INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI

A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor MI 48106-1346 USA
313/761-4700 800/521-0600

RETAINING HIGH-TECH EMPLOYEES: CONSTRUCTIVE AND DESTRUCTIVE RESPONSES TO JOB DISSATISFACTION AMONG ENGINEERS AND OTHER PROFESSIONALS

by

Christina Smith Melnarik

Dissertation Submitted in Partial Fulfillment of
the Requirement for the Degree of
Doctor of Philosophy
Applied Management and Decision Sciences

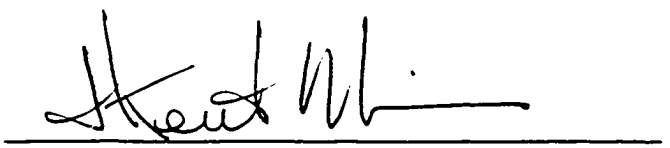
Walden University
May 1998

DOCTOR OF PHILOSOPHY DISSERTATION

OF

CHRISTINA SMITH MELNARIK

APPROVED:



J. KENT MORRISON
VICE PRESIDENT FOR ACADEMIC AFFAIRS

WALDEN UNIVERSITY
1998

Walden University

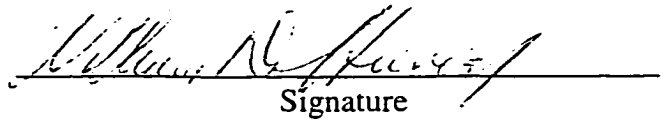
APPLIED MANAGEMENT AND DECISION SCIENCES

This is to certify that I have examined the doctoral dissertation by

Christina Smith Melnarik

and have found that it is complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Dr. William Steeves, Committee Chair
Applied Management and Decision Sciences Faculty



Signature

April 18, 1998

Date

Walden University

APPLIED MANAGEMENT AND DECISION SCIENCES

This is to certify that I have examined the doctoral dissertation by

Christina Smith Melnarik

and have found that it is complete and satisfactory in all respects.

Dr. Gary Gemmill, Committee Member
Applied Management and Decision Sciences Faculty

Signature

3/31/98
Date

Walden University

APPLIED MANAGEMENT AND DECISION SCIENCES

This is to certify that I have examined the doctoral dissertation by

Christina Smith Melnarik

and have found that it is complete and satisfactory in all respects.

Dr. C. J. Schumaker, Committee Member
Health Services Faculty

Signature

3/31/98

Date

Walden University

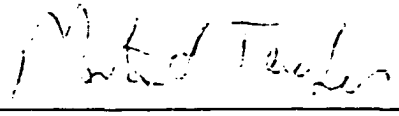
APPLIED MANAGEMENT AND DECISION SCIENCES

This is to certify that I have examined the doctoral dissertation by

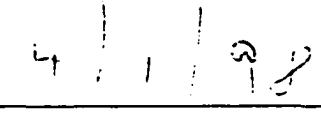
Christina Smith Melnarik

and have found that it is complete and satisfactory in all respects.

Dr. Morton Teicher, Faculty Representative
Human Services Faculty



Signature



Date

Abstract

RETAINING HIGH-TECH EMPLOYEES: CONSTRUCTIVE AND DESTRUCTIVE RESPONSES TO JOB DISSATISFACTION AMONG ENGINEERS AND OTHER PROFESSIONALS

by

Christina Smith Melnarik

M.S., Santa Clara University, 1991
B.S., University of California at Davis, 1985

Dissertation Submitted in Partial Fulfillment of
the Requirement for the Degree of
Doctor of Philosophy
Applied Management and Decision Sciences

Walden University
May 1998

ABSTRACT

Retaining key employees is an ongoing challenge for organizations, and is especially pressing in the high-tech sector where engineers' tenure averages 1.5 years per company (Hodson, 1994). To examine this problem, a model of employees' behavioral responses to job dissatisfaction was derived. A survey study of 118 engineers and 148 non-engineers at the U.S. subsidiary of a Japanese electronics company using *T* test, factor, regression, and discriminant analyses showed the model to predict associations between behaviors, job investments, quality of alternatives, and job satisfaction.

The model was derived from Farrell-Rusbult's (1992) EVLN (exit-voice-loyalty-neglect) typology, Price-Mueller's (1981) job satisfaction factors, Withey-Cooper's (1989) concept of active and passive loyalty, and new variables for high-tech workers (e.g., instability, leadership, climate). Engineers' constructive behavior correlated to career opportunity and correcting past failures. Destructive behavior correlated to frustration over inefficiencies, low job variety, and climate dissatisfaction. Non-engineers' constructive behavior was associated with high met expectations, limited opportunities, and excessive workload. Destructive behaviors correlated to excessive workload, low opportunities, and dissatisfaction with executives.

To avoid an estimated $576,000 loss per departed engineer, companies should develop a workplace community, employees' marketable skills, career options, realistic job previews, clear work responsibilities, and management training. Employees should self-manage by defining personal motivations, communicating expectations, offering solutions, and asking for help. Future research should address scale refinement, moderating factors such as performance and affect, causality/temporal effects, and extension to other settings.

Overall, this study showed that employees neither expect nor need perfection in their work environment. Rather, they need challenging work, a supportive climate, and role clarity. Progressive employees should accept their responsibility to develop self-knowledge and self-reliance. Successful managers should delve into these issues and forge a new relationship with employees. By doing so, companies can minimize the considerable expense of replacing engineers and other key knowledge workers, and employees can develop greater control over their satisfaction in the workplace.

DEDICATION

To Mom and Dad, who continually encouraged my intellectual, spiritual, physical, and emotional growth. You gave me my wings, and enough space to figure out how to use them.

And to Chet, for the extraordinary gift that you are.

ACKNOWLEDGEMENTS

I am grateful for the contributions of Dr. William B. Steeves Jr., faculty mentor and dissertation committee chair. Bill, your guidance helped to refine this huge study, your sense of humor made the process enjoyable, and your reminders to "keep up the running" ensured a modicum of balance during my years in the doctoral program. I am also indebted to my dissertation committee members for their unique contributions. Dr. C.J. "Shuey" Schumaker's logical models and statistical knowledge were essential in strengthening critical areas of the paper. Dr. Gary Gemmill's focus on the study's social impact, kindness and support at each step of the process, and guidance in planning future publications of the work is greatly appreciated. Dr. Mort Tiecher's astute analysis of the final draft was invaluable in identifying logical and topical gaps. Special thanks also to Dr. Ruth Maurer, Applied Management and Decision Sciences track chair, for her always stimulating presence, timely commentary, and the pleasure of sharing her lively wit.

I am deeply indebted to Shigeki Matsue, Tom Nishimura, Kazu Yamada, John Fallin, John Chenette, Jim Duffy, Bruce Calvin, Irish Taylor, Kathy Pinter, and Angie Chavez whose assistance and support were essential to implementing this research at the selected company. Dr. Jerry Talley, your experience, generosity, and ideas for new satisfaction factors were critical in shaping this study. Thank you for your timely assistance.

I am also profoundly grateful for the support, encouragement, and love of my dear friends, Tisa, Al, Max, Valerie, and Michelle. Thank you for believing in me.

Finally, I would like to express my sincere obligation to the researchers upon whose shoulders this work stands: Dr. Albert O. Hirschman, Dr. Caryl E. Rusbult, Dr. Daniel J. Farrell, Dr. Charles W. Mueller, Dr. James L. Price, Dr. Michael J. Withey, and Dr. William H. Cooper.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Retaining and satisfying key employees is one of the most critical challenges for companies today (Hodson, 1994). Despite the volume of research into turnover, organizational loyalty, and motivation, many industries continue to struggle to retain and satisfy key employees (Igbaria & Greenhaus, 1992). This problem is especially pressing in the high-tech sector where turnover rates average 27% per year and engineers' length of service averages 1.5 years per company (Hodson, 1994). These statistics are disturbing because of the direct link from engineers' efforts to customer satisfaction and corporate growth in the dynamic and competitive high-tech industry (Delbecq & Weiss, 1988). As high-tech product lifecycles shrink from years to months, the importance of engineers and other professionals in new product innovation becomes ever more critical.

Under these dynamic conditions, organizations must understand how to retain and satisfy key employees. Because organizations cannot expect to keep employee satisfaction continuously high, the manner in which employees respond to dissatisfaction has important implications. Employees who respond by trying to improve working conditions, alerting management to problems, and suggesting solutions can help increase organizational productivity and effectiveness. However, destructive responses such as quitting, reducing effort, or chronic absenteeism undermine organizational profitability and the satisfaction of other workers (Price, 1989). Thus, it is important to understand how engineers and other professionals react to dissatisfaction because "this can teach organizations how to encourage desired behaviors and discourage undesired ones" (Leck & Saunders, 1992, p. 219).

Some research indicates that organizational aspects that dissatisfy engineers are not always the same as those that dissatisfy other types of workers (Hodson, 1994; Jones, 1996; Keller, Julian,

& Kedia, 1996; Klenke-Hamel & Mathieu, 1990; Steers, 1977). Thus, it is also important to understand if engineers engage in constructive and destructive responses to job dissatisfaction for different reasons than do non-engineering professionals.

Studies of these issues may be found in sociological, psychological, and economic literature. Traditionally, researchers working in these fields have examined the precursors and consequences of turnover, absenteeism, job satisfaction, morale, and labor markets (Hom & Griffeth, 1995). More recently, the study of organizational commitment has become popular (Mueller, Wallace, & Price, 1992; Meyer, Allen, & Smith, 1993; Kalleberg & Reve, 1993). This body of knowledge has explored the antecedents of job satisfaction and organizational commitment, and the causal sequence of attitudes and behaviors between the initiation of dissatisfaction and the act of leaving a company (Hom & Griffeth, 1995).

The antecedents of turnover may be broadly defined as environmental, individual, or organizational factors (Price & Mueller, 1981). Environmental factors include aspects of the employee's environment that either stimulate search activity (such as other attractive job opportunities) or dampen the desire to change locations (such as family responsibilities). Individual factors include attitudes and attributes of the employee that influence their satisfaction, such as a generally positive outlook or basic work motivation. Organizational factors depend on the actual work situation and encompass those aspects of work that may influence an employee's satisfaction, commitment, or intent to stay.

The causal sequence of employee turnover is another area that has been heavily studied through models such Mobley's (1977) linear causal model linking negative evaluation of current job to turnover. Mobley was the first to describe the role of withdrawal intentions, a concept expanded upon in subsequent research (Hom, Caranikas-Walker, Prussia, & Griffeth, 1992; Fuller, Hester, Dickson, Allison, & Birdseye, 1996; George & Jones, 1996; Gaertner & Nollen,

1992; Igbaria & Greenhaus, 1992; Kim, Price, Mueller, & Watson, 1996). Hom and Griffeth (1991) proposed an alternative model that described two decision paths leading to either immediate quit behavior or to quit after finding and choosing a better alternative. A more recent theory advanced by Lee and Mitchell (1994a, 1996) identifies four separate decision paths resulting in a decision to either quit or stay. Substantial research supports the sequential path between job satisfaction, organizational commitment, search behavior, and intent to stay (Mueller & Price, 1990; Iverson & Roy, 1994; Kim et al., 1996). Although the study in this field has been fruitful, it is characterized by several shortcomings.

First, recent authors (Hom & Griffeth, 1995; Fuller et al., 1996) have called for an expanded view of employee attachment and responses to dissatisfaction, arguing that scholars must work to "overcome a pervasive bias in the literature toward regarding exit—in the form of job turnover—as the prototypical response to organizational decline" (Farrell & Rusbult, 1992, p. 204). Farrell and Rusbult also argue that with most research focusing on turnover, researchers have not defined the dependent variables of their studies in broad enough terms. The danger of this narrow view is that turnover and absenteeism may be surface symptoms of a deeper syndrome. By studying only the symptoms, researchers do not address the fundamental behavioral problems (Rusbult et al., 1988). Moreover, these studies and theories do not explain or predict positive outcomes of job satisfaction such as organizational citizenship (Kemery, Bedeian, & Zacur, 1996; Organ & Lingl, 1995). Thus, a comprehensive theoretical model of employee attachment to organizations should include both positive and negative outcomes.

Second, little research in this field has been performed in high-tech companies (Cramer, 1993), focusing instead on nursing, journalism, law, and accounting. Because of the high level of uncertainty, change, and competition in high-tech industries, the retention of knowledge workers in this industry is critical (Cramer, 1993). The problem is more acute in large corporations than in

small ones because small companies offer employees greater opportunities for upward mobility (Hodson, 1994). Moreover, the extreme competition for high-tech employees means companies must go out of their way to hire and retain quality people (Radford & Kove, 1991).

A third deficiency in current literature is the insufficient study of engineers. While studies of professionals such as lawyers (Wallace, 1995a, 1995b), executives (Gaertner & Nollen, 1992), and R&D scientists (Cordero, DiTomaso, & Farris, 1994) are available; research into satisfaction and attachment behaviors among engineers is scarce (Cramer, 1993). The study of this profession is particularly important due to the critical role they play in high-tech industry, and because "increasing competition, increasing levels of education, and declining organizational loyalty require consideration of multiple commitments and job problems experienced by engineers" (Baugh & Roberts, 1994, p. 108). The study of engineers is also motivated by the differences found when comparing antecedents of organizational commitment for engineers and other occupational groups (Steers, 1977). Finally, some researchers have recommended the use of diverse populations to test turnover models (Hom & Griffeth, 1995; Kim et al., 1996).

Thus it is critical that researchers broaden their understanding of the fundamental behaviors that underlie symptoms of dissatisfaction such as exit or absenteeism, and symptoms of satisfaction such as organizational citizenship behavior. The models used in this field should also be tested with different populations to determine if existing theories apply to other industries, especially those with high-risk employees types such as engineers in the high-tech sector.

While the field of employee attachment recognizes a broad spectrum of factors that influence turnover (Hom & Griffith, 1995), for executives and consultants to high-tech companies, the question to answer is less one of what determines turnover, but what organizationally controllable factors are most important to the employee categories most difficult to replace. By understanding the factors that impact different employee behaviors, practitioners can devise

policies, procedures, and interventions that will encourage constructive responses to dissatisfaction and discourage destructive responses. To retain and optimize the satisfaction of engineers and other professionals, managers need to understand employees' constructive and destructive behavioral responses to job dissatisfaction.

Statement of the Problem

Employers and employees must develop a new relationship in response to fundamental changes in the workplace. The forces driving this change include the destruction of the once implicit lifetime-employment-for-lifetime-loyalty contract, emergence of a more global economy, and replacement of money-based by knowledge-based industries. In this new environment, "the relationship between the organization and knowledge workers . . . is radically different. . . . [Employees] can work only because there is an organization. . . . But at the same time, they own the 'means of production'—their knowledge. In this respect, they are independent and highly mobile" (Drucker, 1995, p. 87).

As described in the introduction, engineers are a prime example of knowledge workers with an extremely high turnover rate, but have been understudied in employee attachment literature. Moreover, most employee attachment literature focuses on job turnover as the prototypical employee response to dissatisfaction (Farrell & Rusbult, 1992). The complexity of the employer-employee relationship would be more fully understood if other employee behaviors, such as organizational citizenship, complaining, and withdrawal, were examined. Finally, the significant controversy surrounds some of the models used frequently in employee attachment research.

Thus, this study uses a high-tech population comprised of both engineers and non-engineering professionals to examine issues of importance to knowledge workers, seeking to

answer two questions. First, can a model be derived in response to criticisms of existing models? Second, can this model be successfully applied to determine which structural job aspects cause engineers and non-engineering professionals to react to job dissatisfaction with constructive or destructive behaviors, and whether dissatisfiers differ between engineers and non-engineering professionals?

Purpose of the Study

The purpose of this study was to refine a model used to study employees' behavioral responses to job dissatisfaction, and to use this model to examine two employee groups in a high-tech setting: engineers and non-engineering professionals. This study also involved a comparison to determine whether the responses of engineers and non-engineers to dissatisfaction were different, and if these responses were predicted by different factors. The factors examined were primarily those which could be controlled or influenced by the employing organization (e.g., workload, supervisory support, and professional growth). Based on these findings, implications for policies, procedures, and interventions were made.

The dependent variables studied were five behavioral responses of employees to job dissatisfaction: exit, voice, active loyalty, passive loyalty, and neglect. These behaviors were defined as follows: *exit* was indicated by search behavior, the degree to which an employee is looking for another job; *voice* reflected a willingness to make suggestions for how to improve dissatisfying work situations; *active loyalty* was the willingness of employees to go beyond the call of duty in helping coworkers or supporting the company; *passive loyalty* measured a willingness to accept dissatisfying work situations; and *neglect* reflected a willingness to let a dissatisfying work situation worsen without taking action.

Theoretical Basis for the Study

The model used in this study was synthesized from the Rusbult-Farrell (1983) typology of responses to variations in job satisfaction, the Price-Mueller turnover model (1981), and research on high-tech employee populations. Both of the models address employee attachment, but from significantly different perspectives.

