person rather than a process occurring within the context of a dyadic relationship. The four-level framework provides a mechanism for fuller examination and comparison of perceptions rather than "one person's set of attributions considered in isolation" (Laing et al., p. 59). Such an approach may offer greater insight into the dynamics of interpersonal relationships in organizations.

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DIMENSIONALITY OF THE JOB DESCRIPTIVE INDEX[1]

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The Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969) is the most widely used measure of job satisfaction extant today. More than 50 percent of the articles published between 1970 and 1978 in seven leading management or management related journals that used non-ad hoc

[1]The author expresses thanks to Patricia Cain Smith, Bowling Green State University, for supplying copies of the factor matrices used in Smith, Smith, and Rolls (1974) and also for the coding scheme used.

measures of job satisfaction employed the JDI. The journals examined were *The Academy of Management Journal, Administrative Science Quarterly, Human Relations, Journal of Applied Behavior Science, Journal of Applied Psychology, Organizational Behavior and Human Performance*, and *Personnel Psychology*. In addition, more than 50 percent of the studies using non-ad hoc measures of job satisfaction in *The Proceedings of the Academy of Management* since 1975 have employed the JDI. Earlier issues do not include enough detail on the papers presented to classify. Ad hoc measures are unique or used in only one study.

One reason for the JDI's wide use is the care with which it was developed. Its development is described in detail in Smith et al. (1969) and in a recent paper by Smith and Sandman (1979). Another reason is its applicability across a wide variety of demographic groups (Golembiewski & Yeager, 1978).

The 72-item instrument was designed to measure 5 theoretically and practically useful dimensions of job satisfaction—satisfaction with the work itself, supervision, co-workers, promotion opportunities, and pay. However, a recent study has questioned this five-dimensional structure. Smith et al. (1974) report seven rather than five dimensions because a scree test (Cattell, 1966) indicated that there were seven non-trivial factors in their data. These factors are discussed later in this paper. Smith et al. (1974) did not focus on the dimensionality of the JDI, nor did they examine the utility of more than five factors. The present study examines the dimensionality of the JDI, the utility of a larger number of factors, and their implications.

Smith et al. (1974) reported results from analysis of 3 different samples containing 212 white and 107 black government employees, and 110 white bank employees, respectively. The supervision items split into performance and interpersonal dimensions in all three of their samples. The work scale split into two dimensions in only one (white civil servants) of their samples. The items for co-workers, pay, and promotion opportunities loaded consistently on the a priori factors. Given the results of Smith et al., a similar split of the supervision items was expected in the present study. Because the co-worker items specifically refer either to peer performance on the job or to interpersonal relations with peers, it was expected that they might form two factors. This would parallel the split along similar lines reported for supervisory items by Smith et al. (1974). The pay and promotion items were expected to load entirely on the a priori factors for several reasons. First, these factors remained intact in all three samples in Smith et al.'s study. Examination of these items further reinforces this expectation. Divisions or subtopics are not clearly apparent as they are among the supervision and co-worker items. Third, there are fewer items in these scales, 9 instead of 18, and this lessens the likelihood, given the comparative homogeneity of items, of a split occurring. Expectations about the pattern of the factor loadings for the work itself items were more problematic given Smith et al.'s mixed results and their small sample

sizes. The items in the scale split in only one of their three samples. This could be an artifact unique to that sample. Its small size increases the likelihood that the sample is unique in some way that would cause unique results.

Differences in results between the Smith et al. (1974) study and the present study also are expected for several methodological reasons. The characteristics of the subjects in the sample used in this study are different from their three samples. For example, the type of work they perform and the communities they work in are different. As a result, there is variation in each sample that is unique to it, which can influence factor analytic results. Second, when the number of cases is small relative to the number of variables dominant, strong factors may mask weaker ones. This may have been a problem for Smith et al. because their samples contained 212, 110, and 107 cases. Only one of these provides the minimal 3-to-1 cases-to-items ratio generally believed necessary for factor analysis, much less the more desirable and often recommended ideal of a 10-to-1 cases-to-items ratio (Gorsuch, 1974). This problem does not confound the present study because the cases-to-variables ratio is better than 30 to 1.

