AD-A242 779

Vol
(2)

DOT/FAA/AM-91/15

Cross-Level Inferences of Job Satisfaction in the Prediction of Intent to Leave

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October 1991

Final Report

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U.S. Department
of Transportation
Federal Aviation
Administration

91-15988

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/AM-91/15		

4. Title and Subtitle	5. Report Date
Cross-Level Inferences of Job Satisfaction in the Prediction of Intent to Leave	October 1991
	6. Performing Organization Code
	8. Performing Organization Report No.
7. Author(s)	
L. Alan Witt, Ph.D. and Chan M. Hellman, B.S.	
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
FAA Civil Aeromedical Institute P. O. Box 25082 Oklahoma City, OK 73125	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	
Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591	14. Sponsoring Agency Code

15. Supplementary Notes

This work was performed under Task AM-C-91-HRR122.

16. Abstract

An emerging literature has demonstrated that proportionately more dissatisfied employees intend to leave their employing organization while proportionately more satisfied employees intend to remain. The purpose of the present study was to apply criteria for aggregation of individual-level data to the group-level using a measure of job satisfaction in the prediction of aggregated group-level intent to leave. Data collected from 5,586 employees of the Federal Aviation Administration provided partial support for aggregation. These results have general implications for the use of individual-level job satisfaction scores as predictors of group-level intent to leave.

17. Key Words	18. Distribution Statement
job satisfaction; intent to leave; cross-level inference.	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	10	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

CROSS-LEVEL INFERENCES OF JOB SATISFACTION IN THE PREDICTION OF INTENT TO LEAVE

Given the negative effects of unwanted employee turnover on organizational operations, management sensitivity to the antecedents of employee intentions to leave the organization is significant and warrants empirical attention. Behavioral intentions theory (Fishbein, 1967) suggests that an individual's intentions are the most consistent and dependable predictors of a resulting behavior. Looking at turnover, Hom, Katerberg, and Hulin (1979) indicated that the algebraic formula for Fishbein's theory is B = f(BI), where a person's behavior (B) is a function (f) of the intention to execute the behavior (BI). Indeed, intent to leave has consistently been identified as the best predictor of turnover (Kraut, 1975; Mobley, Horner, & Hollingsworth, 1978; Prestholdt, Lane, & Mathews, 1987; Price & Mueller, 1981; Steel & Ovalle, 1984). For example, Steel and Ovalle's (1984) meta-analysis of the literature indicated that the intention to leave predicted turnover better than such traditionally considered variables as job satisfaction and organizational commitment.

Identification of the factors that lead to turnover before it happens would provide an opportunity to reduce unwanted turnover. This might be accomplished by identifying the precursors of intent to leave. While turnover has been examined quite extensively (cf. e.g., Mobley, Hand, Baker, & Meglino, 1979), the intent to leave concept has received comparatively less attention. Researchers have identified several antecedents of intent to leave: (a) global job satisfaction, facets of job satisfaction, or total-facet job satisfaction (Hom, et al., 1979; Kraut, 1975; Lachman & Aranya, 1986; Marsh & Mannari, 1977; Martin, 1979; Martin & Hunt, 1980; Mobley, et al., 1979; Price & Mueller, 1981; Shore & Martin, 1989; Wright, 1982), (b) group cohesiveness, job autonomy, and personal factors (Marsh & Mannari, 1977), (c) supervisor-related issues (Hom, et al., 1979), (d) organizational commitment (Blau & Boal, 1989, Lachman & Aranya, 1986), (e) job involvement (Blau & Boal, 1989), (f) workload (Jolma, 1990), (g) burnout (Lachman & Diamant, 1987), and (h) life status factors, such as age and tenure in the organization (e.g., Martin, 1979; Mobley, et al., 1978; Price & Mueller, 1981).

A methodological issue that has not been addressed in the literature is the appropriate level of analysis for investigating intent to leave. The aforementioned studies have examined the relationships between individual-level job attitudes and individual-level intent to leave. We suggest that when the criterion of interest is organizational intent to leave, the organization is the appropriate level of analysis. Similarly, when the criterion of interest is group (i.e., a subsystem of the organization) intent to leave, the group is the appropriate level of analysis. Predicting a particular employee's intention to leave may be of interest, particularly for planning purposes for individual managers. The group or organization level intent to leave may also be of interest to managers. In other words, the level of intent to leave within a particular organization or subsystem may sometimes be an important issue, as it is at this level that predictions of organization or group turnover can be made, as well as between group comparisons. For example, when human resources planners are estimating turnover contributions to future personnel needs, the group level(s) of intent to leave (i.e., the aggregations of the individual intentions to leave) may be compared, rather than the individual intentions.