The Rusbult-Farrell (1983) EVLN Typology

The Rusbult-Farrell typology is based on Albert O. Hirschman's seminal work, Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States (1970). Hirschman's theory described three modes of response available to employees, consumers, and citizens when they experience deteriorating satisfaction with the products or services of a company, employer, or government: exit, voice, and loyalty.

In Hirschman's definition, *exit* is the "decision to withdraw or switch" (1970, p. 83); *voice* refers to "any attempt at all to change rather than to escape from an objectionable state of affairs" (p. 30); and *loyalty*, as applied to employees, describes a willingness to "suffer in silence, confident that things will soon get better" (p. 38). Hirschman's theory has become known as the Exit-Voice-Loyalty model of dissatisfaction (Saunders, 1992) and has been applied to many situations, including dissatisfaction by employees (Farrell, 1983; Rusbult & Farrell, 1983; Withey & Cooper, 1989), romantic partners (Drigotas, Whitney, & Rusbult, 1995; Rusbult & Zembrodt, 1983), members of political parties (Burgess & Beilstein, 1996; Eubank, Gangopadahay, & Weinberg, 1996), consumers (Bolton & Bronkhorst, 1995; Zeithaml, Berry & Parasuraman, 1996), and citizens (Dowding & John, 1996; Montgomery, 1996).

Farrell (1983) used Hirschman's work as a conceptual base from which he derived a four-part typology of employee response to change in job satisfaction. In the four-part typology, known

as "the EVLN model of responses to dissatisfaction" (Leck & Saunders, 1992, p. 221), the *exit* category includes "job movement both within and across organizational boundaries, as well as a variety of cognitive activities that precede leaving" (Farrell & Rusbult, 1992, p. 262); the *voice* construct refers to "willingness to make suggestions for improvement" (Meyer et al., 1993, p. 542), *loyalty* is defined as a "willingness to accept things as they are" (p. 542) or a "constructive yet passive reaction wherein employees stand by the organization, waiting for conditions to improve" (Farrell & Rusbult, 1992, p. 262); and the *neglect* category includes "reactions wherein the employee passively allows conditions to worsen" (p. 262).

The EVLN typology has been verified with various populations and methodologies including multidimensional scaling, cross-sectional survey research, secondary analysis of extant data sets, simulation and laboratory experimentation, and pane research (Farrell & Rusbult, 1992). Illustrations of each behavior include:

> Exit: quitting: transferring; sabotage; searching for a different job; thinking about quitting.
> Voice: discussing problems with the supervisor or co-workers; taking action to solve problems; suggesting solutions; seeking help from an outside agency; whistle-blowing.
> Loyalty: giving public and private support to the organization; waiting and hoping for improvement: trusting the organization to do the right thing; being a 'good soldier.'
> Neglect: reduced interest or effort; chronic lateness or absenteeism; using company time for personal business; increased error rate. (p. 202)

As shown in Figure 1, the EVLN model is organized along "two primary dimensions: constructiveness versus destructiveness, and activity versus passivity" (Farrell & Rusbult, 1992, p. 283). The constructive-destructive dimension is defined in terms of "impact on employee-organization relationships . . . not in terms of its broader functional value" (Rusbult et al., 1988, p. 602). Exit and neglect are considered destructive to the employee-employer relationship, while voice and loyalty are considered constructive responses. Exit behavior is destructive in that it

severs the employee-employer link, while loyalty behavior is constructive in attempting to maintain the link despite dissatisfaction.

The active-passive dimension refers to the "impact of an action on a problem and not to the character of a response itself" (Rusbult et al., 1988, p. 602). Here, exit and voice are considered active responses to dissatisfaction, while neglect and loyalty are considered passive responses. Voice is active through its overt attempt to overtly address problem, while a neglect behavior is passive in its unwillingness to directly influence the source of the problem.

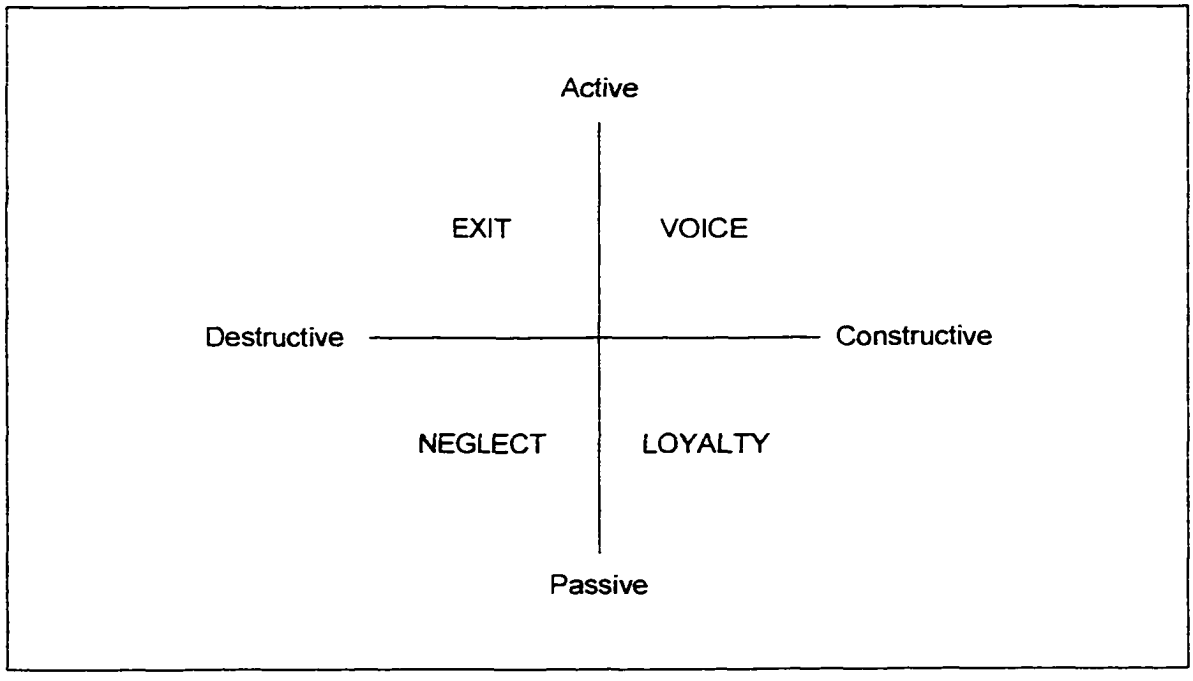


Figure 1. The exit-voice-loyalty-neglect model.

Note. From "Impact of exchange variables on exit, voice, loyalty, and neglect: an integrative model in response to declining job satisfaction," by C. E. Rusbult, D. Farrell, G. Rogers, and A. G. Mainous, 1988, Academy of Management, 31, p. 601. Copyright 1988 by the Academy of Management. Used with permission of the author.

Based on traditional exchange theory, Farrell and Rusbult (1992) use "three broadly defined theoretical predictors . . . to explain employee response to dissatisfaction: level of overall job satisfaction, or job satisfaction prior to the emergence of work problems; quality of job alternatives; and magnitude of investments in a job" (p. 204). These broad factors contain many independent variables, and each factor is hypothetically linked to each of the four types of employee behavior. The link between job satisfaction and employee behavior may be understood by considering that highly satisfied employees are more likely to act to restore satisfaction and more likely to expect improvement, in the event that they encounter work problems. The quality of alternatives factor predicts employee behavior in that people with alternatives are more likely to act then to wait passively for change in a situation. Employees without alternatives may feel forced to wait out the problem. Finally, employees with high investments in their job (e.g., time at the company, skills specific to the firm, relationships with coworkers) are also more likely to engage in activities that will enable them to maintain this investment. Thus, employees with high job investments will work to maintain their relationship with the employer, while those with low job investments have little to lose if they end their relationship, and are likelier to enact behaviors that put that relationship at risk. Thus, as applied to the present study, the EVLN typology holds that job satisfaction, quality of alternatives, and magnitude of job investments may be used to predict employees' use of four different responses to dissatisfaction: exit, voice, loyalty, and neglect.

Controversies Regarding the EVLN Typology

Despite, the validation of the distinctness of the four responses that make up the EVLN typology provided by studies of human relationships (Drigotas et al., 1995; Rusbult & Zembrodt, 1983) and organizations (Farrell, 1983; Farrell & Rusbult, 1985; Rusbult et al., 1988; Rusbult & Lowery, 1985), the typology has been involved in two major areas of controversy. First,

researchers applying Hirschman's EVL model to organizational settings are divided over the operationalization of the loyalty construct. The controversy centers around the conceptualization of loyalty as an attitude or as a behavior (Saunders, 1992). In Rusbult and Farrell's EVLN typology, loyalty is clearly defined as a behavior (Minton, 1992). Other research has examined loyalty as an attitude (Keeley & Graham, 1991; Leck & Saunders, 1990). Moreover, several studies identify two independent aspects of loyalty: active loyalty and passive loyalty (Graham & Keeley, 1992; Leck & Saunders, 1992; Withey & Cooper, 1989).

The second area of controversy is the lack of specificity in the type of dissatisfaction linked to each behavior mode (Leck & Saunders, 1992; Saunders, 1992; Withey & Cooper, 1992). For example, Leck and Saunders (1992) note that "dissatisfaction with different facets of the job led to the expression of different behaviors. This suggests that although exit, patience, and neglect may be responses to dissatisfaction, they may not be responses to the same type of dissatisfaction" (p. 227). Also, Saunders (1992) argues that some studies show different employee behaviors to be "related to different facets of prior satisfaction, suggesting that both Hirschman's and Rusbult and Farrell's models need to examine type of dissatisfaction in more detail" (p. 189). However, Rusbult and Farrell have specifically chosen broad predictive factors because they aim at "a broad, abstract level of explanation" (Rusbult et al, 1988, p. 601) where the level of predictive and dependent variables are of the same conceptual level. This criticism of the EVLN model is supported by Herzberg's (1966) classic model of job satisfaction and job dissatisfaction. Herzberg postulated that these two constructs are *not* opposites, but representative of different aspects of human nature. Job satisfaction was found to result from the job content of the work itself, with achievement, recognition, responsibility, and advancement, while job dissatisfaction was found to result from unsatisfactory company policies, working conditions, security, and pay.

In this study, the definition of loyalty in the EVLN typology was clarified and the EVLN typology was integrated with the Price-Mueller model of voluntary employee turnover to respond to concerns about the lack of precision in Rusbult and Farrell's measurement of job satisfaction.

The Price-Mueller Model of Voluntary Employee Turnover

James L. Price (1977) developed the basis of the Price-Mueller model of voluntary employee turnover. It was expanded by Price and Mueller and their colleagues to study both the antecedents and causal sequence of voluntary employee turnover (Price & Mueller, 1986; Mueller & Price, 1990: Agho, Mueller, & Price, 1993; Iverson & Roy, 1994; Mueller, Boyer, Price, & Iverson, 1994; Kim et al., 1996). As applied to the present study, the Price-Mueller model holds that a set of environmental, individual, and structural independent variables are expected to influence turnover through the process described by job satisfaction, organizational commitment, and search behavior. The Price-Mueller model also argues that job satisfaction increases organizational commitment, but not visa-versa. The Price-Mueller model is based in three research traditions: economics, sociology, and psychology (Mueller & Price, 1990). The psychological aspect emerges in the use of expectancy theory which assumes that employees enter organizations with a set of values and expectations (Vroom, 1964). The subsequent level of attainment of these expectations and values significantly impacts the length of service of the employee. The Price-Mueller model follows the work of other researchers (Porter, Steers, Mowday, & Boulian, 1974; Mowday, Steers, & Porter, 1979) who applied the concept of met expectations to the work environment. In order to translate expectations and values into turnover behavior, one must first identify which particular work conditions evoke expectations and values in employees. As indicated above, the Price-Mueller model describes a set of such work conditions, called *structural* variables and a set of conditions outside the workplace, called *environmental* variables. The third set of

factors in the Price-Mueller model concerns the attitudes, skills, and knowledge that the employee brings to the organization. These factors are collected under the term, *individual* variables. The most recent version of the Price-Mueller model (Kim et al., 1996, p. 952) is shown in Figure 2.

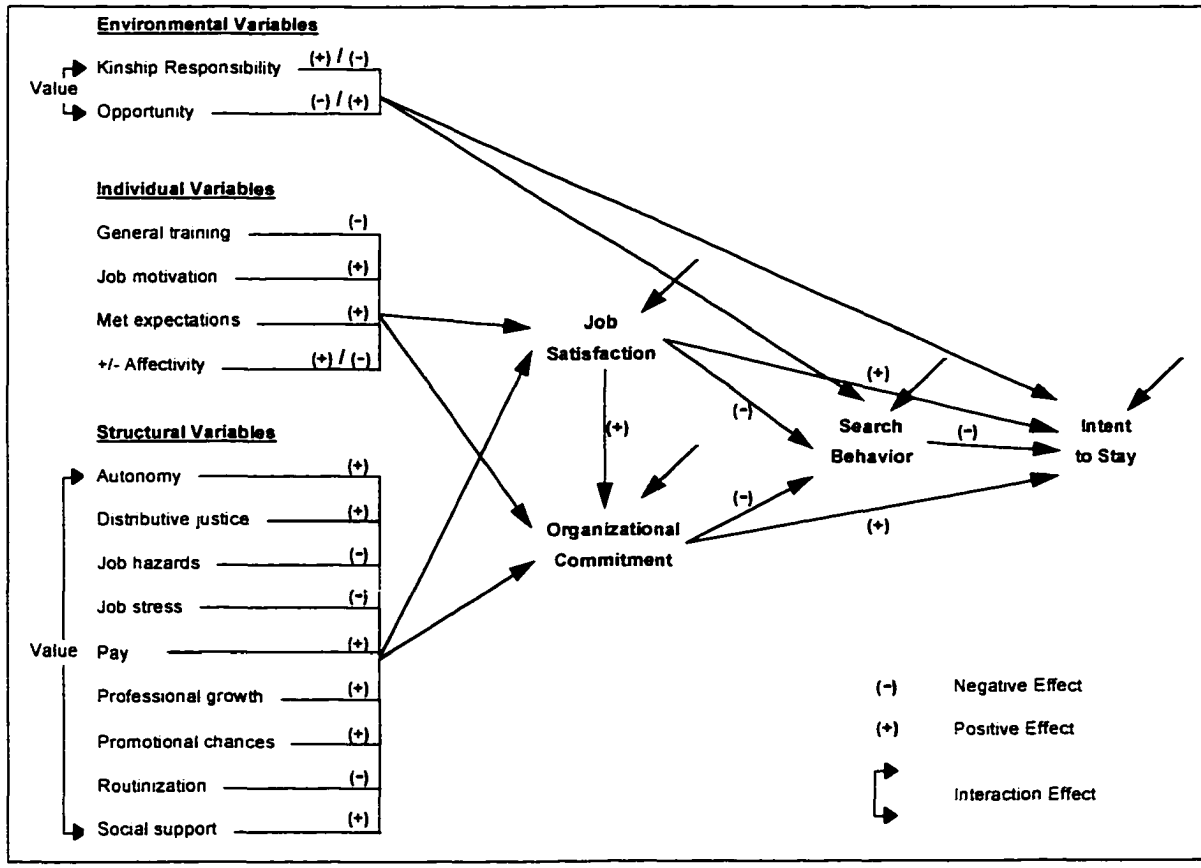


Figure 2. A recent version of the Price-Mueller Model

Note. From "The determinants of career intent among physicians at a U.S. Air Force hospital," by S. Kim, J. L. Price, C. W. Mueller, and T. W. Watson, 1996, Human Relations, 49, p. 952. Copyright 1996 by The Tavistock Institute. Reprinted with permission of the author.

Mueller and Price (1990) use economic research in the model through variables such as "pay, objective supply/demand features of the local labor market, the employee's perception of the external opportunity structure and general training" (p. 322). They consider the psychological variables to be primarily pre-entry variables such as job motivation, amount of choice when

selecting the job, and the extent to which external constraints affected the choice. The sociological tradition provides a set of structural factors which

> capture the employee's relationship to the work setting as well as the patterns of social interaction. These include routinization, autonomy, feedback, coworker cohesion, work load, and task identify. Employee characteristics include work motivation and professionalism. . . . [external factors] include kinship responsibility and community participation. (Mueller & Price, 1990, p. 325)

Limitations of the Price-Mueller Model

One criticism commonly made of the Price-Mueller model is its lack of parsimony (Hom & Griffeth, 1995). For example, the Kim et al. (1996) version of the model included 18 independent variables, three intervening variables, and one dependent variable. Nevertheless, it is precisely this richness that is lacking from the theoretical predictor of job satisfaction in the Rusbult-Mueller EVLN model.

