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Measuring Job Satisfaction: A Note on the Within – And Between – Unit Problem

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An analysis of within-group and between-group sources of covariation was applied to a seven item job satisfaction measure adapted from the Minnesota Satisfaction Questionnaire. Data were collected from 159 chemical workers. Results indicated that some satisfaction items were strongly influenced by the structure of the supervisor groups. This issue of between-versus within-group variation offers a possible explanation for low correlations in past research using job satisfaction measures.

Dansereau, Alutto and Yammarino (1984) have raised an important issue for organizational researchers. To what extent do measures gathered from individuals reflect individual level processes, as opposed to supervisory group (or any other type of group) processes? Markham & Scott (1983) examined the LBDQ XII version of leadership structure items for a version of this psychometric problem. The basic issue is, does phrasing a question to refer to a group guarantee that a group-based response will occur, and vice-versa. In other words, if one asks each member of a supervisory unit how the superior treats the unit, there may be so much variance between individual responses that it is impossible to interpret the results. On one hand, the common practice of averaging the individuals' responses to construct a group mean may have simply produced a statistical artifact which would have no corresponding referent in the external world. In other words no member of the supervisory group in question would have responded with a score equal to or near the group's average. Likewise, the reverse could happen: a question could be phrased to refer to how the superior treats a single individual. If the superior treats all of the members the same, then there would be almost no differences between these responses, and the calculation of an average score to represent the group might be very representative of the process.

Markham and Scott (1983) found that regardless of the manner in which survey questions are phrased (either with reference to groups or to individuals), it is not possible to predict whether the variables being measured occur at the group, the within-group, or the individual level of analysis. Thus, the average score of an item across a supervisory group was descriptive of only some of the data; whereas the signed deviation score of an individual above or below that average was, for other items, more descriptive of the data. In either case, the phrasing of the item with reference to groups or individuals did not predict this phenomenon. If the item was phrased to refer to groups, this was no guarantee that a between-group phenomenon was modeled. Similarly, some items which referred to individuals appeared to fit a between-group model. The purpose of this research is to determine to what extent these results are restricted to leadership measures, and if they apply to other attitudinal measures, specifically job satisfaction. This study applies the same type of

conceptual and statistical analysis from Markham & Scott (1983) to job satisfaction measures.

Methods & Measures: The respondents (N = 159) were employees of a non-union, American chemical manufacturer. Each individual completed a satisfaction questionnaire during an employee survey. All respondents were located within 28 supervisory units. See the Markham & Scott (1983) study for further details.

Seven job satisfaction items were adapted from the short version of the Minnesota Satisfaction Questionnaire. The items are listed in Table 1, along with their means and standard deviations. One would expect this scale to provide a reasonable measure of job satisfaction based on the history and use of the MSQ. (See Scott & Taylor, [1985] for examples.)

For this analysis a technique used by Markham, Dansereau, Alutto & Dumas (1983) examined the effects of a grouping variable, in this case, supervisory units, on bivariate relationships. First, individual level correlations were computed. Second, these correlations were broken into two component scores: the first was based on on weighted group averages (J = 28) and the second based on individual signed deviation scores above or below the group average (N-J = 159-28). Third, all variables were also checked for significant differences between units by the use of a one-way ANOVA with supervisory groups equated with statistical cells. (See Sirotnik [1980] and Dansereau, Alutto, & Yammarino [1984] for further insights into this procedure.)

Results: The results of the one-way ANOVA's are shown in Table 1.

For two of the eight measures, a statistically significant amount of variation is accounted for by differences between supervisory groups. For Item 5, which refers to the supervisor (My supervisor is an excellent person to work with) this result would be understandable due to the phrasing of the question. However, there is no apparent reason for such group differences in the perception of physical working conditions referred to by Item 7.

The matrix of componenet correlations is presented in Table 1 to further explore these group effects. In the lower left triangle of the matrix, three Pearson correlations are present for each pair of items. The correlation on the left is based on the individual raw scores (N = 159); the upper right one is computed from weighted supervisory unit average scores; and the lower right one is the residual, within-group correlation which occurs within units after holding constant differences between supervisory units (N-J = 159-28).

