

## REGRESSION ANALYSIS OF THREE VARIATIONS OF THE TWO-FACTOR THEORY OF JOB SATISFACTION<sup>1</sup>

CHARLES L. HULIN<sup>2</sup>

AND

L. K. WATERS

*University of Illinois at Urbana*

*Ohio University*

Three distinct variations of the two-factor theory were tested by reanalyzing data previously published by Waters and Waters. No support for any of these three frequently assumed versions was found. The results of this and several prior studies were explained by assuming the existence of two main effects: The first is that intrinsic job factors are generally more potent for predicting overall job attitudes, and the second is that overall job satisfaction is more predictable than overall job dissatisfaction. Neither effect requires the assumptions of the discontinuity of satisfaction and dissatisfaction or the assumptions of dimensional differences between intrinsic and extrinsic job factors.

The two-factor theory (Herzberg, 1966; Herzberg, Mausner & Snyderman, 1959) has generated an impressive number of studies since its appearance over 10 yr. ago. In spite of the number of studies which have appeared in these 10 yr., King (1970) has pointed out that no fewer than five different versions of the two-factor theory have either been implicitly assumed or explicitly stated by researchers in designing their studies. Further, King has argued, two of the five versions of the two-factor theory have not been adequately tested since apparent support may reflect little more than method variance. The existence of these five versions represents a serious problem since data which may support one variation of the theory may not support a different variation.

Three of the versions of the two-factor theory identified and discussed by King (1970) are under consideration in this article. These three versions are summarized briefly below.

*Theory 1.* This version of the theory states that variation in all intrinsic variables combined contributes more to variation in job satisfaction than it does to variation in job dissatisfaction, and variation in all extrinsic variables combined contributes more to variation in job dissatisfaction than to variation in job satisfaction. This is the version assumed by Whitsett and Winslow (1967) for their review

of the Dunnette, Campbell, and Hakel (1967) study.

*Theory 2.* This theory predicts that variation in all intrinsic variables combined contributes more to variation in job satisfaction than does variation in all extrinsic variables combined, and variation in all extrinsic variables combined contributes more to variation in job dissatisfaction than does variation in all intrinsic variables combined. Herzberg (1966) implied that Theory 2 is the basic theory since he states:

Once again, ... the divergent trends for motivators and hygiene factors serve to verify the basic theory as these factors are involved in positive and negative job attitude sequences [p. 101].

*Theory 3.* This theory states that each intrinsic variable contributes more to job satisfaction than it does to job dissatisfaction, and each extrinsic variable contributes more to job dissatisfaction than it does to job satisfaction. Theory 3 is a stronger version of Theory 1. Support for Theory 3 implies support for Theory 1. On one occasion, Herzberg (1966) implied that Theory 3 was the basic two-factor theory since he stated:

The chart shows that of the 51 significant differences reported for the six motivator factors, every one was in the predicted direction. For the 57 significant hygiene factors, 54 were in the predicted direction. In sum, then, the predictions from the theory were wrong in less than 3 percent of the cases [p. 125].

These three versions of the two-factor theory may be summarized as follows: Let  $a_i$ ,  $b_i$ ,  $c_i$ , and  $d_i$  represent either correlations between job factors and overall attitudes or frequencies

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<sup>2</sup> Requests for reprints should be sent to Charles L. Hulin, Department of Psychology, University of Illinois, Champaign, Illinois 61820.

of reporting critical incidents associated with either positive or negative job satisfaction. That is, if  $a_i$  represents the correlation between job factor  $i$  and overall satisfaction, then  $b_i$  represents the correlation between the same factor and overall dissatisfaction. Likewise, if  $a_i$  represents the frequency of reporting factor  $i$  being associated with overall satisfaction, then  $b_i$  represents the frequency of reporting that the same factor was associated with overall dissatisfaction.