A second limitation of the Price-Mueller model is that it examines employee attachment only in terms of employee turnover. Recent scholars have called for an expanded view of employee attachment and responses to dissatisfaction (Fuller, Hester, Dickson, Allison, & Birdseye, 1996; Hom & Griffeth, 1995), as well as an endeavor to "overcome a pervasive bias in the literature toward regarding exit--in the form of job turnover--as the prototypical response to organizational decline" (Farrell & Rusbult, 1992, p. 204). This injunction is supported by scholars such as Fuller et al. (1996) whose meta-analysis of turnover literature found that intent to leave and intent to stay develop differently and relate differently to job satisfaction. In their recommendations for further research, they argue that

> More effort needs to be put into research that discriminates between individuals' intention to stay with the organization and individuals' intention to leave the organization. Most models examining the relationships among attitudes, intentions, and behaviors portray only one behavior--organizational separation. . . . To facilitate this type of research *better measures of behavioral intentions . . . need to be crafted.* (p. 1346)

The call to expand the concept of employee attachment from turnover alone to other types of behavior may be answered in a merged model of employee attachment that links Rusbult and Farrell's EVLN typology of responses to variations in employee job satisfaction with the Price-Mueller model of voluntary employee turnover.

Synthesized Model of Employee Attachment

The derivation of the synthesized model of employee attachment used in this study is described in six steps. First, the independent variables of the two models were aligned and merged. Second, Price-Mueller's intervening variables of organizational commitment and job satisfaction were incorporated. Third, a link was established between Price-Mueller's search behavior and intent to stay variables and Rusbult-Farrell's Exit-Voice-Loyalty-Neglect behaviors. Fourth, the EVLN typology was evaluated based on recent findings. Fifth, additional job satisfaction factors important to the high tech population were added to the model. Finally, the synthesized model to be used in the present study was defined.

As previously described, the Price-Mueller model (1981) involves three categories of independent variables driving the turnover decision: environmental, individual, and structural. Rusbult and Farrell's model (1983) utilizes three broad factors to predict employee behavior: job satisfaction, quality of alternatives, and magnitude of job investments. These two sets of variables are compared to each other in Figure 3.

Rusbult et al. (1988) explained that job satisfaction consists of "feelings regarding supervision, pay, and co-worker relations" (p. 603). Leck and Saunders (1992) expanded this set of factors to five: satisfaction with work, supervision, pay, promotion, and co-workers. The social support factor shown in the Price-Mueller model side of Figure 3 includes supervisor support, co-

workers support, and family support. Thus, all the factors considered to account for Rusbult and Farrell's concept of job satisfaction, and many others, are included in the Price-Mueller model.

Farrell and Rusbult (1992, p. 205) included the following elements in their description of job investment size: job length of service, effort expenditure, nonportable training, familiarity, convenient housing and travel arrangements, friends at work, and unvested retirement funds. However, most studies of this construct use length of service or firm-specific training to measure job investment size (Farrell & Rusbult, 1992; Rusbult et al., 1988; Farrell et al., 1990; Rusbult & Lowery, 1985). The Price-Mueller model given in Kim et al. (1996) incorporates length of service, nonportable training, friends at work, and financial benefits beyond salary. These measures account for far more of Farrell and Rusbult's job investment elements than scales of length of service or training alone. Finally, Farrell and Rusbult (1988) describe high-quality alternatives as "attractive job opportunities, the possibility of early retirement, or the acceptable option of not working" (p. 604), and measure this concept by scales such as "How confident are you that you would find a satisfactory job if you were to quit this job?" (p. 625). This factor is identical to the Price-Mueller variable of external opportunity, defined as the availability of alternative jobs in the organization's environment (Agho et al., 1993).

Thus, while the independent variables in the two models are organized differently, the measurements used to define Rusbult and Farrell's independent variables are subsumed in the Price-Mueller independent variable measurements. From this comparison, one can conclude that the independent variables from the Price-Mueller model may be used to evaluate EVLN behaviors.

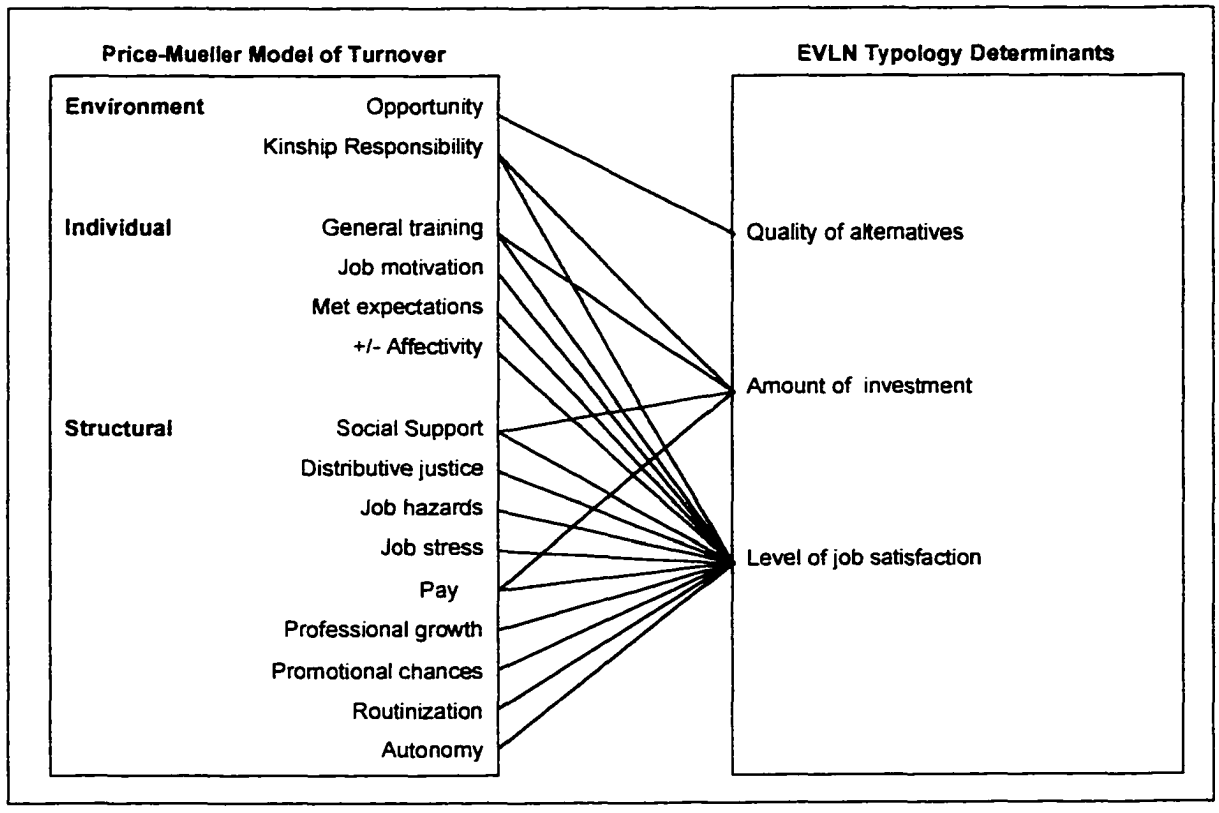


Figure 3. Comparing independent variables in Price-Mueller and Rusbult-Farrell models.

Job Satisfaction and Organizational Commitment

The Price-Mueller model indicates that job satisfaction may be predicted by employee perceptions of the model's individual and structural independent variables. This aspect of the model strengthens the argument that the Rusbult-Farrell global factor of job satisfaction may be better evaluated if broken into the independent variables provided in the Price-Mueller model. Thus, this partitioning of job satisfaction into its component parts allows us to remove job satisfaction as an independent intervening variable in a merged model.

The Price-Mueller model incorporates both job satisfaction and organizational commitment as steps in the causal path from independent variables to turnover. However, the causal sequence of employee tunover is not the focus of this study. Moreover, substantial research

supports the causal link between job satisfaction, organizational commitment, search behavior, and intent to stay (Mueller & Price, 1990; Iverson & Roy, 1994; Kim et al., 1996), so these links will not be examined in the proposed study. Rather, Price-Mueller's search behavior variable will be expanded to four behaviors based on the exit-voice-loyalty-neglect typology.

Employee Attachment Behaviors and Extension of EVLN Typology

Returning to the Price-Mueller model in Figure 2, it is clear that only one behavior is predicted to result from job satisfaction and organizational commitment: search behavior. As seen in the definition of the Exit-Voice-Loyalty-Neglect typology defined earlier, search behavior is one example of the Rusbult-Farrell concept of exit. The merged model will keep this behavioral outcome and add the remaining three behaviors: voice, loyalty, and neglect.

As mentioned in the previous section, the loyalty construct is in need of refinement. Several researchers (Graham & Keeley, 1992; Leck & Saunders, 1992; Withey & Cooper, 1992) have found evidence of two types of loyalty: active loyalty and passive loyalty. Leck and Saunders (1992) used the label *patience* to represent loyalty as a behavior. The term patience was selected because "adopting the term 'patience' for behavioral loyalty describes the construct more precisely, and disentangles the cause (loyalty as attitude) from the effect (patience as behavior)" (p. 222). Where *passive loyalty* is distinguished by patience or trust, and is considered to be slightly destructive to the organization due to its ineffectiveness in helping the organization improve (Withey & Cooper, 1992, p. 232). *Active loyalty* is distinguished by giving something extra or going beyond the expected, and is considered to be constructive in its active maintenance of the employer-employee bond (Graham & Keeley, 1992; Withey & Cooper, 1992).

While studies of loyalty were successful in identifying two distinct types (Graham & Keeley, 1992; Leck & Saunders, 1992; Withey & Cooper, 1992), they did not offer a revised

version of the EVLN model based on their findings. The merged model to be used in this study will take this step by incorporating a more precise definition of loyalty.

Additional Job Satisfaction Factors for High-Tech Industry

Six new independent variables were added to the set selected from the Kim et al. (1996) version of Price-Mueller turnover model. A factor measuring instability was added based on the work of Schellenberg (1996), and five factors were added to the survey during the pilot test after input from experts in the high-tech field (J. L. Talley, personal communication, August 15, 1997) and comments of individuals who took the pilot test: adequacy of infrastructure, clarity of vision, effectiveness in implementing change, executive credibility, and interdepartmental cooperation. Support for the addition of these six variables is discussed in Chapter 3.

Model Used in the Present Study

Based on the arguments outlined above, this study used a model synthesized from the Price-Mueller (1981) model of voluntary employee turnover and the Rusbult-Farrell (1983) typology of responses to variations in job satisfaction. The merged model, as shown in Figure 4, incorporated independent variables from Price and Mueller and recent high-tech research to more precisely define the components of job satisfaction and job investment that are most relevant to each of the EVLN behaviors.

Because the results of the present study may be used to direct the development of policies, procedures, and interventions at high-tech companies, the independent variables selected from the Price-Mueller model were primarily those that are organizationally controllable. Thus, three variables were removed from the Kim et al. (1996) version of the Price-Mueller model: kinship responsibility, work motivation, family support.

Two independent variables that are not organizationally controllable were retained due to their importance in distinguishing the four EVLN behaviors: external opportunities and

transferable skills. Finally, although the *met expectations* variable is considered to be an individual variable, it has an organizationally controllable aspect and was retained in the merged model. That is, the company can take a role in setting employee expectations through the use of tools such as realistic job previews in the hiring process. Realistic job previews are "extensive and realistic communications about a new job to prospective or new employees during recruitment or orientation" which may increase tenure (Hom & Griffeth, 1995, p. 193).

Hypotheses

Null Hypothesis 1: There is no significant relationship between the level of investment in a job and the likelihood of engaging in either constructive behaviors (active loyalty, passive loyalty, and voice) or destructive behaviors (neglect and search).

Null Hypothesis 2: There is no significant relationship between the level of perceived external opportunities and the likelihood of engaging in either active behaviors (active loyalty, voice, and neglect) or passive behaviors (passive loyalty and search).

Null Hypothesis 3: There is no significant relationship between the level of job satisfaction and the likelihood of engaging in either constructive behaviors (active loyalty, passive loyalty, and voice) or destructive behaviors (neglect and search).

Null Hypothesis 4: There is no significant difference in which job satisfaction variables associate with each employee behavior: active loyalty, neglect, passive loyalty, search, and voice.

Null Hypothesis 5: There is no significant difference in the determinants of each behavior (active loyalty, neglect, passive loyalty, search, and voice) for engineers versus non-engineers.

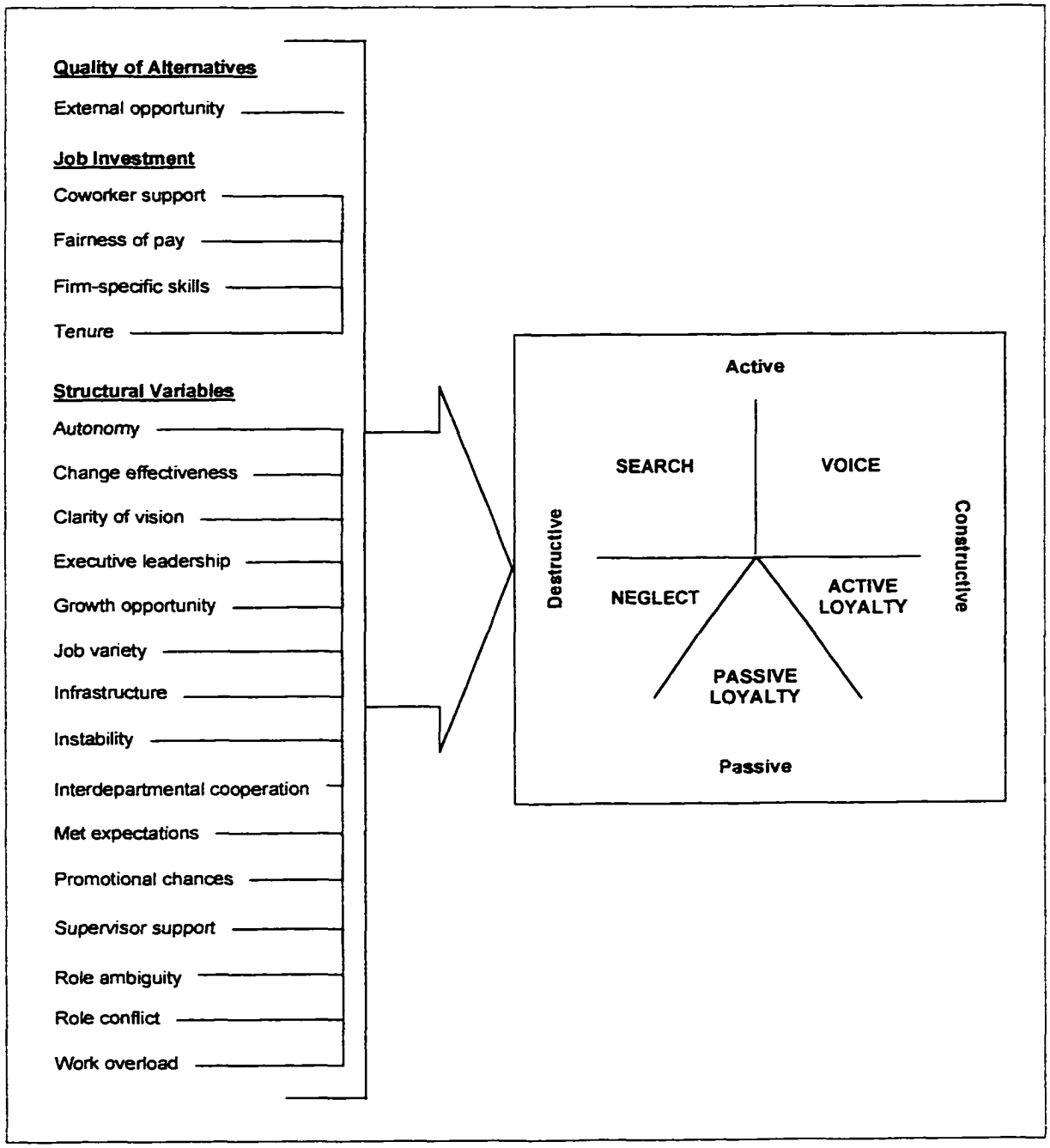


Figure 4. Merged model of employee attachment.

Significance of the Study and Social Impact

Strong forces of social change exist in today's world economy that will dramatically alter the relationship between corporations and employees. This study contributed to professional and social interests by addressing three such forces: growing dependence on knowledge workers, increasing workforce diversity, and increasing organizational complexity.

The first basic force of social change involves a fundamental shift from capital-powered industries to knowledge-powered industries (Drucker, 1995; Toffler, 1990). Many of these new industries emphasize worker participation and increasingly require workers to innovate, cooperate, and take responsibility for the direction of their work. Other industries depend almost totally on the skills of their *human* capital. Toffler (1990) described several characteristics of knowledge-based industries: dependence on electronically-exchanged knowledge instead of land, labor, raw materials, and capital; evolution from mass production to flexible, customized production; substitution of bureaucracies by free-flow information systems; and the evolution of workers from interchangeable commodities to critical, often irreplaceable, means of production. High-tech companies are prototypical examples of the knowledge-based industry (Hodson, 1994).