The upper right triangle summarizes an inferential comparison procedure which indicates for any given triad of bivariate component correlations whether: (1) the unit average correlation is most important (i.e., if it is significantly different from zero *and* significantly larger than the residual correlation), or (2) the reverse is true (i.e., if the residual correlation is significantly greater than zero *and* significantly greater than the unit average correlation), or (3) an ambiguous condition exists in which both component correlations are significant, or (4) a traditional null condition exists (i.e., neither component correlation is significantly different from zero).

TABLE 1

Descriptive Statistics, One Way ANOVA Results and Component Correlations and Inferences for the MSQ Items

Measures	Mean	S.D.	One-way ANOVA with groups as Cells		Component Correlations and Inferences																
	x	o	n b	n w	1		2		3		4		5		6		7		8
1. I am satisfied with the opportunity to talk with other employees at work	4.41	.81	18%	72%	X		A		A		W		N		A		A		W
2. I find real enjoyment in my work	3.71	1.14	24%	76%	.15	-.13 .22**	X		A		A		A		W		A		A
3. I like my fellow employees	4.44	.73	21%	79%	.19	.11 .19**	.23	.20 .23**	X		W		W		N		A		W
4. I am sorry I ever took the job	4.12	1.08	21%	79%	.28	.18 .28**	.37	.57** .31**	.27	.17 .27**	X		A		A		A		A
5. My supervisor is an excellent person to work with	3.67	1.26	46%***	54%	.10	.07 .10	.32	.30 .28**	.15	.03 .21**	.21	.32* .17	X		B		A		A
6. I am satisfied with the wages I am paid for the the work I do	2.96	1.40	22%	78%	.21	.15 .24**	.17	-.05 .25*	.01	-.01 -.00	.19	.32* .16	.17	.37* -.08	X		W		A

7. Physical working conditions are excellent	2.87	1.37	32%**	68%	.11	-.23 .20*	.35	.35 .35**	.18	.36* .10	.33	.43* .29*	.34	.38* .31**	.30	.16 .37**	X X				A A
8. All in all, I am satisfied with my job	3.91	1.01	25%	75%	.31	.12 .34**	.65	.60** .65**	.22	.01 .26**	.43	.52** .39**	.45	.71** .29**	.41	.44* .42**	.49	.47* .48**			X

* $p < .05$
** $p < .01$
*** $p < .001$

The correlation on the left is based on individual scores (N = 159).
The correlation on the upper right is based on unit average scores (J = 28).
The correlation of the lower right is based on residual scores (N-J = 131).
The inferences in the upper right TRIANGLE are based on a Z score test to determine the significance of the difference between the correlation based on the unit averages and on the correlation based on the residual score. "N" signifies the traditional null condition. "A" signifies an ambiguous condition in which an inference toward either the set of correlations is inferred to signify a condition in which the variation within supervisory units is more systematic than between units. "B" means that the set of correlations is inferred to signify a condition in which the variation between supervisory units is more significant than within units.

If the various aspects of job satisfaction are an individual differences condition, then one would expect the following findings: (1) there should be no significant differences between supervisory units on any of these measures, and (2) all component correlations would fall in the ambiguous condition, indicating that no inference could be drawn to either a between-unit or within-unit condition. From Table 1, two of the eight satisfaction measures vary significantly between units, contrary to expectations. From Table 1, of 28 pairs of interrelationships, seven or (25%) occur at the within-level; one occurs at the between-group-unit level; two are null; and the rest (64%) are ambiguous.

Discussion: The point of this study is straightforward: The use of job satisfaction measures may need to be re-examined in light of structural effects based on differences between and within supervisory groups. To the extent that certain job satisfaction variables are better modeled as within-unit or between-unit processes, then the use of individual raw score analysis will not fully capture these descriptions, and the resulting inferences will be weaker and less descriptive than need be. Markham & Scott (1983) illustrated a version of this problem with leadership measures. This study extends the argument to satisfaction measures which we commonly assume, *a priori*, work only at the individual level of analysis. In this case the point is not to suggest that satisfaction items need to be rephrased to refer to the group's overall level of satisfaction. Rather, the logic works in reverse: simply because the question is phrased with reference to an individual's satisfaction level does not guarantee that an individual level phenomenon has been measured. It is only by using a technique which sifts through alternative data configurations that we can increase our precision in capturing and understanding organizational processes.

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