|                   | Overall satisfaction ( $y_1$ ) | Overall dissatisfaction ( $y_2$ ) |
|-------------------|--------------------------------|-----------------------------------|
| Intrinsic factors | $a_1$                          | $b_1$                             |
|                   | $a_2$                          | $b_2$                             |
|                   | $\vdots$                       | $\vdots$                          |
|                   | $a_n$                          | $b_n$                             |
| Extrinsic factors | $c_1$                          | $d_1$                             |
|                   | $c_2$                          | $d_2$                             |
|                   | $\vdots$                       | $\vdots$                          |
|                   | $c_n$                          | $d_n$                             |

Theory 1 states that  $\sum_{i=1}^n a_i > \sum_{i=1}^n b_i$  and  $\sum_{i=1}^n d_i > \sum_{i=1}^n c_i$ . In the case of a correlational study, Theory 1 would predict that the multiple correlation based on the intrinsic factors,  $a_i$ , would be greater than the corresponding multiple correlation based on  $b_i$  ( $R_{a_1 a_2 \dots a_n, y_1} > R_{b_1 b_2 \dots b_n, y_2}$ ). Theory 1 would also predict that  $R_{d_1 d_2 \dots d_n, y_2} > R_{c_1 c_2 \dots c_n, y_1}$ .

Theory 2 predicts that  $\sum_{i=1}^n a_i > \sum_{i=1}^n c_i$  in the case of a critical incident study, and  $R_{a_1 a_2 \dots a_n, y_1} > R_{c_1 c_2 \dots c_n, y_1}$  in the case of a correlational study. Theory 2 also predicts that  $\sum_{i=1}^n d_i > \sum_{i=1}^n b_i$ , in the case of a critical incident study and  $R_{d_1 d_2 \dots d_n, y_2} > R_{b_1 b_2 \dots b_n, y_2}$  in the case of a correlational study.<sup>3</sup>

Theory 3 predicts that  $a_i > b_i$  for all  $a_i$ , and  $b_i$  and  $d_i > c_i$  for all  $d_i$  and  $c_i$ . Note again that Theory 3 is a stronger version of Theory 1 and support for Theory 3 implies support for Theory 1.

King (1970) concludes that Theory 1 has

<sup>3</sup> This is a somewhat simplified statement of an appropriate test of Theory 2. See the discussion in the Results section for some caveats.

been supported by critical incident studies and subject-coded studies but has not been tested adequately in studies where the determinants of satisfaction and dissatisfaction were obtained by means other than self-report. A number of studies apparently testing deductions of Theory 1 were discarded by King and earlier by Hulin and Smith (1967) because these discarded studies measured overall satisfaction and dissatisfaction on a single scale rather than following the assumptions of the two-factor theory and assuming satisfaction and dissatisfaction were on two separate and distinct continua. King, and Hulin and Smith contend that if a theory denies the existence of a single dimension of overall satisfaction/dissatisfaction and makes no predictions about it, it is not appropriate to test the theory using a single satisfaction/dissatisfaction continuum.

Theory 2 has not been tested adequately in studies other than critical incident studies according to King (1970).

Theory 3 is supported only by critical incident studies. Support for this theory appears to reflect method variance. King (1970) argues that only one study (Hulin & Smith, 1967) adequately tests this theory using a method different from critical incident studies. This study reports data which fail to support the predictions of Theory 3. Recently, Waters and Waters (1969) reported data which also failed to support Theory 3. Unfortunately, Hulin and Smith did not gather data appropriate to test Theories 1 and 2 (according to King), and Waters and Waters analyzed their data to test Theory 3 but not Theories 1 and 2.

This article reports a reanalysis and reinterpretation of the Waters and Waters (1969) data to test Theories 1 and 2. Specifically, two methods of measuring satisfaction (the Job Description Index [JDI] scales and a set of Likert scales) were used to assess satisfaction with various job factors. Part and multiple correlations between these factors and measures of overall satisfaction and overall dissatisfaction were obtained in order to evaluate the linear association between the job factors and overall job attitudes.