In knowledge-based industries, the relationship between organization and employee "is radically different. . . . They [employees] can work only because there is an organization. . . . But at the same time, they own the 'means of production'—their knowledge. In this respect, they are independent and highly mobile" (Drucker, 1995, p. 87). In this new economic environment, "loyalty can no longer be obtained by the paycheck. The organization must earn loyalty by proving to its knowledge employees that it offers them exceptional opportunities for putting their knowledge to work" (p. 89).

In this changing organizational and social environment, employee satisfaction becomes a critical component of organizational strategy, for in companies where employees own the means of production, dissatisfied employees have the "freedom to move to wherever opportunities for effectiveness, for accomplishment, and for advancement seem greatest" (Drucker, 1995, p. 255). Delbecq and Weiss (1988) found exactly this phenomenon among engineers employed in electronics companies. They described these engineers as "technical champions" with an especially strong need for accomplishment and independence. When this need was not supported by employers "there was always the possibility that the champion would join another competitor or form a start-up" (Delbecq & Weiss, 1988, p. 131).

This study directly examined the changing relationship between corporations and employees catalyzed by the emergence of knowledge-based industries. The selection of an electronics company provided the opportunity to investigate these forces at work in a prime example of such an industry. By focusing on engineers, the study analyzed one of the prototypical examples of the knowledge worker. The study tied together the needs of knowledge workers (e.g., structural aspects of job dissatisfaction) to the choices knowledge workers exercise in relationship to their companies (e.g., constructive and destructive responses to job dissatisfaction).

Another fundamental social change facing modern companies is the increasing diversification of their workforce (Albert, 1994). As will be described in the methodology section, the population to be selected in the proposed study consists of a wide variety of ethnic backgrounds. In addition, the population is taken from the U.S. subsidiary of a large Japanese multinational corporation. Western subsidiaries of Japanese corporations often face serious challenges due to differences in Western and Japanese management styles, organizational structures, social norms, and cultural expectations (Pucik, 1994; Watanabe & Yamaguchi, 1995). This study examined a group of professionals who were immersed in issues of diversification and

cultural blending that will face other industries in coming decades. While this study did not compare the attitudes of different cultural groups, the ecological environment of the study's population is very culturally diverse and provided an in situ example of a company dealing with diversification issues in all their intricacy.

A third social change being experienced in modern companies is the growing complexity of their work environment and organizational structure (Beer & Eisenstat, 1996; Senge, 1990; Solomon, 1994). Senge (1990) explains that in the face of this complexity, uncertainty, and pace of change, many "organizations break down, despite individual brilliance and innovative products, because they are unable to pull their diverse functions and talents into a productive whole" (p. 69). When the talents needed in this changing environment are contained within the minds of knowledge-based workers with high job expectations and high potential mobility, companies are particularly challenged to maintain a productive whole. Moreover, practitioners often examine exiting employees (leavers) to identify possible interventions for improving the satisfaction and productivity of the remaining workforce (stayers). However, leavers are actually a smaller population than stayers and "sometimes companies have lost many people who are still with them" (Hughes & Flowers, 1987, p. 22). Understanding the voice-loyalty-neglect behaviors of the can help practitioners devise strategies to help both the company and the employees. This study investigated a company that faces just such uncertainties and complexity both in its environment and organization.

Five aspects of this study make it significant to the field of employee attachment research. First, it applied the Price-Mueller model and Rusbult-Farrell model to a high-tech population. This is significant due to calls from some scholars for the Price-Mueller model to be applied to nonhospital populations (Hom & Griffeth, 1995), and that "future investigators will need to assess the validity of the present [EVLN] model across varied employment settings" (Rusbult et al., 1988,

p. 617). Second is the focus on engineering professionals, an occupation understudied in turnover literature (Cramer, 1993). A third significance is the combination of the Price-Mueller model's independent variables and Rusbult-Farrell's EVLN behaviors. This aspect of the study was significant due to the calls for a more detailed examination of job satisfaction aspects that predict each EVLN behavior (Leck & Saunders, 1992). Fourth is the incorporation of both active and passive loyalty into the EVLN typology. The fifth area of significance lies in the comparison of engineers and non-engineering professionals. This comparison is significant for reasons such as those expressed by Cramer (1993):

> Considerable research has been conducted on turnover . . . although relatively few studies have examined turnover in professional employees or college graduates. Whether generalizations can be made from one organization or group of employees to another remains unclear. Before implementing potentially expensive intervention programs in an attempt to reduce turnover, employers must first identify the specific factors that are likely to be associated with it. Few published studies examining turnover among professional personnel have done this. (p. 795)

In summary, this study addresses three major issues of social change: growing dependence on knowledge workers, increasing workforce diversity, and increasing organizational complexity. The changes underway in the relationship between employers and knowledge-worker type employees are addressed by using a population of engineers in a high-tech industry. The issue of the impact of increasing workforce diversity is addressed through the highly diverse population selected as well as through the incorporation of several job satisfaction factors likely to illuminate problems caused by multiculturalism (e.g., executive leadership, supervisor support, and coworker support). Finally, this issue of organizational complexity is addressed through the high-tech industry selected, which is commonly considered one of the most volatile industries, as well as through the selection of certain independent variables (e.g., instability, quality of alternatives, and climate satisfaction).

Definition of Terms

This section contains operational definitions for the population of interest, the dependent variables, and the independent variables. Operational definitions for the dependent and independent variables to be used in this study are given in Table 1. The company studied is part of the electronic components sector of the *high-tech industry*, which is defined

> in terms of industries that utilize greater-than-average numbers of engineers and scientists and expend greater-than-average amounts on research and development. This operational definition includes electronics, machinery, ordnance, chemicals, instrumentation, pharmaceuticals, aerospace, genetic engineer, and communication equipment. (Hodson, 1994, p. 247)

The two groups compared are called engineers and non-engineering professionals. The *engineers* group was comprised of engineers and engineering managers. These employees hold at least a bachelor degree in electrical engineering or computer science discipline and identify themselves as engineers. The *non-engineering professionals* group was comprised of all employees in marketing, sales, administration, and general management. This group did not identify themselves as engineers. Some individuals in the non-engineering group hold engineering degrees but do not identify themselves as engineers because their recent work experience has become primarily nontechnical, such as in marketing or sales. The individuals involved in the study did not contain any employee working above the senior manager level (executives) or any employee working for an hourly wage, thus excluding contractors or temporary workers.

Table 1

Definitions of Variables for this Study

Variable	Definition
Active loyalty	Willingness to go beyond the expected for the company (Withey & Cooper, 1992).
Neglect	Passive withdrawal in the face of dissatisfaction (Meyer et al., 1993).
Search	Extent to which an employee is looking for another job (Kim et al., 1996)
Voice	Willingness to make suggestions for improvement (Meyer et al., 1993).
Passive loyalty	Willingness to accept things as they are (Meyer et al., 1993).
Autonomy	Degree to which employees exercise power relative to the job (Kim et al., 1996).
Clarity of vision	The degree to which the executive's vision is communicated to the employees.
Change effectiveness	The degree to which change is implemented efficiently in the organization.
Coworker support	Assistance for job-related problems provided by peers at work (Kim, et al., 1996)
Executive leadership	The degree to which employees are confident in the executives' decisions.
External opportunity	The availability of jobs in the organization's environment (Agho et al., 1993).
Firm-specific skills	The transferability of skills and knowledge among employers (Kim et al., 1996).
Fairness of pay	The degree to which financial rewards are fair (Mueller et al., 1994)
Growth opportunity	Chances provided by the employer to increase job-related knowledge and skills (Kim et al., 1996).
Infrastructure	The degree to which employees feel they have the tools, processes, and systems they need to achieve their work goals.
Instability	The amount of organizational turmoil, measured by frequency of turnover in direct supervisor, reorganizations, and organizational change.
Intrdptl Cooperation	The level of cooperation and coordination perceive between departments.
Job variety	The degree to which the job is not repetitions (Mueller et al., 1994).

(table continues)

Table 1 (continued)

Definitions of Variables for this Study

Variable	Definition
Met expectations	The extent to which beliefs about the nature of employment corresponds to the facts about employment (Kim et al., 1996).
Promotional chances	The degree of potential vertical job mobility in a company (Kim et al., 1996).
Role conflict	Degree to which clear information concerning job expectations is lacking in one's job (Klenke-Hamel & Mathieu, 1990).
Role ambiguity	Degree of incongruity of expectations concerning one's job responsibilities (Klenke-Hamel & Mathieu, 1990).
Supervisor support	The strength of supervisor-subordinate relations (Gaertner & Nollen, 1989).
Tenure	Length of time the employee has worked at the company.
Work overload	Degree to which workload is excessive (Curry, Wakefield, Price, & Mueller, 1986).

Limitations and Assumptions

Six limitations and their corresponding assumptions will be discussed in this section: the measurement of intentions instead of actual behavior, the inability to infer causality or temporal effects, lack of parsimony in the merged model, limitations due to the study of a single company, geographic and cultural considerations, and effect of company culture. First, the evaluation of employee behaviors in this study was made using intentions to engage in a behavior, rather than measurements of the behavior itself. While this is a common limitation among studies in this field (Bluedorn, 1982; Dalessio, Silverman, & Schuck, 1986; Fuller et al., 1996), "research has consistently demonstrated that behavioral intentions are one of the best predictors of behavior" (Leck & Saunders, 1992, p. 228). Ajzen (1991) and Tubbs and Ekeberg (1991) studied the link

between intention and behavior and found that intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior.

Another limitation of this study was the inability to determine causal links between the independent and dependent variables. The correlations drawn described the strength and direction of relationships between variables, but did not determine whether certain aspects of dissatisfaction caused certain behaviors. Moreover, the nature of this study did not allow the observation of temporal effects. While these effects are of great interest (Lee & Mitchell, 1996; Dickter, Roznowski, & Harrison, 1996), the focus of this study the examination of the determinants of employee responses to job dissatisfaction in the high-tech setting, rather than understanding the decision making process of employees on the path to turnover. The study of causal and temporal effects was left to future research.

Third, as described earlier, the original Price-Mueller model has been criticized for its lack of parsimony (Hom & Griffeth, 1995). The current study also lacks parsimony with 20 independent and 5 dependent variables. The survey instrument included at least two items per variable wherever possible to increase the reliability of the scales. Thus, there was a risk that the length of the questionnaire may impact the willingness of employees to fully complete it. However, the examination of multiple aspects of satisfaction was important in this study because research on turnover among engineers in high-tech settings is limited. Thus, it was important to draw from a wide pool of antecedents to identify key determinants. The use of multiple variables measuring different aspects of job satisfaction was also appropriate as a response to calls for greater specificity in the Rusbult-Farrell behavioral predictor variables (Leck & Saunders, 1992). Moreover, the number of questions used in the study (86 items) is comparable to other studies such as Kim et al. (1996) which used 76 items and reported a 52% response rate and Agho et al. (1993) which used 85 items and reported a 67% response rate.

Fourth, the population in this study was drawn from only one company, which may limit the generality of the findings to other high-tech settings. However, limiting the population to one company was important to this study because "conducting the survey in a single organization helps control the effects of context variables such as industry, structure, career and pay structures, culture, policies and procedures" (Burke, 1996, p. 1232). The control of these aspects of the work environment was especially important in this study due to the comparison of engineers to non-engineers. If such a comparison were made between employees of different companies, bias due to employer policies and attributes could confound the comparison.

Fifth, the population studied was comprised of employees from various Western, Asian, Middle-Eastern, and European cultural groups located in several regions throughout the United States. While it is known that culture influences work behaviors (Lee & Jablin, 1992), and while geographic differences in job satisfaction may exist, this study assumed that professional differences were more significant than cultural and geographic differences. Moreover, the focus of the study was on organizationally controllable aspects of job satisfaction. Because this study concerned a company operating in situ, it is important to consider the constraints under which the company is operating. The company under investigation has a policy of treating all locations and all cultures with the same procedures and salary structures. Thus, while geographic and cultural differences may be of interest to the research community, they are less useful to practitioners who must show equal treatment to all employees regardless of location or cultural background.

Sixth, the company studied is the U.S. subsidiary of a large Japanese electronics corporation. The nature of the relationship between the subsidiary and parent may cause unexpected interactions between variables not seen in the populations used to develop the model and new constructs. Hospital employees and nurses comprise the major populations used to develop the Price-Mueller model (Agho, Price, & Mueller, 1992; Kim et al., 1996; Mueller et al.,

1994), while university and manufacturing populations were used in EVLN typology studies (Farrell & Rusbult, 1992; Withey & Cooper, 1989; Withey & Cooper, 1992).

Methodology

This study of differences between determinants of engineer and non-engineer responses to dissatisfaction was performed using a cross-sectional survey method (i.e., questionnaires were administered at one time to the entire sample). Scales were drawn from the work of other researchers. The scale content validity was assessed by a group of knowledgeable experts in the high-tech field. The data were collected with an anonymous, self-administered questionnaire, which was first pilot tested on a small group of company employees.

Data analysis began with a comparison of the respondents' demographic characteristics to those of the population to determine if the sample represented of the population. This comparison used chi-square analysis because it involved the comparison of more than two groups of categorical variables (Suskie, 1996, p. 104). A factor analysis was performed to verify the distinctness of the variables and develop the final scales used in the statistical analysis. Descriptive statistics were calculated for all final scales. An internal consistency reliability analysis was performed by calculating Cronbach's coefficient alpha for the final scales. Normality and multicollinearity were analyzed to verify the assumptions that underlie regression and discriminant analysis.

Ten multiple regression analyses, followed by ten multiple regression analysis using backward elimination, were performed on each behavior for engineers and non-engineers to find the major determinants of each behavior. Finally, a group of heavy users of each behavior were selected and a discriminant analysis was performed on each employee behavior (exit, voice, active

loyalty, passive loyalty, and neglect) using engineers and non-engineering professionals as the compared groups.

Organization of the Study

In this introduction section, the problem of engineering dissatisfaction and turnover was introduced and described. The study's purpose of examining which factors determine employees' responses to job dissatisfaction was introduced along with the study's potential significance, limitations, and assumptions. A merged model was derived from the turnover model of Price and Mueller (1981) and the behavioral typology of Rusbult and Farrell (1983). Research questions were presented, and significant terms were defined. Finally, the methodology to be used was summarized.

In the next chapter, Review of the Literature, the EVLN typology and predictive independent variables from the Price-Mueller model will be described and supported through a detailed examination of pertinent literature. In the third chapter, Methodology, the details of the survey instrumentation, data collection procedures, and data analysis methods will be discussed. The dissertation report to be written after the conclusion of the proposed study will contain two further chapters. The fourth chapter will describe the results of the statistical analyses. The fifth chapter will discuss these results, draw conclusions based on the results and comparisons with literature in the field, and outline the direction of future research.

CHAPTER 2

REVIEW OF THE LITERATURE

Having introduced the problem, purpose, significance, theoretical basis, hypotheses and research questions, terms, assumptions, and limitations of the proposed study in the previous chapter, it is now important to examine the literature that will serve as a foundation for this study. This chapter begins with an overview of employee attachment research within the field of organizational behavior research. The Rusbult-Farrell EVLN behavioral typology is then developed and supported. This is followed by an examination of expected predictors of each behavior, incorporating the Price-Mueller independent variables to expand the concept of job satisfaction within the Rusbult-Farrell model. Additional independent variables included in the study are discussed. The literature review is then summarized.

Orienting the Study within Organizational Behavior Research

The study of employee attachment is contained within the broader field of management and organizational behavior research. Other topics include the study of performance, productivity, team behavior, leadership, organizational effectiveness, organizational culture, physical environment studies, and structural studies (Zikmund, 1988). This section summarizes the major fields of research in employee attachment and places the proposed study within this body of inquiry.

While employee attachment is the general area of interest, the research and theory connecting employee perceptions to behaviors constitutes this study's specific focus. This study focused on the reasons behind different employee responses to job dissatisfaction. Moreover, the study did not focus on the research directed toward these variables and behaviors in isolation. It

was mainly concerned with the research that links employee perceptions with exit-voice-loyalty-neglect behaviors.

Studies of employee attachment and intent to stay may be found in sociological, psychological and economic literature. The topic is generally studied in terms of turnover, absenteeism, job satisfaction, morale, and the labor market (Hom & Griffeth, 1995). More recently, the topic of organizational commitment (active loyalty) has become popular in turnover research (Kalleberg & Reve, 1993; Meyer et al., 1993; Mueller et al., 1992). Also, some researchers have expanded the study of turnover into a broader classification of withdrawal cognitions or responses to dissatisfaction (Drigotas, Whitney, & Rusbult, 1995; Farrell, 1983; Rusbult et al., 1988; Withey & Cooper, 1989).