Job satisfaction has been the most frequently cited antecedent of intent to leave. If we attempt to predict group-level intent to leave from individual-level job satisfaction data, then we are committing the "fallacy of the wrong level" (Galtung, 1967, p. 45). The purpose of the present study was to examine cross-level effects of job satisfaction in the prediction of intent to leave. As defined by Mossholder and Bedeian (1983, p. 547), cross-level inference "occurs when relations among variables at one level are inferred from analyses performed at a different level." They suggested that the attempt to infer individual level relations from higher level analyses is known as downward cross-level inference, while the attempt to infer macro level relations from lower level analyses is known as upward cross-level inference. As noted by Lance, Hedge, and Alley (1989), cross-level research

has received increasing attention in fields such as political science, education, technology, and sociology. The process of determining the existence of multi-level effects with regard to job satisfaction requires demonstration that both individual and aggregate components contribute significantly to group intent to leave (i.e., upward cross-level inference).

Jones and James (1979) proposed 4 criteria to justify aggregation of individual-level perceptual data: (a) significant mean differences in perceptions across different subunits (Drexler, 1977), (b) interperceiver agreement or reliability of the perceptions (Howe, 1977), (c) homogeneous situational characteristics, and (d) meaningful relationships between the aggregated perception score and various individual, subunit, or organizational criteria (Pritchard & Karasick, 1973), such as the relationship between employee perceptions of organizational effectiveness and organizational profit levels. Once these criteria are met, "cross-level formulation" (Dansereau & Markham, 1986) or a justification for group-level satisfaction is established.

The purpose of the present study was to assess the utility of cross-level effects of job satisfaction in the prediction of intent to leave by applying the Jones and James (1979) criteria.

METHOD

Subjects and Procedure

Questionnaires were mailed to a random sample of 8,029 employees of the Federal Aviation Administration (FAA). The sample was stratified by facility and occupational group in order to increase the probability of obtaining a representative sample. Returning completed questionnaires were 5,586 employees (69.5%; 4,423 males and 1,163 females). Ages reported by the respondents were as follows: 29 and under (15.8%), between 30 and 39 (38.2%), between 40 and 49 (33.7%), and 50 or over (12.3%). Over 92% indicated education or training beyond that of a high school diploma, with 49.8% reporting some college education, 21.7% having received a bachelor's degree, and 13.8% indicating that they have education above the bachelor level. About 27% indicated that they had worked for the FAA 3 years or less, 34.4% for 4 to 9 years, 15.5% for 10 to 15 years, 12.1% for 16 to 20 years, and 10.4% for 20 or more years.

The occupational group (e.g., accounting workers, air traffic controllers, airway facilities specialists, computer programmers) represented the organization's subsystem that would have sufficient homogeneous situational characteristics to permit aggregation. Although employees within occupational groups worked at different sites, they worked in organizational structures unique from other groups and shared relatively common organizational cultures. Moreover, assessment of job attitudes by occupational group has a tradition in the FAA (e.g., Myers, Schroeder, Van Deventer, & Collins, 1988).

Measures

Intent to leave was assessed by a single item (M = 2.66, SD = 1.37), "Taking everything into account, how likely or unlikely is it that you will leave the FAA for any reason within the next five years?" Response options were presented on a 5-point Likert-type scale (1 = very unlikely; 5 = very likely). Job satisfaction was assessed by the Schroeder, et al.(1986) 10-item measure (alpha = .82, M = 33.34, SD = 7.61). Items (e.g., "In general, how satisfied are you with your job - the kind of work you do?" and "Overall, how satisfied are you with your pay?") were presented on a 5-point Likert-type scale (1 = very dissatisfied; 5 = very satisfied).