METHOD

The respondents in this study were 160 non-supervisory female employees in one regional office of a

national insurance company. The employees ranged in age from the late teens to early 60s and all were at least high school graduates. Immediate supervisors of all employees sampled were also females.

A job attitude questionnaire was administered to small groups of employees by the second author during a single working day. Respondents were assured that their individual responses would not be made known to the company. Names were requested but employees were given the option of not responding to that item if they "felt uncomfortable" doing so. Approximately 17% did not give their names. Other information (job title, department, etc.) obtained on the questionnaire probably would have been sufficient to identify the respondent.

The job attitude scales were presented in booklet form and consisted of separate overall satisfaction and dissatisfaction scales (always the first two scales, order randomized), an overall satisfaction/dissatisfaction scale, the five scales of the JDI, and a list of 11 job factors (arranged in alphabetical order) to be rated on a satisfaction/dissatisfaction scale. Ratings of satisfaction/dissatisfaction (both overall and for specific job factors) were made on a 12-point anchored scale and the separate satisfaction and dissatisfaction ratings on 7-point scales which consisted of the appropriate 6 points of the 12-point satisfaction/dissatisfaction scale plus a seventh alternative (not satisfied or not dissatisfied). Other data were gathered, but only the above data are analyzed in this article. See Waters and Waters (1969) for details of these other data.

## RESULTS

### *Tests of Theory 3*

The explication of the five versions of the theory make the distinctions between them clear. It is not clear, however, how one would test the deductions of the theories. Waters and Waters (1969) and Hulin and Smith (1967), for example, attempted to test the deductions of Theory 3 by comparing the correlations between measures of satisfaction with various job factors and overall satisfaction or overall dissatisfaction. Such a procedure ignores confounding caused by the covariance between the measures of satisfaction with the different job factors. Partial correlations between measures of satisfaction with the job factors and overall satisfaction, or standard partial regression weights relating satisfaction with job factors to overall satisfaction might be appropriate methods which would take account of the covariance terms. Theory 3 was tested in this article by means of the regression of each of the overall measures on the set of independent variables. The standard partial regression weights indicating the relationship

TABLE 1  
STANDARD PARTIAL REGRESSION WEIGHTS RELATING  
INTRINSIC AND EXTRINSIC JOB VARIABLES TO  
OVERALL JOB SATISFACTION AND OVERALL  
JOB DISSATISFACTION: LIKERT SCALES

| Variables                      | Overall satisfaction | Overall dissatisfaction |
|--------------------------------|----------------------|-------------------------|
| Intrinsic variables            |                      |                         |
| Responsibility                 | .08                  | .08                     |
| Work itself                    | .17                  | .19                     |
| Growth and advancement         | -.11                 | .04                     |
| Recognition                    | -.03                 | -.13                    |
| Achievement                    | .26                  | .13                     |
| Extrinsic variables            |                      |                         |
| Competent supervision          | .18                  | .23                     |
| Considerate supervision        | .07                  | .07                     |
| Company policies and practices | .18                  | .09                     |
| Co-workers                     | -.03                 | -.10                    |
| Working conditions             | .06                  | .14                     |
| Unclassified variables         |                      |                         |
| Salary                         | .16                  | .02                     |
| $R^2$                          | .43                  | .30                     |

Note.— $N = 160$ .

between each of the 11 job variables measured by Likert scales on the one hand and overall job satisfaction and overall job dissatisfaction on the other are presented in Table 1. The 11 job variables are grouped so that the intrinsic variables appear first, followed by the extrinsic variables, and finally by the variable "salary" which is unclassified in this table. According to Theory 3 each intrinsic variable should contribute more to overall satisfaction than to overall dissatisfaction. Each extrinsic variable should contribute more to overall dissatisfaction than to overall satisfaction. Thus, according to Theory 3, the first five weights in Column 1 of Table 1 should each be larger than the corresponding entries in Column 2 of Table 1. Only the weights assigned to recognition and achievement are in line with the prediction of Theory 3.<sup>4</sup>

<sup>4</sup>It seems unlikely that the lack of predictability could be due to an inadequate sampling of job factors to use as predictor variables. The five JDI scales were chosen so as to be consistent with the important factors of job satisfaction which have been found in previous studies. The 11 job variables measured by the Likert scales in this study appear to do a more than adequate job of sampling.