Method

Data were gathered as part of a quality of working life study in a large U.S.-based soft-goods company. Approximately 2,700, or 75 percent of the company's work force voluntarily returned questionnaires. Listwise deletion of missing data reduced the useful number of cases to 2,261. As shown in Table 1, the employees in this sample range from the top of the corporate hierarchy to the janitorial level. Formal education ranges from none through the doctoral level. In addition, nearly 41 percent of the respondents are women, and over 13 percent are minority group members.

TABLE 1
Rank and Education of Respondents[a]

	N	*Percent*
Rank		
1st aggregate (lowest rank)	489	20.1
2nd	493	20.3
3rd	215	8.8
4th	656	27.0
5th	346	14.2
6th aggregate (highest rank)	231	9.5
Education		
0–high school	982	37.3
Vocational–junior college	597	22.6
College (4 years)	501	19.0
College (more than 4 years)	553	21.0

[a]Numbers do not total 2,671 because of missing data. The percentages are adjusted to eliminate the effects of missing data. Percentages may not total 100 because of rounding errors.

The analytic techniques employed here are essentially the same as those used by Smith et al. Items are coded as follows: Y is = 3, "?" = 2, NO = 1, and reversed items are recoded prior to factor analysis. The items needing recoding are identified in Smith et al. (1969). A principal components analysis was performed. This was followed by a scree test of the eigenvalues (Cattell, 1966) to determine the number of non-trivial factors or the number of factors to rotate. A scree test was used because it usually is a more conservative determinant of the number of non-trivial factors than the eigenvalue greater than or equal to 1.0 criterion. Here, for instance, there were 14 factors with eigenvalues greater than 1.0, and the scree test indicated 9 non-trivial factors. Finally, the non-trivial factors were subjected to a varimax rotation to an orthogonal terminal solution. In addition to these analyses, Bartlett's (1950) test for significance in the correlation matrix was performed prior to factor analysis of the data.

TABLE 2
JDI Factor Loadings[a]

Items	*Factors*								
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
Work									
Fascinating	06	-04	57	21	-06	-06	18	02	-20
Routine	04	14	72	08	04	09	00	-03	07
Satisfying	10	04	51	14	05	09	12	-09	-52
Boring	09	18	58	09	04	24	02	-03	-26
Good	11	11	29	01	08	10	07	-07	-58
Creative	08	05	66	14	00	10	14	-03	-23
Respected	20	08	21	18	11	06	11	-11	-47
Hot	01	09	-14	00	08	37	-01	-08	00
Pleasant	14	10	15	07	09	31	15	-17	-48
Useful	11	12	19	05	14	-05	-05	-02	-45
Tiresome	07	15	41	02	08	53	04	-03	-07
Healthful	05	-01	08	14	-02	16	15	-10	-40
Challenging	11	05	70	13	04	-10	11	00	-31
On your feet	00	10	06	-01	24	20	03	-09	40
Frustrating	03	12	-07	11	-01	62	00	-10	-09
Simple	08	15	68	00	07	-05	01	02	01
Endless	05	07	06	03	03	63	-01	-07	02
Gives sense of accomplishment	09	07	54	09	03	05	11	-03	-53
Supervision									
Asks my advice	27	08	34	09	12	-20	06	-30	-03
Hard to please	09	06	-02	10	12	18	00	-69	-07
Impolite	37	09	05	07	07	05	-04	-63	-03
Praises good work	44	00	04	16	03	-02	09	-34	-12
Tactful	43	01	07	13	03	02	08	-55	-07
Influential	43	01	17	28	05	-03	14	00	-12
Up-to-date	66	06	03	11	09	-01	12	-12	-09
Doesn't supervise enough	47	16	14	04	13	08	05	00	03
Quick-tempered	14	06	02	07	04	11	01	-70	-02
Tells me where I stand	53	04	03	15	05	-08	05	-09	-15
Annoying	39	12	02	10	03	12	-02	-63	-05
Stubborn	14	05	-02	14	04	15	05	-72	02
Knows his/her job well	73	02	02	08	08	07	12	09	07
Bad	55	15	00	09	08	07	-05	-38	-02
Intelligent	64	04	10	04	08	-05	15	-17	-04
Leaves me on my own	01	04	06	-01	09	-17	13	-42	-13
Lazy	56	13	06	06	04	10	-05	-15	00
Around when needed	59	10	05	06	02	06	05	-13	-10

[a]Decimal points are omitted to simplify presentation.

