63	.61	.49

Note. N = 73.

[a]Correlated t test, df = 72.

*p<.05.

**p<.01.

Table 7

Summary of Scale Score Stability Analysis for the Groups

Group PP
Second Administration
(Paired Comparison)

Scale score x

First Administration (Paired Comparison)	$-4 \geq x \leq 0$	$.1 \geq x \leq 1$	$1.1 \geq x \leq 4$	
$-4 \geq x \leq 0$	319 (21.8)	60 (4.1)	6 (.4)	385
$.1 \geq x \leq 1$	68 (4.7)	419 (28.7)	100 (6.8)	587
$1.1 \geq x \leq 4$	0 (0)	91 (6.2)	397 (27.2)	488
	387	570	503	

Group PR
Second Administration
(Rank Order)

Scale score x

(Paired)	$-4 \geq x \leq 0$	$.1 \geq x \leq 1$	$1.1 \geq x \leq 4$	
	297 (22.2)	52 (3.9)	1 (.1)	350
	106 (7.9)	333 (24.9)	89 (6.6)	528
	6 (.4)	115 (8.6)	341 (25.4)	462
	409	500	431	

Group RR
Second Administration
(Rank Order)

Scale score x

First Administration (Rank Order)	$-4 \geq x \leq 0$	$.1 \geq x \leq 1$	$1.1 \geq x \leq 4$	
$-4 \geq x \leq 0$	334 (21.7)	88 (5.7)	2 (.1)	424
$.1 \geq x \leq 1$	73 (4.7)	426 (27.7)	92 (6.0)	591 (Rank Order)
$1.1 \geq x \leq 4$	3 (.2)	75 (4.9)	447 (29.0)	525
	410	589	541	

Group RP
Second Administration
(Paired Comparison)

Scale score x

	$-4 \geq x \leq 0$	$.1 \geq x \leq 1$	$1.1 \geq x \leq 4$	
	254 (17.4)	70 (4.8)	3 (.2)	327
	109 (7.5)	372 (25.5)	95 (6.5)	576
	11 (.8)	147 (10.1)	399 (27.3)	554
	374	589	497	

Note. Numbers in parentheses refer to total cell percentages. Group abbreviations: P = paired comparison form and R = multiple rank order form of Minnesota Importance Questionnaire.

26

Table 8

Range and Median of Profile Stability Coefficients, by Group

| Group[a] | N | Range | | Median |
		Low	High	
PP	73	.00	.99	.92
PR	67	.66	.98	.91
RP	73	.42	.98	.86
RR	77	.67	.99	.92

[a]Abbreviation: P = paired comparison and R = multiple rank order

form of Minnesota Importance Questionnaire.

Table 9

Frequencies, Percentages, and Chi-square Comparing
Form Preference, by Order of Administration

Order of Administration	Form Preference[a]			
	Paired		Ranked	
	Frequency	Percent	Frequency	Percent
Paired-Ranked	13	9.29	54	38.57
Ranked-Paired	33	23.57	40	28.57

[a]$x^2 = 9.41$, df $= 1$, $p < .005$.

Table 10

Content Analysis of Reasons Given for Form Preference

Form Preference	Reason	N
Multiple rank order	Easier to rank five needs than to judge between two needs because it allows for expression of degree or order of preference.	54
	Paired comparison form is repetitive and boring.	40
Paired comparison	Easier to judge between two needs than to rank five needs.	46

Table 11

Means, Standard Deviations, and Range of Time Required to
Complete the Minnesota Importance Questionnaire, by Form

Form	Mean	Standard Deviation	Range
Paired comparison (N = 140)	27' 52"	7' 34"	15' - 65'
Multiple rank order (N = 138)[a]	16' 31"	6' 52"	8' - 31'

Note. Time in minutes and seconds.

[a]Twelve subjects did not report either beginning or completion time.