TABLE 2  
STANDARD PARTIAL REGRESSION WEIGHTS RELATING  
INTRINSIC AND EXTRINSIC JOB VARIABLES TO  
OVERALL JOB SATISFACTION AND OVERALL  
JOB DISSATISFACTION: JOB  
DESCRIPTION INDEX

| Variables              | Overall satisfaction | Overall dissatisfaction |
|------------------------|----------------------|-------------------------|
| Intrinsic variables    |                      |                         |
| Work                   | .52                  | .36                     |
| Promotions             | -.02                 | .03                     |
| Extrinsic variables    |                      |                         |
| Supervision            | .15                  | .19                     |
| Co-workers             | .05                  | -.07                    |
| Unclassified variables |                      |                         |
| Pay                    | .15                  | .12                     |
| <i>R</i> <sup>2</sup>  | .44                  | .25                     |

Note.—*N* = 160.

Also, according to Theory 3 the weights for each of the extrinsic variables should be larger in Column 2 than they are in Column 1. Again, two of the five, competent supervision and working conditions, meet this criterion.

A parallel analysis of the relationship between the job variables measured by the JDI and overall satisfaction and dissatisfaction is presented in Table 2. Theory 3 would predict that the first two weights in Column 1 should be larger than the corresponding weights in Column 2. One, work satisfaction, meets this criteria. Each of the weights for the extrinsic variables should be larger in Column 2 than it is in Column 1. One of the two, supervision, meets this criterion.

No tests of significance of the differences between the regression weights were computed, since only 40% of the predictions of Theory 3 were correct in Table 1, and only 50% of the predictions were correct in Table 2. A theory should do better than chance before we compute significance levels of differences. These data support the results and conclusions of Hulin and Smith (1967) and Waters and Waters (1969) which were based on simple correlational analyses.

*Tests of Theory 2*

Theory 2 is somewhat more difficult to test directly than Theory 3. Ideally, we would like

to obtain the regression of each dependent variable on the 11 job variables (as was done in Tables 1 and 2) and convert the standard partial regression weights associated with each set of independent variables (intrinsic and extrinsic) into estimates of the percentage of variance of the dependent variable accounted for by each set. Unfortunately, this can only be done in the case where the covariances between the independent variables are zero. Such is not the case with these data. Two alternative strategies were followed. First, the regressions of overall satisfaction and dissatisfaction on the intrinsic variables and on the extrinsic variables were computed. The squared multiple correlations which resulted from these four analyses, using the Likert scales as the independent variable, are given in Table 3. The results of the same analyses using the JDI scales as the independent variables are given in Table 4. It should be noted that the Likert scale measuring satisfaction with salary and the JDI scale measuring pay satisfaction were considered to be extrinsic variables in all subsequent analyses. This is in keeping with Herzberg's original classification. Separate analyses were done dropping both pay (salary) scales entirely. The results were not changed appreciably.