Employee turnover and attachment research may be classified into six major groupings: consequences; determinants and correlates; theories, models and constructs; discussion of research methods; and interventions. Figure 5 shows these groupings within a literature map of the field. The literature map is used to build a visual picture of the existing research about this topic (Creswell, 1994). The map shows the key interest of this study (attachment) and builds from this topic to define groups of studies. The dashed line in the figure shows how this proposed dissertation topic relates to the literature in the field.

Consequences

The study of consequences focuses on consequences of turnover and includes both the positive and negative effects experienced by organizations (Mueller & Price, 1989; Price, 1989) and leavers (LaFarge, 1994). Other studies examine the effect of turnover on stayers (Brockner & Kim, 1993). The consequences of turnover may be economic, psychological, and/or organizational. Organizations may experience negative effects such as separation costs (lost revenues, overtime

pay, administrative costs), replacement costs (advertisement, recruiting, selection), training costs, lost productivity, lower service/product quality, stayers' demoralization, and increased probability of turnover among stayers (Price, 1989). Organizations may also experience positive effects such as improved productivity due to the loss of poor performers, opportunity to gain knowledge and skills from newcomers, labor cost savings, and opportunities to promote stayers (Hom & Griffeth, 1995).

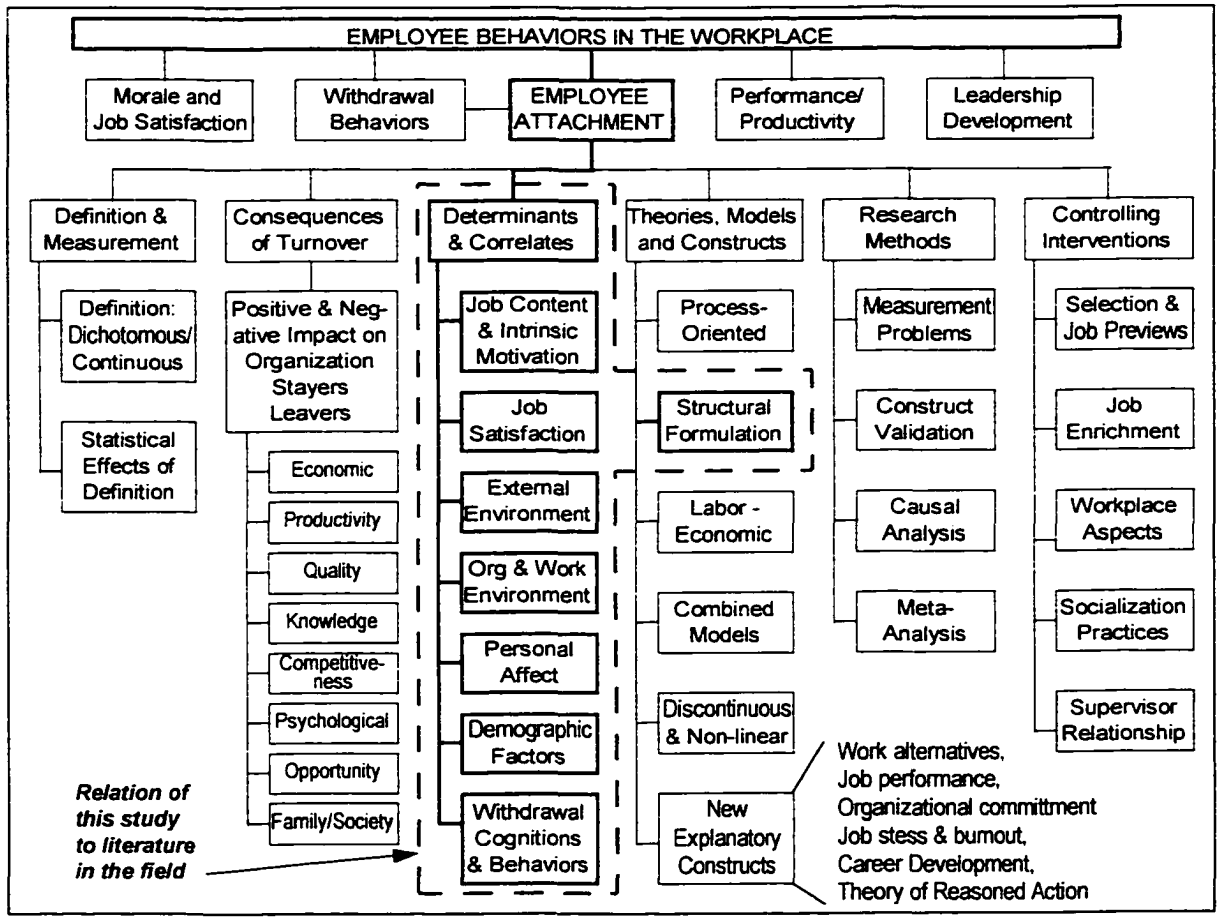


Figure 5. Literature map of employee attachment.

Note. Diagram based in part on chapters 2 and 3 of Employee turnover, by P. W. Hom and R. W. Griffeth, 1995.

Voluntarily exiting employees generally move to a better position in terms of pay, opportunity, rejuvenation, and possibly improved living conditions for the family. On the other hand, they may face negative consequences such as loss of seniority and fringe benefits, transition stress, relocation costs, and disruption of family and community life. Voluntary leavers may also experience ambivalent feelings upon their departure such as a sense of excitement and forward movement mixed with fear about future and sadness as relationships end (LaFarge, 1994). Turnover can cause a decrease in the job satisfaction of stayers especially if they compare themselves strongly with the leaver. Stayers with higher self-esteem and those who are positioned to benefit by the exit may experience positive affects (Brockner & Kim, 1993).

Determinants and Correlates

The bulk of employee attachment research examines determinants and correlates of turnover (Hom & Griffeth, 1995). The determinants are generally classified into four categories: job satisfaction and work environment, job content and intrinsic motivation, external environment, and withdrawal cognitions. Demographic variables such as age, gender, education, and tenure are also generally included in studies. Recently, positive or negative affect have been added to turnover studies (Agho et al., 1993; Kim et al., 1996) as a possible contaminating factor in the measurement of variables such as role stress and social support.

Factors found to affect job satisfaction and work environment include met expectations, compensation, equity, management relations, peer group relations, job stress, company climate, and internal career opportunities. Job content and intrinsic motivation is generally measured through factors such as routinization, job stress, work satisfaction, and professionalism. Factors in the external environment include perceived work alternatives, actual alternatives, and family relationships.

Withdrawal cognitions (e.g., search intentions, organizational commitment, expected utility of alternative) are generally used as intervening factors between the previously mentioned variables and turnover. The Price-Mueller model (Kim et al., 1996) used in the proposed study provides a fairly comprehensive set of determinants of turnover.

Theories, Models and Constructs

Another large portion of research focuses on defining theories, models and constructs. Two types of models dominate the field: process-oriented models focus on the decision-making processes preceding a behavior, while structural formulation models focus on the structure of variables influencing turnover and its intervening factors (Hom & Griffeth, 1995). Some models include both process and structure (Bluedorn, 1982; Kim et al., 1996).

The first formal *structural theory* of turnover was presented by March and Simon (1958) in their theory of organizational equilibrium. In this theory, organizations and individuals monitor the balance between compensation from the company and contributions from the employee. Turnover decisions result from employee's evaluation of the perceived desirability of movement against the perceived ease of movement. This theory includes the concepts of job satisfaction, external opportunity, and internal opportunity. While March and Simon's theory was never directly tested (Hom & Griffeth, 1995), it heavily influenced the work of later researchers (Hulin, Roznowski, & Hachiya, 1985; Lee & Mitchell, 1994a; Mobley, 1977; Steers & Mowday, 1981).

Porter and Steers (1973) published the next major turnover theory using the concept of met expectations as the major determinant of job satisfaction, and subsequently, turnover decision. Their work strongly influenced that of scholars such as Price and Mueller (1981). The Price-Mueller structural theory is based on a detailed analysis of the turnover literature and precise development of the scales used to assess model constructs validity and reliability. The model has

undergone several expansions, the most recent published by Kim et al. (1996). This model evaluates intent to stay via three intervening variables (search behavior, job satisfaction, and organizational commitment) which are predicted in turn by a set of environmental, individual, and structural variables. While the Price-Mueller model lacked parsimony, it introduced several key ideas to the study of turnover, including kinship responsibility, professionalism, and economic opportunity (Hom & Griffeth, 1995).

The *process-oriented* theories generally start with job satisfaction and proceed to withdrawal cognitions, usually intent to search, intent to leave, absenteeism, or reduced productivity. Actual job search then begins along with varying degrees of comparison between alternatives. The models conclude with employee exit. The EVLN theory to be used in this study may help future researchers to expand their view of employee behaviors that result from variations in job satisfaction.

The first process-related theory was that of Mobley (1977), who presented a linear causal model linking negative evaluation of current job to turnover. Mobley was the first to describe the role of withdrawal intentions, a concept expanded upon in subsequent research (Hom et al., 1992; Fuller et al., 1996; George & Jones, 1996; Gaertner & Nollen, 1992; Igbaria & Greenhaus, 1992; Kim et al., 1996).

Hom and Griffeth (1991) proposed an alternative model which described two decision paths leading to either immediate quit behavior or to quit after finding and choosing a better alternative. A recent theory advanced by Lee and Mitchell (1994a, 1996) proposes four distinct decision paths resulting in a decision to quit or stay.

Developing the EVLN Typology

Hirschman's (1970) Exit-Voice-Loyalty theory of participant response to deteriorating conditions is the basis of Rusbult and Farrell's Exit-Voice-Loyalty-Neglect typology of employee response to dissatisfaction. The main goal behind Hirschman's work was to "explore recuperative mechanisms for declining organizations" (Graham & Keeley, 1992, p. 194). Thus, he was most interested in understanding how consumers, citizens, and employees provide feedback to their institutions when they perceive a decline in quality. Hirschman defined voice and exit as primary forms of feedback in these contexts. The feedback mechanism provided by the *voice* response is fairly obvious. Hirschman (1970) defined voice as

> any attempt at all to change, rather than to escape from, an objectionable state of affairs, whether through individual or collective petition to the management directly in charge, through appeal to a higher authority with the intention of forcing a change in management, or through various types of actions and protests. (p. 30)

Clearly, the use of voice can provide management explicit information about the source of employees' dissatisfaction, and gives management the opportunity to respond and negotiate. However, voice "can be overdone: the discontented customers or members could become so harassing that their protests would as some point hinder rather than help whatever efforts at recovery are undertaken" (Hirschman, 1970, p. 31).

When applied to the employee-employer relationship, Hirschman views *exit* as another form of feedback that alerts managers to problems within the organization that need to be addressed. Hirschman describes this process relative to consumer feedback: "there exists a management reaction function which relates quality improvement to the loss in sales—upon finding out about customer desertion, management undertakes to repair its failings" (1970, p. 23). The link between exit and manager action is less predictable in organizations due to the probable lack of

explicit information regarding the causes of dissatisfaction, and lack of an opportunity to discuss optional solutions with the departed employee. Based on this fact, some scholars challenge Hirschman's position that exit is a valid form of feedback in the organizational context (Keeley & Graham, 1991).

As mentioned in the introduction, Hirschman's *loyalty* construct raises a great deal of controversy due to "anomalies in Hirschman's original work" (Minton, 1992, p. 275). In the original work, Hirschman refers to loyalty as both an attitude and a behavior. In its attitudinal form, loyalty moderates the exit-voice decision, in that "loyalty holds exit at bay and activates voice" (Hirschman, 1970, p. 78). Thus, dissatisfied but loyal employees would be more likely to use voice and less likely to exit. As a behavioral alternative to exit and voice, Hirschman describes loyalty as a response type where employees "refuse to exit and suffer in silence, confident that things will soon get better" (p. 38).

Farrell and Rusbult's EVLN Typology

Daniel J. Farrell (1983) first advanced a typology of employee responses to job dissatisfaction based on Hirschman's exit-voice-loyalty concept. Farrell (1983) included the neglect category based on the work of Rusbult, Zembrodt, and Gunn (1982) who added the construct to Hirschman's EVL typology in their study of dissatisfaction in romantic involvements. Neglect was initially defined as "lax and disregardful behavior among workers" (Farrell, 1983, p. 598), and included behaviors such as lateness, absenteeism, and increased error rates. Farrell then joined Rusbult in more focused studies of employee responses to dissatisfaction (Farrell & Rusbult, 1981, 1985; Rusbult & Farrell, 1983), and then developed the following definitions of exit, voice, loyalty, and neglect (Rusbult et al., 1988):

> *Exit* refers to leaving an organization by quitting, transferring, searching for a different job, or thinking about quitting. . . . *Voice* describes actively and constructively trying to

> improve conditions through discussing problems with a supervisor or co-workers, taking action to solve problems, suggesting solutions, seeking help from an outside agency like a union, or whistle-blowing. . . . *Loyalty* means passively but optimistically waiting for conditions to improve--giving public and private support to the organization, waiting and hoping for improvement, or practicing good citizenship. . . . *Neglect* refers to passively allowing conditions to deteriorate through reduced interest or effort, chronic lateness or absences, using company time for personal business, or increased error rate. (p. 601)

Drawing on Hirschman's (1970) focus on active, constructive means for responding to organizational decline, Rusbult and Farrell organized their EVLN typology along two dimensions: constructive-destructive and active-passive. The resulting quadrants were shown earlier in Figure 1. These dimension were drawn from Hirschman's exploration of ways in which dissatisfied participants (employees, consumers, citizens) can provide feedback to the source of dissatisfaction (firms, organizations, governments). It is the feedback that may be classified as active or passive, constructive or destructive.

Action is evaluated based on the "impact of an action on a problem and not to the character of the response itself" (Rusbult et al., 1988, p. 602). Within this typology, exit and voice are considered active responses to dissatisfaction, while neglect and loyalty are considered to be passive responses. The basis for this distinction can be seen in Hirschman's original work where he explained that "dissatisfied consumers (or members of an organization), rather than just go over to the competition [exit], can 'kick up a fuss' [voice] and thereby force improved quality or service upon delinquent management" (1970, p. 30). Both of these activities (exit and voice) are clearly action-based. In the organizational setting, the exit response involves departure of the employee from the company, and the voice response involves "different degrees of activity and leadership in the attempt to achieve change 'from within'" (p. 38).

In contrast, the loyalty response as defined by Hirschman and Farrell is a passive behavior characterized with phrases such as "suffering in silence" or "patiently waiting." In this case, the employee is choosing inaction in the belief that the dissatisfying situation will improve. Similarly,

neglect describes behavior that is "lax and disregardful behavior among workers" (Farrell, 1983, p. 598) or "inattentive behavior, such as lack of caring and staying away" (p. 598) in romantic relationships. While the neglect behavior may involve action, it is not considered an active response because it does not directly address the problem.

The level of constructiveness or destructiveness refers to the effect a response has on the employer-employee relationship. Along the constructive-destructive dimension, exit and neglect are considered to be destructive responses, while voice and loyalty are considered to be constructive responses. Exit is considered destructive because it ends the employer-employee relationship, neglect is destructive in that it allows dissatisfying situations to continue, thus weakening the employer-employee relationship. In contrast, employees who use voice attempt to re-establish a state of satisfaction by deciding that it is worthwhile to stay in an organization based on an expectation that the firm has good chances of getting "'back on the track,' through one's own action or through that of others" (Hirschman, 1970, p. 38). Likewise, loyalty also results in maintenance of the employer-employee relationship.

Expanding the Loyalty Behavior

As described in the introduction, while a loyalty response does maintain the relationship, some argue that in the long run, the passivity of the loyalty response undermines its constructiveness (Graham & Keeley, 1992; Withey & Cooper, 1989). Moreover, research into prototypical acts of loyalty indicates that items involving "patience" or "waiting and hoping for improvement" are among the least likely indicators of loyal behavior, while acts such as "give something extra when the organization needs it" and "do things above and beyond the call without being asked" are raked at the top of the list of prototypically loyal acts (Withey & Cooper, 1992, p. 232). Based on these findings, Withey and Cooper defined the highly prototypical acts as *active*

loyalty and the minimally prototypical acts as *passive loyalty*. Their study used factor analysis to demonstrate that these two forms of loyalty were distinct.

Interestingly, Rusbult et al. (1988) define loyalty as "passively but optimistically waiting for conditions to improve . . . *or practicing good citizenship* [italics added]" (p. 601). Moreover, although they define loyalty as a passive state where employees wait for conditions to improve, they support the construct with literature on behaviors such as organizational citizenship and innovation (Farrell & Rusbult, 1992, p. 203). Recent research in organizational citizenship behavior (OCB) define the construct as "individual contributions that go beyond traditional notions of in-role performance or productivity" (Organ & Lingl, 1995, p. 339). These scholars measure OCB with items such as "Demonstrates concern about the image of the company" and "Helps others who have heavy workloads" (p. 344). Thus, OCB literature seems to support Withey and Cooper's (1992) findings of two distinct aspects of loyalty: active and passive loyalty.