TABLE 2 (cont.)
JDI Factor Loadings[a]

Items	Factors								
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*
Co-workers									
Stimulating	05	22	30	13	01	-03	55	-07	-10
Boring	-01	62	12	07	03	09	21	-06	-03
Slow	06	55	02	06	05	14	39	-04	11
Ambitious	05	15	14	11	06	-01	64	-02	-06
Stupid	09	68	04	03	08	02	08	-01	03
Responsible	17	44	02	04	05	-01	52	-02	-03
Fast	06	15	-08	07	05	09	67	-03	-04
Intelligent	21	37	13	02	09	-08	56	-05	-05
Easy to make enemies	04	66	03	07	07	03	11	-09	-07
Talk too much	14	57	03	06	01	11	14	00	-02
Smart	17	35	14	00	09	-11	54	-02	04
Lazy	11	66	07	07	05	08	25	00	06
Unpleasant	05	74	08	01	08	-01	-01	-07	-09
No privacy	11	46	12	10	-01	11	05	-06	-13
Active	10	34	06	05	02	02	62	-02	-10
Narrow interests	02	48	13	10	06	07	35	-09	-01
Loyal	10	39	01	07	07	05	42	-05	-18
Hard to meet	01	59	00	03	03	00	12	-07	-08
Promotion									
Good chance for advancement	08	05	03	84	03	00	03	-07	-15
Opportunity somewhat limited	07	03	07	69	00	01	07	-07	00
Promotion on ability	22	09	04	64	13	01	09	-02	-13
Dead-end job	15	13	20	65	08	03	03	-05	-17
Good chance for promotion	09	07	07	84	02	00	04	-06	-15
Unfair promotion policy	25	16	09	52	24	10	08	-06	-09
Infrequent promotions	04	03	10	66	16	08	07	-11	12
Regular promotions	06	03	06	69	13	02	06	-09	06
Fairly good chance for promotion	08	08	05	80	08	01	00	-09	-12
Pay									
Income inadequate for normal expenses	-07	-11	-12	00	64	07	04	04	02
Satisfactory retirement plan	06	07	-15	17	30	09	04	03	-13
Barely live on income	06	15	14	01	69	-06	-06	-06	-04
Bad	10	24	08	06	60	-07	-10	-08	-16
Income provides luxuries	02	-09	14	08	54	-01	20	-03	04
Insecure	09	18	-05	11	43	-03	-02	-10	-33
Less than I deserve	10	-01	-08	17	64	17	09	-04	01
Highly paid	01	-11	02	11	57	09	19	-04	07
Underpaid	11	05	-09	13	71	13	05	-05	00
% of Variance Explained	*17.23*	*6.44*	*5.39*	*4.69*	*3.80*	*2.97*	*2.20*	*2.12*	*1.97*

[a]Decimal points are omitted to simplify presentation.

Results

The scree test, or plot of eigenvalues against factor numbers, indicated that there were nine non-trivial factors in this data, not five corresponding to the original scales, or seven, as in Smith et al. (A plot of the eigenvalues and a discussion of their interpretation is available from the author.) Orthogonally rotated factor loadings are reported in Table 2. The nine factors are here called ability of the supervisor to do his/her job, co-workers' interpersonal relations, challenging work, promotion opportunities, pay, frustration with work, ability of co-workers to do their jobs, interpersonal relations with the supervisor, and fulfillment in work. As expected, both the supervisor and co-worker items load on parallel factors referencing

interpersonal relations and performance/ability to do their job. Some of the factors resulting from the split scales are difficult to interpret, particularly those resulting from the 18 work itself items. Other researchers may wish to rename some of these scales. The promotion and pay factors remained relatively intact, as expected. Only one item failed to load significantly (greater than .40) on the pay dimension.

Scales were created by summing the items that loaded on each of the factors. However, items with less than .4 loadings or that loaded on more than one factor were deleted. As a result, three of the work, two of the supervision, one of the co-worker, and one of the pay items are deleted. Cronbach alphas for both the original JDI scales and the new scales are reported in Table 3. The internal consistency of seven of the nine new scales is reasonably high. The high reliabilities for the majority of the new as well as of the old scales are encouraging. The high reliabilities indicate that statistically the items within a scale seem to be measuring the same thing. Two of the new scales have comparatively low reliability. This means that they are not very useful, and further study of the JDI's dimensionality and resulting scales is needed.