A major concern with data collections of this type is the threat of single-source bias (Bass, Aviolo, & Yammarino, 1988) or method variance (Podsakoff & Organ, 1986; Spector, 1987). The notion of method variance suggests that collecting data from the single source of individuals leads to an artificially inflated relationship between the constructs measured, because the ratings for each individual share a single information processing and dispositional basis. To both avoid and examine the possible effect of method variance, we implemented a procedure suggested by Schneider (personal communication, May 2, 1990). For each occupational group, we aggregated the job satisfaction scores as many

times, less one, as there were employees in the group. Analyses were run between aggregated intent to leave and the aggregated job satisfaction scores across individuals, assigning to the individuals the aggregated job satisfaction score ("Group^{-1}") that did not contain their own expression of job satisfaction. Although this method of aggregation may still be "contaminated," the removal of the individual from the aggregated group job satisfaction score reduced the threat of individually-based response contamination. To look for the possible effects of method variance, we also computed the aggregated group job satisfaction score ("Group^{TOT}") leaving in the individual score; this score reflects the actual aggregated score of job satisfaction (i.e., the mean job satisfaction score of the occupational group).

RESULTS

The analyses plan followed the criteria for aggregation. First, analyses of variance were used to identify possible differences in intent to leave and level of job satisfaction across different occupational groups. Occupational group differences in both intent to leave (F 1/13 = 3.0, p < .01) and job satisfaction (F 1/13 = 11.7, p < .01) were statistically significant. The means and standard deviations of the intent to leave and job satisfaction scales for each of the occupational groups are presented in Table 1. As shown there, there was some variability between the occupational groups in both intent to leave and level of job satisfaction. The finding that some occupational groups (e.g., air traffic control and logistics) had both low intent to leave and low job satisfaction scores suggests that a number of other factors may affect intentions to leave. For example, air traffic control personnel have relatively fewer career alternatives than other workers, so that even when they experience low job satisfaction, leaving the organization may be an unlikely alternative.

Second, researchers have argued that aggregated measures should meet criteria of within-group agreement (i.e., homogeneity) to avoid aggregation bias (Drexler, 1977, James, 1982). The intraclass correlation coefficient provides an estimate of interrater agreement (James, 1982). We employed the intraclass correlation coefficient -- ICC(1,k) -- discussed by Shrout and Fleiss (1979, p. 426) as the lower bound estimate of the mean rater reliability of the aggregate score. The coefficients are in the lower end of the acceptable range of those reported in previous studies (Glick, 1985) for the intent to leave item [ICC (1,k) = .66], but in the higher end for the job satisfaction scale [ICC (1,k) = .91].

Third, as shown in Table 2, individual-level scores on the satisfaction measure were very weakly and negatively related to occupational group-level intent to leave scores (r = -.11, p < .01). In other words, individual expressions of job satisfactions were essentially unrelated to the mean group-level intent to leave.

Occupational group-level satisfaction scores, however, were moderately related to group-level intent to leave scores (Group^{TOT}: r = -.65, p < .01 vs. Group^{-1}: r = -.40, p < .01). These results are consistent with earlier studies showing that correlations of aggregate variables based on homogeneous groups are higher than their individual counterparts (cf. Rousseau, 1985).

To further assess the final criterion for aggregation, multiple regression analyses were employed to assess individual and occupational group contributions to the criterion measure of occupational group-level intent to leave (Mossholder & Bedeian, 1983). First, given the findings demonstrating the relationships between biodata and intent to leave, 5 biodata variables -- pay grade, age, education level, gender, and number of years worked in the organization -- were entered into the equation. These individual-level demographic variables accounted for a small but significant amount of the variance in occupational group-level intent to leave (R^2 = .07, F 5/4737 = 72.88, p < .01). Scores on the job satisfaction measure for each individual were then entered into the equation, the results of which are presented in Table 3. As shown, individual job satisfaction scores contributed only an additional 1% of the variance. The aggregated job satisfaction scores -- Group^{-1} and Group^{TOT} -- were then entered into the equation in separate analyses. As shown in Table 3, the data indicated that the addition of Group^{-1} and Group^{TOT} to the

equations predicting occupational group intent to leave added appreciable variance over-and-above the variance contributed by individual-level job satisfaction score. The R^2 of the $Group^{TOT}$ equation was considerably higher (R^2 = .44) than the $Group^{-1}$ equation (R^2 = .20).