Predicting the Behavioral Responses

Having defined five types of employee responses to changes in job satisfaction, it is now appropriate to explore the conditions that may lead employees to react with these behaviors. That is, why do some employees react constructively to work problems while others react destructively? Why do some employees react in an active manner while others withdraw from the situation? Alternatively, which aspects of job dissatisfaction are most likely to result in certain behaviors?

As described in the derivation of the merged model in the introduction section, Rusbult and Farrell defined three broad predictor factors in their model: overall job satisfaction, quality of job alternatives, and magnitude of investments in a job (Farrell & Rusbult, 1992). They explained that "each of these broadly defined predictors subsumes multiple concrete factors, and each predictor is

associated with hypotheses regarding all four response[s] to dissatisfaction" (p. 204). These three classes of predictors are addressed in reverse order of their complexity. Table 2 summarizes the relationship between employee behaviors and the predictors, and adds the predictions for active loyalty and passive loyalty based on Withey and Cooper (1992).

Table 2

Relationship Between EVLN Behaviors and Predictors

Predictor	Exit	Voice	Passive Loyalty	Active Loyalty	Neglect
Quality of Alternatives	+	+	-	+	-
Investments in Job	-	+	+	+	-
Job Satisfaction	-	+	+	+	-

Quality of Job Alternatives

Rusbult and Farrell (1988) give three examples of the quality of job alternatives factor: "attractive job opportunities, the possibility of early retirement, or the acceptable option of not working" (p. 604). In most of their studies, they use global measures for this concept including items such as "How confident are you that you would find a satisfactory job if you were to quit this job?" (Farrell & Rusbult, 1992, p. 206). This factor appears identical to the Price-Mueller variable of external opportunity, defined as the availability of alternative jobs in the organization's environment (Agho et al., 1993) and measured with similar items such as: "There are plenty of good jobs outside this organization that I could have" (Wallace, 1995a, p. 833).

The quality of job alternatives factor is associated with "greater tendencies toward active reactions to dissatisfaction (exit or voice) and lesser tendencies toward passive responding (loyalty

or neglect)" (Farrell & Rusbult, 1992, p. 204). Employees with high quality alternatives are expected to take action when faced with work problems because the presence of alternatives provides a source of energy for action. Also, high quality alternatives give the employee options in the event that their action has negative consequences. Employees without job alternatives, or with low quality alternatives are expected to be less willing to risk action.

Rusbult and Farrell's expectation that good alternatives increase exit behaviors is supported by scholars such as Hulin et al. (1985) who argue that "the direct linkage from job opportunities to job affect . . . should enhance the voluntary termination rates during times of full employment" (p. 245). Studies in this area have found that of external opportunities have found that outside opportunity was the most important discriminant of executive stayers versus leavers (Gaertner & Nollen, 1992), the second most significant factor in predicting turnover (Price & Mueller, 1981), and a key factor in reduced job satisfaction, commitment, and intent to stay (Mueller et al., 1994). Examining the issue in more detail, Bluedorn (1982) correlated job search and turnover to both existing and foregone environmental opportunity. He found that job search increased with environmental opportunity but decreased for foregone environmental opportunity. Finally, when assessing the impact of perceived and actual external opportunities on the likelihood of quitting turnover, Schellenberg's (1996) found that *perceived* external opportunities were more predictive of turnover than *actual* opportunities.

Also consistent with Rusbult and Farrell's expectations, external opportunities have also been shown to increase voice behaviors such as grievance filing (Olson-Buchanan, 1996) and complaining (Kowalski, 1996). Strength of the job market has also been shown to motivate companies to adopt explicit employee voice mechanisms in order to retain a high proportion of core employees (Lewin & Mitchell, 1992).

Magnitude of Investments in a Job

Farrell and Rusbult's (1992) concept of job investment size includes two aspects: "the resources an employee has put into a job that become intrinsic to that position . . . and the original extraneous resources that have become inadvertently linked to a job" (p. 205). Examples of job investment size are job tenure, effort expenditure, unportable training, familiarity, convenient housing and travel arrangements, friends at work, and unvested retirement funds. In their research, Farrell and Rusbult typically gauge this factor with specific measures of tenure and job-specific training; and general measures such as "Generally speaking, how much have you invested in this job (e.g., time, education and training, personal identity, effort, sacrifices)?" (1988, p. 625).

In the EVLN model, job investment size is expected to increase the tendency to respond to dissatisfaction in constructive ways (voice and loyalty), while decreasing the tendency of destructive responses (exit and neglect). These results are expected because "employees who have great investment in their jobs have much to lose by abandoning them. . . . With low investment, an employee has little to lose if the job were to end" (Rusbult et al., 1988, p. 604). Other researchers concur with this reasoning. For example, Wallace (1995a) found that "employees with more firm specific skills tend to have limited choices outside the current place of employment" (p. 818) and that "the more firm-specific skills lawyers acquire on the job, the more committed they are to the firm since . . . such skills are more highly valued and rewarded by that particular firm" (p. 818).

Previous research further supports this connection, showing that employees are more likely to stay with a company if they have longer tenure (Buchanan, 1974; Kalleberg & Reve, 1993; Schellenberg, 1996), fewer transferable skills (Allen & Meyer, 1990; Mueller & Price, 1990), less higher education (Allen & Meyer, 1990; Bluedorn, 1982; Curry et al., 1986; Igbaria & Greenhaus, 1992; Klenke-Hamel & Mathieu, 1990). Finally, Kalleberg and Reve (1993) found that firm-specific training increased both loyalty and organizational commitment in U.S. manufacturing

employees. In total, these studies support Rusbult and Farrell's assertions regarding the effect of magnitude of job investments on employee behaviors.

Coworker Support

The concept of *coworker support* (also referred to as coworker cohesion or integration) is defined as the "assistance for job-related problems provided by peers at work" (Kim et al., 1996, p. 951). Integration and satisfaction with coworkers increases job satisfaction, and thereby lengthens retention. Wallace (1995a) found this to be a more significant determinant of organizational commitment (and thereby intent to stay) for professionals than for nonprofessionals. Many studies have found that coworker support strongly increases both job satisfaction and organizational commitment (Curry et al., 1986; Mueller et al., 1994; Mueller & Price, 1990; Wallace, 1995b), job satisfaction alone (Agho et al., 1992; Iverson & Roy, 1994; Mathieu, 1991; Price & Mueller, 1981), organizational commitment alone (Alnajjar, 1996; Allen & Meyer, 1990; Buchanan, 1974; Kim et al., 1996; Wallace, 1995a), and productivity (Keller et al., 1996).

Fairness of Pay

Fairness is defined as "the degree to which rewards and punishments are related to performance inputs into the organization" (Mueller et al., 1994, p. 207), and is also referred to as *distributive justice*. Perceptions of fairness have been found to significantly impact organizational commitment (Allen & Meyer, 1990; Wallace, 1995a, 1995b), job satisfaction (Agho et al., 1993), and intent to stay (Curry et al., 1986; Mueller et al., 1994). Fairness has also been found to be of greater importance to professionals than nonprofessionals (Wallace, 1995b).

Job Satisfaction

Job satisfaction is a "positive emotional state that reflects an affective response to the job situation" (Mueller et al., 1994, p. 182). Rusbult et al. (1988) expect that higher job satisfaction

will encourage constructive responses (voice and loyalty) and discourage destructive responses (exit and neglect). Their reasoning for this effect is that employees who are "generally satisfied with their jobs should feel strongly motivated to restore good working conditions and may also feel optimistic about the possibilities for improvement" (1988, p. 603). Previous research supports these expectations in showing that low satisfaction predicts turnover (Bozionelos, 1996; Burke, 1996; Dalessio, Silverman, & Schuck, 1986; Flowers & Hughes, 1973; Gunter & Furnham, 1996; Hulin et al., 1985; Pollard, 1995), absenteeism (Blegen, Mueller, & Price, 1988; Brooke & Price, 1989), and within firm transfers (Cordero, DiTomaso, & Farris, 1994).

While Rusbult and Farrell measured job satisfaction as a general attitude (Rusbult et al., 1988), others criticized this approach arguing that "dissatisfaction with different facets of the job led to the expression of different behaviors. This suggests that although exit, patience, and neglect may be responses to dissatisfaction, they may not be responses to the same type of dissatisfaction" (Leck & Saunders, 1992, p. 227).

For this reason, the present study incorporated independent variables from the Price-Mueller model of voluntary employee turnover (Kim et al., 1996) to expand the measurement of job dissatisfaction. The variables used include autonomy, growth opportunity, job variety, met expectations, promotional chances, role ambiguity, role conflict, supervisor support, and work overload. The following discussion considers each of these independent variables with respect to their impact on job satisfaction.

Autonomy

Autonomy is defined as the "degree to which an employee exercises power relative to his/her job" (Kim et al., 1996, p. 951), and is considered to be the opposite of *centralization*, the degree to which power is concentrated in an organization (Agho et al., 1993). *Involvement in decision making* is another construct seen in turnover research that overlaps with autonomy. This

is especially evident when one compares measurement scales. Several scholars have found that centralization increases intent to leave, turnover, and absenteeism by strongly decreasing job satisfaction and organizational commitment (Brooke, Russell, & Price, 1988; Blegen et al., 1988; Booke & Price, 1989). In his study of lawyers, Wallace (1995a) concluded that when

> lawyers participate in decisions at the organizational level they are more committed to the organization. This should be relevant to organizations employing professionals, since participating in decisions regarding the future direction and goals of the organization will probably ensure that they are consistent with those of the professional members and that professional members are more committed to organizational decisions, thereby reducing the potential friction between the professional and bureaucratic systems. (p. 827)

Autonomy is especially important to engineers. Scholars of high-tech environments describe a "need for independence of engineering and technical 'champions'" (Delbecq & Weiss, 1988, p. 131). These researchers found that engineers were likely to join a competitor or form a start-up if their need for independence was unfulfilled. Moreover, Hodson (1994) found that engineers characterize "their jobs as requiring extremely high degrees of responsibility and autonomy . . . intelligence and creativity. Precision and reliability were seen as secondary" (p. 258). The need for autonomy is also seen in professionals who work in large organizations (Jones, 1996). Autonomy has also been found to increase commitment (Kalleberg & Reve, 1993; Wallace, 1995b), and job satisfaction (Agho et al., 1993; Burke, 1996; Iverson & Roy, 1994; Pollard, 1995; Wallace, 1995a), the precursors to intent to stay in the Price-Mueller (1981) model.

Other studies have examined the impact of participation in decision making in the turnover process. Parker (1993) examined the relationships among workers' perceived level of control over decision making, level of perceived professional self-efficacy, willingness to engage in dissent in the face of injustice, confidence that changes can be effected, and intent to exit. The study found that perceived level of control over decision making was positively correlated to constructive behaviors such as voice and to nurses' confidence that desired changes can be effected. Other

researchers have found that participation correlates positively to affective organizational commitment (Allen & Meyer, 1990; Wallace, 1995a), productivity (Keller et al., 1996), and psychological commitment (Gaertner & Nollen, 1989). Employees are also more likely to remain with organizations when they feel integrated into management team (Gaertner & Nollen, 1992), or involved in decision making (Pearson, 1995). Overall, the literature on autonomy, centralization, and participation in decision making shows that increasing independence improves job satisfaction especially for engineers and other professionals.

Growth Opportunity

In this study, *growth opportunity* is defined as "chances provided by the employer to increase job-related knowledge and skills" (Kim et al., 1996, p. 951). Kim et al. argue that this factor should be important to professionals, "since cognitive knowledge is basic to the definition of a profession . . . the chance to acquire this knowledge . . . would be a possible determinant of intent to stay" (p. 955). In their study of physicians, they found that professional growth was a strong positive predictor of intent to stay. Gaertner and Nollen (1989, p. 979) similarly argue that training and development "represent an investment in future employee performance. . . . [and] may be interpreted by employees as an indication of the company's commitment to its human resources."

Research on other professionals such as engineers (Cordero et al., 1994; Cramer, 1993), research and development scientists (Jones, 1996), and lawyers (Wallace, 1995a, 1995b) further supports the link between opportunities for professional growth and intent to stay. Research on nonprofessional populations also shows that as training positively predicts job satisfaction (Burke, 1996; Gunter & Furnham, 1996), organizational commitment (Kalleberg & Reve, 1993; Meyer et al., 1993), and tenure (Cramer, 1993; Glazier, 1989).

Finally, the formality or informality of development efforts impacts tenure. Wholey (1990) found that formal training increases tenure, but informal training does not impact either mobility or

security. This aspect of professional growth is important to the population evaluated in this study because "on-the-job training appears to provide the major source of skill acquisition for workers in high-tech settings" (Hodson et al., 1994, p. 260).

Job Variety

Job variety (also called routinization, job complexity, substantive complexity, and job challenge) is defined as the degree to which a job is not repetitious (Mueller et al., 1994, p. 207). This factor is important to this study because it is a more significant determinant of organizational commitment (a precursor of intent to stay) for professionals than for nonprofessionals (Wallace, 1995a; Jones, 1996). Several studies support the correlation between variety and job satisfaction (Agho et al. 1993; Burke, 1996; Curry et al., 1986; Gunter & Furnham, 1996), organizational commitment (Allen & Meyer, 1990; Bluedorn, 1982; Curry et al., 1986; Kalleberg & Reve, 1993; Mueller et al., 1994), and retention (Pearson, 1995), and loyalty (Kalleberg & Reve, 1993).

Met Expectations

The *met expectations* factor concerns the extent to which beliefs about the nature of employment correspond to the facts about employment (Kim et al., 1996, p. 951). This factor is based on the work of several researchers (Porter et al., 1974; Mowday et al., 1979) who argue that job satisfaction and intent to stay decline when the job does not meet employees' initial expectations. Recent research has confirmed the role of met expectations in turnover (Iverson & Roy, 1994; Pearson, 1995).

Promotion Chances

Promotional chance is defined as the "degree of potential vertical occupational mobility within an organization" (Kim et al., 1996, p. 951). As a major component of the internal labor market, the promotional chance variable has been an important variable in turnover research since the first systematic theory was proposed by March and Simon (1958). This factor is important

because it ties the "interests of employees to the firm in a continuing way because the potential for long-term rewards in highly valued" (Wallace, 1995a, p. 816). Promotions also help to fulfill needs for advancement and power (Medcof & Hausdorf, 1995).

Various studies link promotional opportunity to increased job satisfaction (Igbaria & Greenhaus, 1992; Wallace, 1995a, 1995b; Kim et al., 1996), increased organizational commitment (Buchanan, 1974; Bluedorn, 1982; Curry et al., 1986; Igbaria & Greenhaus, 1992; Schwarzwald, Shalit, & Koslowsky, 1992; Kalleberg & Reve, 1993; Wallace, 1995a, 1995b; Kim et al., 1996), decreased turnover (Porter et al., 1974; Gaertner & Nollen, 1992; Kalleberg & Reve, 1993; Kim et al., 1996; Schellenberg, 1996), and increased career satisfaction (Bozionelos, 1996). These studies include several types of occupations including engineers. Gaertner and Nollen (1992) also found that speed of promotion influenced organizational commitment, and employees who were promoted faster were more committed. Similarly failure to get promoted correlated with feelings of inequity, decrease in commitment, and increase in absenteeism (Schwarzwald et al., 1992), and exit (Gaertner & Nollen, 1992).

Parallel to the results from studies of external opportunities discussed earlier, *perceptions* of internal opportunities are likely to be more important in determining job satisfaction and turnover intentions than *actual* opportunities (Cordero et al., 1994). These authors studied research and development scientists and distinguished between exit from a department and exit from a company. They found that scientists with opportunities to advance in their technical career were more likely to leave their employer, while those with opportunities to move into management were less likely to leave employer, but more likely to change divisions.

In their study of manufacturing engineers, Gaertner and Nollen (1989) identified promotion, company-provided training/development, and employment security as three factors that all reflect "the organization's basic philosophy regarding the employment relationship. The effects

of . . . [which] are pervasive and slow to change, more permanent than . . . a particular supervisor-subordinate relationship" (p. 978).

Supervisor Support

The *supervisor support* factor measures the strength of supervisor-subordinate relations (Gaertner & Nollen, 1989) and is defined as "assistance for job-related problems provided by the immediate supervisor" (Kim et al., 1996, p. 951). The concept of supervisor relations includes the idea of leader-member exchange (LMX) which Hom and Griffeth (1995) described as follows:

> Superiors develop more effective working relationships (trust, for example) with select subordinates (high LMX). Leaders exchange various incentives, such as latitude on the job and influence on decision making, beyond the formal employment contract with these select employees. In return, high-LMX subordinates reciprocate with higher contributions toward the functioning of the unit. This mutual interpersonal exchange fosters, in turn, the subordinates' morale and loyalty. (p. 113)

This factor is especially important in the job satisfaction of high-tech employees because "there appears to be an intensive, if fairly quiet, crisis of . . . managerial competence and style in the high-tech settings we studied. The causes of the crisis appear to reside in too-rapid technological change . . . and unmediated management power" (Hodson, 1994, p. 270).