Correlations between the alternative scales and the corresponding JDI scales, shown in Table 4, are of moderate-to-large size because they contain common items. This characteristic obviously increases in size with the number of common items. In contrast, intercorrelations between the new scales are generally of reasonably small size. Only the two co-worker and two supervision scales correlate at or near the .5 level. This is reasonable given their common referents. The rest are much smaller. They are similar to those between the original five JDI scales. Only two of the other correlations are larger than the mean (.344) intercorrelation between the original JDI scales.

TABLE 3
Scale Characteristics

	Number of Items	*Alpha Coefficients*	*Range*	*Mean*	*Standard Deviation*
Alternative scales					
Supervisor's ability	10	.81	10-30	13.82	3.98
Co-worker interpersonal relations	10	.84	10-30	15.10	3.50
Challenging work	6	.81	6-18	9.97	3.57
Promotion opportunities	9	.90	9-27	18.78	5.59
Pay	8	.78	8-24	13.16	3.81
Work frustration	3	.52	3- 9	5.81	1.91
Co-workers' ability	7	.80	7-21	10.48	3.21
Supervisor interpersonal relations	6	.79	6-18	8.35	2.97
Fulfillment in work	6	.45	6-18	9.31	2.05
Original scales					
Work itself	18	.80	18-54	29.44	6.56
Supervision	18	.87	18-54	25.38	6.99
Co-workers	18	.89	18-54	26.82	6.25
Promotion opportunities	9	.90	9-27	18.78	5.59
Pay	9	.77	9-27	14.89	4.09

TABLE 4
Intercorrelations Between Scales[a]

		9 Alternative Scales								*5 Original Scales*				
		A2	*A3*	*A4*	*A5*	*A6*	*A7*	*A8*	*A9*	*J1*	*J2*	*J3*	*J4*	*J5*
Supervisor's ability	/A1	27	28	38	28	18	33	50	37	38	89	35	38	29
Co-workers' interpersonal relations	/A2	—	27	23	20	25	56	21	31	37	29	88	23	21
Challenging work	/A3		—	30	15	20	33	12	40	84	27	34	30	14
Promotion opportunities	/A4			—	30	18	27	28	33	37	40	28	1.00	24
Pay	/A5				—	14	21	23	30	25	30	23	30	98
Work frustration	/A6					—	15	24	33	56	23	23	18	14
Co-workers' ability	/A7						—	18	33	39	31	88	27	22
Supervisor interpersonal relations	/A8							—	31	28	81	22	28	24
Fulfillment in work	/A9								—	73	41	36	33	30
Work itself	/J1									—	40	43	37	25
Supervision	/J2										—	34	40	31
Co-workers	/J3											—	28	24
Promotion opportunities	/J4												—	32
Pay	/J5													—

[a]Correlations between new scales derived from a common original JDI scale are underlined. Correlations between the new scales and the one from which they were derived also are underlined.

It seems clear that the JDI contains more than five dimensions. The results reported here indicate that the pay and promotion opportunity dimensions remain relatively intact, just as they did in Smith et al.'s study. This research confirms the ability/performance and interpersonal relations split in the supervisory items reported by Smith et al. and extends it to the co-worker scale. Their study suggests, and this one confirms, that there may be some difficulty with the items in the work itself dimension. For them, it split into two factors that were not easily interpretable. Here it split into three factors that were not much more interpretable than theirs.

The reasonably high reliabilities and low interscale correlations suggest that the alternative scales may be useful for organizational research. This seems especially so for the ability/performance and interpersonal relations scales for the supervision and co-workers. Given their psychometric properties, they also are useful because they are more specific scales than the original ones. In addition, the two supervisory scales for job performance/ability and interpersonal relations loosely parallel two of the major dimensions of leadership identified in the Ohio State Leadership Studies (Stogdill, 1974) and in Blake and Mouton's (1964) Grid Theory—production and interpersonal orientations. This parallelism should be investigated in future research. The usefulness of all three of the alternative

scales based on the work items is not so clear. As a result, further research needs to be conducted about the dimensionality of the JDI. Moreover, this instrument and all others are subject to variations unique to different samples. Consequently, confirmatory factor analysis should be performed and reliability coefficients computed prior to use of the JDI or other measures.

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