Table 1

Intent to Leave and Job Satisfaction Scales Score
Means and Standard Deviations Across Occupational Groups

Occupational Group	Intent to Leave Mean	Intent to Leave SD	Job Satisfaction Mean	Job Satisfaction SD
Accounting	2.81	1.37	34.55	7.21
Air Traffic Control	2.59	1.35	32.24	7.50
Aircraft Certification	2.71	1.40	36.24	7.05
Airports	2.74	1.49	35.98	7.74
Airway Facilities	2.79	1.41	34.13	7.49
Aviation Standards	2.53	1.24	35.67	7.57
Budgeting	3.23	1.20	35.48	7.37
Flight Standards	2.66	1.34	35.22	7.52
Human Resources Management	2.92	1.29	35.80	7.63
Logistics	2.58	1.39	33.83	7.92
Computing	2.85	1.54	35.02	7.95
Medical	2.92	1.42	36.63	6.13
Security	2.83	1.26	33.39	7.96

Table 2
Intercorrelation Matrix

Variable	1	2	3	4
1. Individual Satisfaction Scores				
2. $Group^{-1}$ Satisfaction Scores	.17			
3. $Group^{TOT}$ Satisfaction Scores	.07	.64		
4. Individual Intent to Leave Scores	-.29	-.05	-.04	
5. $Group^{TOT}$ Intent to Leave Scores	-.11	-.40	-.65	.07

Note: All correlations are $p < .01$.

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Table 3
Results of Hierarchical Regression Analyses

Individual and Occupational Group-Level Predictor Variables	Full Model			Addition of Individual Sat.			Addition of Group Sat.		
	R^2	F	p<	ΔR^2	F	p<	ΔR^2	F	p<
Ind. & Group^{-I} Satisfaction	.20	170.84	.01	.01	41.27	.01	.12	724.65	.01
Ind. & Group^{TOT} Satisfaction	.44	544.76	.01	.01	68.13	.01	.37	3134.18	.01

Note. The full model includes the addition of the Group^{TOT} or Group^{-I} satisfaction scores to the equation of the biodata predicting intent to leave.

DISCUSSION

Several caveats should be emphasized. First, data were collected from employees of the FAA and may not be representative of other work populations. Second, the present study neither examined nor controlled for a number of possible confounding variables, including nonwork variables relevant to organizational intent to leave, availability of career options, and events external to the organization (e.g., budget problems) that may have affected job satisfaction and/or intent to leave considerations at the time of measurement. Third, other measures of organizational intent to leave and job satisfaction may have yielded different results. Fourth, these data may be subject to common method variance. The finding that the relationship between the Group^{TOT} satisfaction and occupational group-level intent was appreciably stronger than the relationship between the Group^{-I} satisfaction and occupational group-level intent supports this notion. Further research is needed to evaluate Schneider's (personal communication, May 2, 1990) suggestion for reducing the effects of method variance for data collected from a single source.

The application of the Jones and James (1979) criteria to these data provided some support for the aggregation of the job satisfaction measure. We found significant occupational group differences. The intraclass correlation coefficients were of sufficient size to warrant aggregation. In other words, there may have been a reasonable degree of homogeneity of intent to leave and job satisfaction levels within the occupational groups. The examination of relations between the aggregated job satisfaction and intent to leave scores yielded sufficient increases in variance that were over-and-above the contributions of individual-level job satisfaction scores. These data suggest that when the criterion is group-level intent to leave, group-level job satisfaction is a more appropriate predictor than is individual-level job satisfaction. It is likely that certain organizations or organizational subsystems engender certain levels of job satisfaction among their employees. By aggregating individual job satisfaction scores at the unit level, between-group comparisons and links to conceptually relevant constructs can be made. Using the analytic approach described here, aggregate job satisfaction measures may be appropriate in the prediction of aggregate intent to leave or other unit-level phenomenon of interest. Therefore, we suggest that this approach may be more meaningful for managers.

The focus of cross-level inferences has been on organizational climate. Rousseau (1985, p. 6) suggested that meaning can "be added by aggregation when each individual's score on a variable (X) reflects the result of a unit-level phenomenon whose overall effect is of interest."

Intent to leave has been conceptualized as an individual phenomenon. However, a common anecdote is the comparison of organizations as having employees with different levels of intentions to leave and commensurate turnover rates. Indeed, it is likely that organizations and organizational subsystems engender different levels of job satisfaction that may affect intent to leave, thus, to some extent it is a unit-level phenomenon. Aggregation of individual job satisfaction permits prediction of organizational or subsystem intent to leave, which may be of considerable interest to managers. The data discussed here suggest that the application of the Jones and James (1979) criteria for aggregation provides appropriate helpful guidelines for pursuing such a task.

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☆U.S. GOVERNMENT PRINTING OFFICE: 1991 - 661 017/40269