A great deal of research has found connections between different flavors of supervisor support and various endogenous variables. For example, Cramer (1993) found that *satisfaction with management supervision* increased job satisfaction in engineers. Kim et al. (1996) found that *supervisor support* predicted job satisfaction. Buchanan (1974) determined that *social interaction with supervisor* predicted organizational commitment, as did *influence of superiors* (Alnajjar, 1996), *supervisor-subordinate relations* (Gaertner & Nollen, 1989), and *management receptiveness* (Allen & Meyer, 1990). *Satisfaction with supervisor* was also found to increase productivity. (Keller et al., 1996). Jones (1996) found that *supervisors' human relation skills and scientific expertise* increased departmental reputation for research and development scientists.

Finally, Iverson and Roy (1994) found that supervisor support increased both job satisfaction and behavioral commitment.

Role Stresses

In past studies, role stress has been measured by three scales: role conflict, workload, and role ambiguity. Mathieu (1991) developed an aggregate measure called *role strain* from a combination of role ambiguity, role conflict, and role overload. Brooke et al. (1988) combined role ambiguity and role conflict. They used confirmatory factor analysis to show that role ambiguity and role conflict "were not assessing distinct constructs" (p. 141) and the combined scale related strongly to both job satisfaction and organizational commitment.

Role ambiguity is defined as "unclear job obligations" (Kim et al., 1996, p. 951) or "degree of incongruity of expectations concerning one's job responsibilities" (Klenke-Hamel & Mathieu, 1990, p. 795); while *role conflict* is defined as "inconsistent job obligations" (Kim et al., 1996, p. 951) or "degree to which clear information concerning job expectations is lacking in one's job" (Klenke-Hamel & Mathieu, 1990, p. 795). *Acceptable workload* (also called workload or role overload) concerns the amount of work expected from the employee (Price & Mueller, 1986).

Igbaria and Greenhaus (1992) showed that role stress can arouse turnover intentions in MIS employees (a class of high-tech workers), and explained their findings as follows: "as a result of insufficient information to perform the job adequately, conflicting or unclear expectations of peers, or ambiguity of performance evaluation methods, MIS employees may feel less satisfied with their job and career, and less committed to their organizations" (p. 37). Schellenberg (1996) also argues that job stress has special significance in the high-tech industry because

> Whereas the pressures of economic uncertainty are being felt in a wide range of sectors, high-tech firms are seen as especially vulnerable to environmental flux. Numerous accounts portray the normal condition of high-tech firms as one of chronic upheaval related to *constant restructure*, shifting job demands, and cycles of growth and decline . . . even people who like change find the upheaval of high-tech work stressful. (p. 191)

As expected, role stressors decrease job satisfaction (Agho et al., 1993; Curry et al., 1986; Gunter & Furnham, 1996; Kim et al., 1996; Mueller et al., 1994) and organizational commitment (Allen & Meyer, 1990; Bluedorn, 1982; Kim et al., 1996).

Comparison of Studies using the Price-Mueller Model

In Table 3, the independent variables examined in major Price-Mueller model studies are shown along with those included in the present study. This table helps to place the present study within the context of previous research. The definitions of most of the terms in Table 3 may be found in Table 1. The definitions of terms not listed in Table 1 follow: kinship responsibility is the degree of an individual's obligations to relatives in the community (Blegen, Mueller, & Price, 1988); work motivation is the degree to which work is a central part of a person's life (Mueller et al., 1994); professionalism the degree of dedication to occupational standards of performance (Agho et al., 1993); positive affect is an individual's dispositional tendency to experience pleasant emotional states (Kim et al., 1996); negative affect is an individual's dispositional tendency to experience unpleasant emotional states (Kim et al., 1996); job hazards are dangerous or unsafe working conditions (Kim et al., 1996); and benefits are nonmonetary compensation (Kim et al., 1996).

Table 3

Comparison of Independent Variables Used in Research of the Price-Mueller Model

Factor	This Study	Kim et al. 1996	Wallace 1995a	Mueller et al. 1994	Iverson & Roy 1994	Agho et al. 1993	Curry et al. 1986	Mueller & Price 1990	Brooke & Price 1989	Price & Mueller 1981
Kinship responsibility	-	X	X	X	X	-	X	X	X	X
External opportunity	X	X	X	X	X	X	X	-	-	X
Transferable skills	X	X	X	X	-	X	X	X	-	X
Work motivation	-	X	X	X	-	X	X	X	X	-
Professionalism	-	-	-	X	-	-	-	X	-	X
Met expectations	X	X	-	-	X	-	-	-	-	-
Positive/negative affect	-	X	-	-	-	X	-	-	-	-
Autonomy	X	X	X	X	X	X	X	X	X	-
Fairness	X	X	X	X	-	X	X	-	X	X
Job hazards	-	X	-	-	X	-	-	-	-	-
Role conflict	X	X	-	-	-	X	-	-	X	-
Role ambiguity	X	X	-	X	X	X	X	-	X	X
Acceptable workload	X	X	-	X	-	X	X	X	X	-
Pay	-	X	X	X	X	X	X	X	X	X
Benefits	-	X	X	-	-	-	-	-	-	-
Growth opportunities	X	X	-	-	-	-	-	-	-	-
Promotional chances	X	X	X	-	X	X	X	X	-	X
Job variety	X	X	-	X	X	X	X	X	X	X
Supervisor support	X	X	-	-	X	X	-	X	-	X
Coworker support	X	X	X	X	X	X	X	X	-	X

New Factors for the High-Tech Industry

The survey study included all of the job satisfaction facets discussed above as well as six others based on research in high-tech settings.

Instability

The first additional factor, instability, was based on Schellenberg's case study of Pendulum corporation (1996) made a compelling argument for the impact of organizational instability on workers' propensities to quit their jobs. Schellenberg argues that increasing instability of high-tech organizations "threatens to impair the operation of internal labor markets and undermine other bureaucratic or corporatist incentives that raise workers' commitment to their employers" (p. 190). Instability is somewhat similar to a more traditional determinant of commitment, *organizational dependability*, defined as "the extent to which the organization was seen as being dependable in carrying out its commitments to employees" (Steers, 1977, p. 50). Organizational dependability has been found to increase organizational commitment (a precursor of intent to stay) among engineers (Steers, 1977) and other populations (Allen & Meyer, 1990).

Because of the especially high level of instability in the electronics industry (Delbecq & Weiss, 1988; Hodson, 1994; Schellenberg, 1996), this new variable was included in the proposed study. While Schellenberg (1996) measured instability in terms of the number of cost centers employees worked for in a given time, this study will measure instability in terms of the number of supervisor changes in the past 2 years.

Additional Job Satisfaction Factors

Five additional factors were added to the survey during the pilot test after input from experts in the high-tech field (J. L. Talley, personal communication, August 15, 1997) and comments of individuals who took the pilot test: adequacy of infrastructure, clarity of vision,

change effectiveness, executive credibility, and interdepartmental cooperation. Additional justification for these five factors is found in several studies from the employee attachment field. The *adequacy of infrastructure* factor is evident in Malik and Wilson's (1995) study of the effect of "formalization" on engineers in the weapons systems industry. For the engineers in this study, "job formalization is desirable because it indicates "the extent to which . . . the appropriate procedures are available to help them deal with task-related problems" (p. 213). Thus, formalization, or the degree to which job tasks are defined in procedures, helps engineers deal more productively with task uncertainty. *Clarity of vision* and *executive leadership* are similar to Gaertner and Nollen's (1989) concept of communication which is measured by items such as "Top management has done an effective job of communicating our current business strategy to employees" (p. 983). The communication factor correlated positively to commitment. *Change effectiveness in implementing change* is influenced by three of Baugh and Roberts's (1994) variables: structural constraints, bureaucratic obstacles, and obstacles to innovation. These factors were found to correlate negatively with organizational commitment. *Interdepartmental cooperation* was evaluated in Keller et al.'s (1996) study of R&D team productivity. This study showed that higher perceptions of participation and cooperation contributed to higher productivity in R&D teams. Hodson (1994) also found that a major dissatisfier among high-tech engineers was a "negative atmosphere generated by office politics" (p. 270).

Demographics

Five demographic variables were included in the study: occupation, tenure, age, ethnicity, and gender. Occupation was used to group responses into engineer and non-engineering professional categories. As described earlier, tenure was used to assess job investment. The remaining demographic variables was used to evaluate the representativeness of the sample with

respect to the population. The literature provides some support for the evaluation of occupation as a determinant of employee behavior. For example, Steers (1977) found that met expectations were important for hospital workers, but not for engineers. Also, fairness of pay is of more importance to professionals than nonprofessionals (Wallace, 1995a). Job variety is a more significant determinant of organizational commitment for professionals than for nonprofessionals (Jones, 1996; Wallace, 1995a). Other scholars have identified factors specific to the job satisfaction and organizational commitment of engineers (Hodson, 1994; Jones, 1996; Medcof & Hausdorf, 1995). On the other hand, Agho et al. (1993) found that occupation did not impact satisfaction. Furthermore, employees at higher organizational levels have been show to exhibit higher job satisfaction (Burke, 1996; Gaertner & Nollen, 1992; Schwarzwald et al., 1992) due to greater satisfaction with broad assignments, challenge, interaction with executives, and advancement.

Summary

This chapter placed the proposed study within the overall context of organizational behavior research and explored five employee behavioral responses to job dissatisfaction. The three broad predictors of each behavior described by Farrell and Rusbult (1992) were then examined and merged with independent variables from the Price-Mueller model and new variables expected to be significant to engineers and other high-tech workers. This synthesis was performed in response to calls for greater specificity in Rusbult and Farrell's concept of job satisfaction (Leck & Saunders, 1992; Withey & Cooper, 1992). Finally, the role that demographic variables will plan in the study was explained. In the next chapter, a detailed process will be described for measuring the variables defined above, collecting data, and analyzing data in order to evaluate research hypotheses and answer research questions.

CHAPTER 3

METHODOLOGY

Are the determinants of employee responses to job dissatisfaction different between engineers and non-engineering professionals? The introduction chapter provided a context for this question, including its background, theoretical basis, and significance. The previous chapter placed this question within a body of literature in the field and described and supported the dependent and independent variables to be used in the study. The current chapter presents a detailed procedure designed to answer this question. This procedure follows seven steps: survey design, population and sample selection, instrumentation, data collection procedures, and response bias.

Statement of the Problem

Employers and employees must develop a new relationship in response to fundamental changes in the workplace. The forces driving this change include the destruction of the once implicit lifetime-employment-for-lifetime-loyalty contract, emergence of a more global economy, and replacement of money-based by knowledge-based industries. In this new environment, "the relationship between the organization and knowledge workers . . . is radically different. . . . [Employees] can work only because there is an organization. . . . But at the same time, they own the 'means of production'—their knowledge. In this respect, they are independent and highly mobile" (Drucker, 1995, p. 87).

As described in the introduction, engineers are a prime example of knowledge workers with an extremely high turnover rate, but have been understudied in employee attachment literature. Moreover, most employee attachment literature focuses on job turnover as the prototypical

employee response to dissatisfaction (Farrell & Rusbult, 1992). The complexity of the employer-employee relationship would be more fully understood if other employee behaviors, such as organizational citizenship, complaining, and withdrawal, were examined. Finally, the significant controversy surrounds some of the models used frequently in employee attachment research.

Thus, this study uses a high-tech population comprised of both engineers and non-engineering professionals to examine issues of importance to knowledge workers, seeking to answer two questions. First, can a model be derived in response to criticisms of existing models? Second, can this model be successfully applied to determine which structural job aspects cause engineers and non-engineering professionals to react to job dissatisfaction with constructive or destructive behaviors, and whether dissatisfiers differ between engineers and non-engineering professionals?

Hypotheses

Null Hypothesis 1: There is no significant relationship between the level of investment in a job and the likelihood of engaging in either constructive behaviors (active loyalty, passive loyalty, and voice) or destructive behaviors (neglect and search).

Null Hypothesis 2: There is no significant relationship between the level of perceived external opportunities and the likelihood of engaging in either active behaviors (active loyalty, voice, and neglect) or passive behaviors (passive loyalty and search).

Null Hypothesis 3: There is no significant relationship between the level of job satisfaction and the likelihood of engaging in either constructive behaviors (active loyalty, passive loyalty, and voice) or destructive behaviors (neglect and search).

Null Hypothesis 4: There is no significant difference in which job satisfaction variables associate with each employee behavior: active loyalty, neglect, passive loyalty, search, and voice.

Null Hypothesis 5: There is no significant difference in the determinants of each behavior (active loyalty, neglect, passive loyalty, search, and voice) for engineers versus non-engineers.

Survey Design

This study of differences between determinants of engineer and non-engineer responses to dissatisfaction was performed using a cross-sectional survey method in which a questionnaire is administered at one time to the entire sample. A quantitative paradigm is appropriate to address the hypotheses and research questions because a large body of literature on employee retention and turnover exists, the set of variables is known, and several theories already exist in the field (Singleton, Straits, & Straits, 1993).

Among quantitative research methods, a survey design is the preferred type for this study because of "the economy of the design, the rapid turnaround in data collection, and the ability to identify attributes of a population from a small group of individuals" (Creswell, 1994, p. 119). Also a survey method is most appropriate for the target population of over 1200 employees because "among all approaches to social research . . . surveys offer the most effective means of social description; they can provide extraordinarily detailed and precise information about large heterogeneous populations" (Singleton et al., 1993, p. 252).

Further support for using a survey method is drawn from research based on the Price-Mueller and Rusbult-Farrell models. Most studies involving the Price-Mueller model used a cross-sectional survey method (Agho et al., 1992; Bluedorn, 1982; Brooke et al., 1988; Brooke & Price, 1989; Iverson & Roy, 1994; Kim et al., 1996; Mueller & Price, 1989; Mueller et al., 1992;

Wallace, 1995a; Wallace, 1995b). Similarly, many studies of the Rusbult-Farrell model used cross-sectional survey research (Farrell & Rusbult, 1985; Meyer et al., 1993; Parker, 1993; Withey & Cooper, 1989, 1992).

Regarding other quantitative methods, a longitudinal study (e.g., multiple applications of a questionnaire over time) is impractical for the proposed study because the focus of this study is to examine the determinants of different employee responses to dissatisfaction for two occupational groups. The longitudinal survey method allows the study of temporal and causal aspects, however, it is important to first establish correlations before investigating causal or temporal effects.

Also, an experimental study is impractical due to the difficulty of manipulating the independent variables and subjects, and because the study involves far more than one independent variable of interest. Experiments generally address only one hypothesis at a time, but survey studies allow the simultaneous examination of numerous research questions (Merriam & Simpson, 1995) such as those defined in this study.

Population and Sample Selection

The population examined in the study was the professional employees of the U.S. subsidiary of a multinational Japanese electronics corporation. The corporation is referred to as ABC to protect its anonymity. Employees in this U.S. subsidiary are involved in designing, manufacturing, marketing, and selling semiconductor products. As of July 1997, the subsidiary employed a total of 1,247 workers situated in California's Silicon Valley, several business centers and sales offices across the United States, and a manufacturing site which declined to participate in this study.

The employees examined in this study include engineers and non-engineering professionals; excluding executives, hourly employees, and Japanese expatriate workers on temporary assignment to the U.S. (1 to 5 years).

Japanese expatriate workers were excluded because their responses were expected to differ significantly from the local workers. Response differences were expected due to different management styles, career ladders, compensation policies, and coworker interactions experienced by local workers and expatriates (Dedoussis, 1994; Dirks, 1994; Pucik, 1994). Moreover, the responses most important to this study were those from the local employees because it is from this group that retention issues arise. Almost all Japanese expatriate employees remain with the same company for their entire career (Pucik, 1994). The breakdown of professional employees is shown in Table 4.

Table 4

Numbers of Professional Employees in Company to be Studied by Group

Group	Japanese Expatriates	Local Employees	Total
Engineers	70	252	322
Non-engineering professionals	18	218	236
Total	88	470	558

The sample size for the study was determined with the following process. First, the population of each group (engineers and non-engineering professionals) of interest was identified by sorting the company's employee database into two groups based on job title and degree required for each job title. Hourly workers, contractors, part-time workers, and executives (managers above the second management level) were excluded from the population of interest.

As described in the definitions of terms section, the "engineers" group contained all employees in engineering positions, including first-line and second-line engineering managers. The "non-engineering professionals" group was comprised of all individuals in positions that require a non-engineering bachelor's degree, again including first-line and second-line managers. The size of the sample was calculated using the following equation (Scheaffer, Mendenhall, & Ott, 1990, p. 69):

$$n = \frac{N\sigma^2}{(N-1)D + \sigma^2}$$

where

n = sample size,
N = population size,
σ^2 = square of the standard deviation in the population,
D = $B^2/4$, and
B = error of estimation.