According to Theory 2 the intrinsic variables should account for a greater proportion of the variance of overall satisfaction than the extrinsic variables do. The results given in Tables 3 and 4 support this hypothesis. Theory 2 also predicts that the extrinsic variables should account for a greater proportion of the variance of overall dissatisfaction than do the intrinsic variables. The results given in Tables 3 and 4 do not support this prediction. Thus,

TABLE 3  
PROPORTIONS OF VARIANCE (*R*<sup>2</sup>) OF OVERALL  
SATISFACTION AND OVERALL DISSATISFACTION  
ACCOUNTED FOR BY INTRINSIC AND  
EXTRINSIC VARIABLES CONSIDERED  
SEPARATELY: LIKERT SCALES

| Variable  | Overall satisfaction | Overall dissatisfaction |
|-----------|----------------------|-------------------------|
| Intrinsic | .34                  | .23                     |
| Extrinsic | .29                  | .22                     |

Note.—*N* = 160.

TABLE 4

PROPORTIONS OF VARIANCE ( $R^2$ ) OF OVERALL SATISFACTION AND OVERALL DISSATISFACTION ACCOUNTED FOR BY INTRINSIC AND EXTRINSIC VARIABLES CONSIDERED SEPARATELY: JOB DESCRIPTION INDEX SCALES

| Variable  | Overall satisfaction | Overall dissatisfaction |
|-----------|----------------------|-------------------------|
| Intrinsic | .39                  | .21                     |
| Extrinsic | .35                  | .15                     |

Note.— $N = 160$ .

two of the four predictions made by Theory 2 are supported in Tables 3 and 4.

It is not entirely clear, however, that the analyses summarized in Tables 3 and 4 are appropriate. In these analyses, the intrinsic and extrinsic variables were not allowed to compete for the same pool of variance since the regressions of overall job attitudes on the intrinsic and extrinsic job factors were obtained separately. It is clear that there is considerable overlap in the variance accounted for by the two sets of independent variables. For example, the squared multiple correlation of all of the variables predicting overall satisfaction is .43, yet the sum of the squared multiple correlations of the two sets of variables predicting overall satisfaction is .63. An alternative analysis would be to obtain the proportion of variance of the overall satisfaction and dissatisfaction measures which are uniquely (given the independent variables at our disposal) controlled by each set of independent variables. In order to obtain these values, the multiple correlations between all predictor variables combined and each overall measure were obtained. The multiple correlations between each subset and predictor variables (intrinsic and extrinsic) taken separately were obtained next. These values are sufficient to compute the amount of variance of the dependent variable uniquely accounted for by the intrinsic or extrinsic variables. For example, the difference between  $R^2$  using all variables to predict overall satisfaction and  $R^2$  using only the extrinsic variables is the proportion of variance of overall satisfaction uniquely accounted for by the intrinsic variables. These proportions of variance are given

TABLE 5

PROPORTIONS OF VARIANCE OF OVERALL SATISFACTION AND DISSATISFACTION UNIQUELY CONTROLLED BY INTRINSIC AND EXTRINSIC VARIABLES: LIKERT SCALES

| Variable  | Overall satisfaction | Overall dissatisfaction |
|-----------|----------------------|-------------------------|
| Intrinsic | .14                  | .08                     |
| Extrinsic | .09                  | .07                     |

Note.— $N = 160$ .

in Table 5 (for the Likert scales) and Table 6 (for the JDI scales).

Theory 2 would predict that the proportion of variance of overall satisfaction uniquely accounted for by the intrinsic variables would be greater than the variance of overall satisfaction accounted for by the extrinsic variables. This prediction is supported both in Table 5 and Table 6. Theory 2 would also predict that the proportion of variance of overall dissatisfaction uniquely accounted for by extrinsic variables would be greater than that accounted for by intrinsic variables. This prediction is supported in neither Table 5 nor Table 6. Two of the four predictions made by Theory 2 are supported in Tables 5 and 6. Thus in Tables 3, 4, 5, and 6 only one-half of the predictions made by Theory 2 are supported. A random model would do as well.

#### Tests of Theory 1

Theory 1 predicts that intrinsic variables account for a greater proportion of the variance of overall satisfaction than they do of overall dissatisfaction. Likewise, extrinsic variables should account for a greater proportion of the variance of overall dissatisfaction than

TABLE 6

PROPORTIONS OF VARIANCE OF OVERALL SATISFACTION AND DISSATISFACTION UNIQUELY CONTROLLED BY INTRINSIC AND EXTRINSIC VARIABLES: JOB DESCRIPTION INDEX SCALES

| Variable  | Overall satisfaction | Overall dissatisfaction |
|-----------|----------------------|-------------------------|
| Intrinsic | .09                  | .10                     |
| Extrinsic | .05                  | .04                     |

Note.— $N = 160$ .

they do of overall satisfaction. Tables 3, 4, 5, and 6 present the data necessary to test Theory 1. Three of the eight predictions made by Theory 1 are supported. Four of the eight would be chance. It did not seem necessary to compute significance levels.

### DISCUSSION

The data reported in this article would seem to meet all of the criteria discussed by King (1970) for testing three of the two-factor theories. That is, overall satisfaction and dissatisfaction were assessed on separate scales; a wide range of individual job factors was considered; the analyses were adequate to test the different versions of the theory. Fewer than 50% of the predictions of the three versions of the two-factor theory were supported. No version of the theory made more than 50% correct predictions. We again arrive at the oft-stated conclusion: The two-factor theories receive no support when tested using data generated by methods other than the critical incident or *S*-coded techniques.

Two trends in the data analyzed in this article are noteworthy, aside from the specific tests of the theories. All of the data in Tables 3-6, with the exception of one reversal (i.e., Row 1, Table 6), can be accounted for by assuming the existence of two main effects. The first main effect is that intrinsic variables are generally more potent and account for more of the variance in workers' overall attitudinal responses to their jobs than extrinsic variables. Independent support for this hypothesis may be found in Hulin and Smith (1967), Waters and Waters (1969), and Graen (1966). The second main effect is that overall satisfaction is more predictable than overall dissatisfaction. Whether this is due to reliability, validity, or choice of independent variables is unknown. Independent support for this hypothesis may be found in Hulin and Smith (1967), Graen and Hulin (1968), and Graen (1966). These two main effects would result in a large proportion of the variance of overall satisfaction being accounted for by intrinsic characteristics, a small proportion of the variance of overall dissatisfaction accounted for by extrinsic variables, with the other two cells being intermediate in size (see Tables 3-6). We need assume nothing

about "the continuity" or discontinuity of overall responses to the job. Neither do we need assume anything about the qualitative differences between intrinsic and extrinsic variables. Two simple main effects, one due to the relative potency of the intrinsic and extrinsic variables and one due to psychometric characteristics are sufficient to account for these data. It appears that a two-factor theory may account for much of the data generated by Herzberg's theory. It does not appear to be the two-factor theory which was originally proposed.

It should be noted that only three versions of the two-factor theory were investigated in this study. However, King (1970) has concluded that Theory 4 and Theory 5, being stronger versions of the first three versions, have received no support in the literature. Thus, regardless of which particular version of the two-factor theories one assumed was "the theory," little support can be found for it in the world of data.

Finally, we should end on a note of caution. The problem of multicollinearity complicates the interpretation of Tables 1 and 2. Gordon (1968) has demonstrated the theoretical and logical absurdity of using multiple measures of the same construct in a regression analysis. Similar problems of interpretation are caused when a number of linearly related variables are included in the same regression analysis. The negative  $\beta$  weights associated with growth and advancement, recognition, and co-workers, even when these variables have positive correlations with the criteria, indicates the multicollinearity which exists among the 11 Likert scales and further indicates that these 11 scales are redundant for predicting overall attitudinal responses to the job. Therefore, Tables 1 and 2 should be approached with all due respect for the problem of unstable  $\beta$ s. If only one intrinsic variable and one extrinsic variable were included in the analyses, this problem would be removed. Unfortunately, this procedure would not adequately test the theory.

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\* Asterisk indicates author for whom address is supplied.