As shown in Table 4, the total number of local employees in the engineering group is 531; and the total number of employees in the non-engineering professionals group is 346. The standard deviation (σ) in the population was estimated to be one fourth of the range because "the range is often approximately equal to four standard deviations (4σ)" (Scheaffer, Mendenhall, & Ott, 1990, p. 69). Because answers to the Likert scale items that measure job satisfaction may range from 1 to 7, the range is 6 points. Thus the standard deviation was estimated as 1.5 points. The error of estimation was set at 10% of the standard deviation, or 0.1 points.

These calculations indicated that 228 engineers and 186 non-engineering professionals were needed to estimate the means of the population with a bound on the error of estimation B = 0.1 points. Total number of surveys mailed initially was calculated assuming a response rate of 60% and an eliminated survey rate of 5%. The initial questionnaire mailing was sent to 401 engineers and 326 non-engineering professionals.

Instrumentation

The survey instrument was constructed using components of several other instruments. Permission for use of each portion was received from the researchers listed in Table 7. The new scales were developed using pilot testing, consensus scaling, and item analysis techniques described by Cooper and Emory (1995).

The instrument was comprised of a cover letter signed by the human relations executive of the company being examined, the survey questions, closing instructions, and a return postcard. A post office box address was used on the return envelope. This strategy was designed to increase employees' feeling of anonymity and to increase the response rate. An alternative address would have been one inside the company. Using this type of address was expected to decrease the feeling of anonymity and increase chances of lost responses due to processing through two mail systems: external and internal. The postcard included in the mailing contained the name of the respondent and it was used to identify nonrespondents who require a second or third mailing.

Summaries of Survey Instrument Scales

Appendix A contains the survey questionnaire used in this study. Sample items for each variable are shown in Table 6, and a cross-reference between the variables, sources, previous reliabilities, and number of scales is given in Table 7.

Response options for most items are a 7-point Likert scale ranging from "to a great extent" to "not at all." The center of the scale (4) was labeled "to some extent." A neutral position was not included because the "respondents are being asked questions about their own lives, feelings, or experiences, a 'don't know' response is often a statement that they are unwilling to do the work required to give an answer" (Fowler, 1993, p. 76).

Table 5

Sample Items for Independent and Dependent Variables

Variable	Sample Item
Autonomy	I have the appropriate amount of input into what happens on my job
Change effectiveness	Major change efforts at ABC are driven by a clear understanding of customer and/or employee needs
Clarity of vision	ABC's strategic direction is clearly communicated
Coworker support	To what extent are the people in your immediate group friendly?
Executive credibility	ABC's leaders inspire employees to give their best for the company
External opportunity	There are plenty of good jobs outside ABC that I could have
Fairness of pay	To what extent are you fairly rewarded for the amount of effort that you put forth?
Firm-specific skills	The skills and knowledge I have learned on the job at ABC would transfer easily to most other organizations
Growth opportunity	I have the opportunity to expand the scope of my job
Infrastructure	ABC is careful to develop the systems and procedures needed to operate smoothly as an organization
Instability	Organizational changes at ABC occur too frequently
Interdept cooperation	Different departments at ABC coordinate efforts and/or support each other to benefit the company overall
Job variety	How creative does your job require that you be?
Met expectations	My experiences at ABC have been better than I originally expected
Promotional chances	There are plenty of promotion opportunities for me at ABC
Role ambiguity	I have clear planned goals and objectives for my job
Role conflict	I receive conflicting requests and/or priorities from different sources within ABC
Supervisor relations	My manager treats me in a way that motivates me to give my best effort
Work overload	During the past three months, my workload has been entirely too much for me to handle
Active Loyalty	I usually give something extra when the organization needs it
Neglect	I care very little about what happens to ABC as long as I get a paycheck
Passive Loyalty	Most problems at work will go away with time
Search	I have recently spent some time looking for another job
Voice	I sometimes discuss poor working conditions with my manager and/or with other upper managers at ABC

Table 6

Summary of Survey Instrument Sources, Reliabilities, and Scales

Variable Name	Source	Previous Reliability	# Items
Autonomy	Mueller, Boyer, Price, and Iverson (1994)	0.84, 0.804	3
Change effectiveness	new scale	n/a	3
Clarity of vision	new scale	n/a	3
Coworker support	Mueller, Boyer, Price, and Iverson (1994)	0.85	3
Executive credibility	new scale	n/a	3
External opportunity	Price and Mueller (1981)	0.761	3
Fairness of pay	Mueller, Boyer, Price, and Iverson (1994)	0.91	3
Firm-specific skills	Wallace (1995b), Allen and Meyer (1990)	n/a[a]	2
Growth opportunitiy	Gaertner & Nollen (1989)	0.805, 0.81	4
Infrastructure	new scale	n/a	3
Instability	Schellenberg (1996)	n/a[b]	3
Interdept cooperation	new scale	n/a	3
Job variety	Mueller, Boyer, Price, and Iverson (1994)	0.72, 0.689	3
Met expectations	Iverson and Roy (1994)	n/a[b]	3
Promotional chances	Price and Mueller (1981)	0.853	3
Role ambiguity	Rizzo, House, Lirtzman (1970)	0.78, 0.81, 0.51	3
Role conflict	Rizzo, House, Lirtzman (1970)	0.82, 0.82, 0.80	3
Supervisor support	Gaertner & Nollen (1989)	0.872	5
Tenure	n/a	n/a	1
Work overload	Curry, Wakefield, Price & Mueller (1986)	0.489 (test/retest)	3
Search behavior	Rusbult, Farrell, Rogers, and Mainous (1988)	0.98, 0.76, 0.97	4
Voice	Rusbult, Farrell, Rogers, and Mainous (1988)	0.45, 0.57, 0.77	4
Passive Loyalty	Rusbult, Farrell, Rogers, and Mainous (1988)	0.75, 0.56, 0.70	5
Active Loyalty	Withey and Cooper (1992)	0.53 (3 items)	5
Neglect	Rusbult, Farrell, Rogers, and Mainous (1988)	0.79, 0.69, 0.82	4
Demographics	-	-	4
Total number of items			86

[a]Alpha not calculated by either study because each used just one scale. This study will combine the two scales and calculate a reliability measure.
[b]Alpha reliability and range cannot be assessed for a single item (Agho et al., 1993; Kim et al., 1996).

Scale Validity, Reliability, and Pilot Test

Content validity of the scales drawn from the work of other researchers was assessed by a group of knowledgeable experts in the high-tech field (Litwin, 1995) and through a pilot test of the instrument with a small group of employees in the chosen population (Creswell, 1994). Construct validity was also supported by the findings of previous researchers who used the selected scales and evaluated the scales' validity.

A pilot test was performed on the survey instrument to reestablish the validity and reliability of the survey which many have been weakened or distorted due to the modification and combination of separate instruments (Creswell, 1994). This testing also helped to "detect weaknesses in design and instrumentation" (Cooper & Emory, 1995, p. 66). The pilot test was especially important because some of the study population does not use English as a primary language. The pilot group consisted of 34 individuals from different occupations and ethnicities. This group size was based on Sudman's guidelines (1976, p. 87). The pilot test group examined the questionnaire for typographical errors, item numbering, type size, vocabulary level, length, style, flow, appropriateness of items, cultural sensitivity, and language (Litwin, 1995). The survey questions were modified to correct any weaknesses. Also, the level of language used in the proposed scales was checked against that used in a study of EVLN typology by Lee and Jablin (1992), who found that their scales were sufficiently clear to employees from Korean, Japanese, and Western cultures.

Internal consistency reliability was evaluated on multiple-item scales to see how well the items measured the same issue in the respondent sample. Internal consistency was measured by calculating Cronbach's coefficient alpha. These calculations were made using the SPSS version 7.5 statistical analysis software package.

Data Collection Procedures

Survey administration followed the 3-step process outlined by Creswell (1994). An initial mailing of the complete instrument was sent to all employees, followed by a second mailing of the complete instrument to nonrespondents after 2 weeks, followed by a postcard reminder to nonrespondents after 2 additional weeks to complete and send in the questionnaire.

The first mailing was preceded by the mailing of an advance postcard 7 days before the questionnaire. This postcard informed employees that the "mailing they will be getting is an important survey and not 'junk mail' to be tossed out unopened" (Suskie, 1996, p. 80). As previously described, a separate postcard was included in the first and second mailings so that follow-up mailings were only sent to employees who had not responded to the questionnaire. This postcard was included to maintain "the respondent's anonymity, at the same time telling the researcher when someone has completed the questionnaire" (Fowler, 1993, p. 47).

Response Bias

Response bias, defined as "the extent to which those not responding are biased--that is, systematically different from the whole population" (Fowler, 1988, p. 40), were determined using wave analysis to examine whether nonrespondents "responses would have substantially changed the overall results of the survey" (Creswell, 1994, p. 123). The mean response to all questions from the first 35 respondents and last 35 respondents were compared with *t* tests to determine if any significant differences emerged.

Data Analysis

Data analysis began with a comparison of the respondents' demographic characteristics to those of the population to determine if the sample is representative of the population. A factor analysis was performed to verify the distinctness of the variables to confirm and develop the final scales used in the regression and discriminant analysis. Descriptive statistics were then calculated for all final scales.

Data analysis began with a comparison of the respondents' demographic characteristics to those of the population to determine if the sample represented of the population. This comparison used chi-square analysis because it involved the comparison of more than two groups of categorical variables (Suskie, 1996, p. 104). All survey items designed to measure dependent variables were entered in a confirmatory factor analysis to determine if the multiple items expected to measure each dependent variable did indeed load on a common factor. Items designed to measure independent variables were involved in a separate confirmatory factor analysis to determine if any reduction of the number of variables was appropriate for the population. Thus, the factor analyses were used to verify the distinctness of the variables and develop the final scales used in the statistical analysis. Descriptive statistics were calculated for all final scales. An internal consistency reliability analysis was performed by calculating Cronbach's coefficient alpha for the scales of each factor. Normality and multicollinearity were analyzed to verify the assumptions that underlie regression and discriminant analysis.

Ten multiple regression analyses, followed by ten multiple regression analysise using backward elimination, were performed on each behavior for engineers and non-engineers to find the major determinants of each behavior. Finally, a group of heavy users of each behavior were selected and a discriminant analysis was performed on each employee behavior (exit, voice, active

loyalty, passive loyalty, and neglect) using engineers and non-engineering professionals as the compared groups.

Survey returns

Statistics about survey returns and nonreturns were reported. An initial return rate was calculated based on the number of total returns. Surveys were then be reviewed for completeness and incomplete surveys were eliminated. This process followed the guidelines outlined in Bourque & Fielder (1995) and Suskie (1996). A final return rate was then calculated based on the number of acceptable returns.

A chi-square analysis was used to determine if the sample of survey respondents represented the employee population. The comparison variables were demographic characteristics of age, gender, ethnicity, and tenure. All of these demographic variables were converted to categorical data (i.e., where the possible responses to a question fall into discrete categories rather than a continuous numerical scale). Chi-square analysis is an appropriate statistical test in this case because it evaluates goodness-of-fit (how well the data support an assumption about the distribution of the data against an assumed distribution) where more than two categorical variables are to be compared (Aczel, 1996).

Factor Analysis, Correlations, and Residuals

A factor analysis was conducted on the items to determine if any of the independent variables shared underlying factors for the respondent sample. This step was used to reduce the data and increase parsimony in the event that items from multiple variables load on the same factor. Factor analysis was performed using the SPSS, version 7.5 statistical software package.

Multicollinearity and normality were assessed following the factor analysis. The correlation matrix indicated estimated interaction between the factors. It was important to calculate

correlation coefficients because one of the difficulties encountered in regression and discriminant analysis is multicollinearity. This problem arises because of the inclusion of multiple variables in the equation. Cooper and Emory (1995) describe multicollinearity as

> the situation where some or all of the independent variables are highly correlated. When this condition exists, the estimated regression coefficients can fluctuate widely from sample to sample, making it risky to use the coefficients as an indicator of the relative importance of predictor variables. (p. 524)

They recommend that correlations at or above 0.80 may be problematic, and that these correlations be "dealt with in one of two ways: (1) choose one of the variables and delete the other or (2) create a new variable that is a composite of the highly intercorrelated variables and use this new variable in place of its components" (p. 525). This guideline was used in the development and assessment of the final dependent and independent variables.

Descriptive and Reliability Analysis

Descriptive statistics (mean, standard deviation, and range) were calculated for all independent and dependent factors in the study. The descriptive statistics for multi-item scales were based on summing the items and dividing by the number of items. Numerical variables were checked for outliers using box plots. Cronbach's coefficient alpha was calculated as previously described.

Regression Analysis

Multiple regression analysis was used to determine relationships between each behavior and the independent variables. Separate models were created for engineers and non-engineers. A linear regression using all variables was run to determine the explanatory power of the independent variables. A backward elimination method was then used to identify the best-fit model of optimized explanatory power and parsimony. This statistical technique was appropriate because enabled the calculation of "a self-weighting estimating equation by which to predict values for a criterion

variable...from the values for several predictor variables. . . controlling for confounding variables to better evaluate the contribution of other variables" (Cooper & Emory, 1995, p. 522). Much of the research using the Price-Mueller and EVLN models use multiple regression analysis, especially in cases where the sample size was small or where the correlation of variables was of more interest than building a structural model (Bluedorn, 1982; Brooke & Price, 1989; Kim et al., 1996; Mueller et al., 1994; Mueller & Price, 1989; Mueller & Price, 1990; Price & Mueller, 1981; Rusbult et al., 1988; Wallace, 1995; Withey & Cooper, 1992). The generalized equation for multiple regression analysis is as follows:

$$\underline{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon$$

where

β_0 = a constant, the value of Y when all X values are zero.
β_i = the slope of the regression surface or the response surface. The b represents the regression coefficient associated with each X_i.
$\underline{\varepsilon}$ = an error term, normally distributed about a mean of 0. For purposes of computation, the ε is assumed to be 0.

Multiple regression analysis is based on several assumptions and is prone to several difficulties. These were dealt with in the study as indicated below. First, regression analysis assumes linear relationships between independent and dependent variables. This assumption was evaluated graphically using scatter plots. Second, regression analysis assumes that residuals are normally distributed with a mean of zero. The residual analysis was performed as part of he SPSS, version 7.5 regression analysis. Third, while dummy variables may be used (nominal variables coded 0, 1), all other variables must be interval or ratio. All of the variables used in this study meet this criterion. A further difficulty encountered in multiple regression analysis is multicollinearity which was evaluated as described earlier.

Discriminant Analysis

Finally, two-group linear stepwise discriminant analysis were used examine the differences between predictors of engineers and non-engineers responses to job dissatisfaction. A separate analysis was performed for each of the five expected response types: exit, voice, passive loyalty, active loyalty, and neglect. This analysis was performed with the SPSS release 7.5 statistical analysis software package.

Discriminant analysis is closely related to multiple linear regression analysis. The main difference between the two analyses is that linear regression involves a continuous-scale dependent variable, while discriminant analysis involves a qualitative dependent variable, often a classification (Aczel, 1996). Like linear regression, this statistical technique is appropriate because the intent of this research matches the three most common uses of the statistical method (Cooper & Emory, 1995), which are to:

> develop a self-weighting estimating equation by which to predict values for a criterion variable . . . from the values for several predictor variables. . . . controlling for confounding variables to better evaluate the contribution of other variables. . . . [and] to test and explain causal theories. (p. 522)

Discriminant analysis result in an equation that will "help us predict the value of a dependent variable based on values of a set of independent variables" (Aczel, 1996, p. 755). The goal of discriminant analysis is to derive a "linear combination of the independent variables that *discriminates best* between the two or more a priori defined groups" (p. 756). The generalized prediction equation for discriminant analysis is as follows:

$$\underline{D} = b_0 + b_1X_1 + b_2X_2 + \ldots + b_nX_n$$

where

$\underline{D}$ = the discriminant score
$\underline{b_0}$ = a constant, the value of Y when all X values are zero.
$\underline{b_i}$ = slope of the regression surface or the response surface. Represents discriminant weights (similar to estimated regression coefficients) associated with each X_i.

Discriminant analysis is based on several assumptions. One assumption is that "the populations under study have multivariate normal distributions with equal variance-covariance matrices and possibly different means" (Aczel, 1996, p. 758). Discriminant analysis assumes that residuals are normally distributed with a mean of zero. The residual analysis described earlier will evaluate this.

The results of discriminant analysis was the discriminant function showing the direction (positive or negative) and relative size (discriminant weights) for each discriminating variable. A classification results table was also be calculated to find the "hit ratio." This value indicates the "overall percentage of cases that were correctly classified by the discriminant function . . . similar to the R^2 statistic in multiple regression" (Aczel, 1996, p. 765). This percentage was evaluated against a proportional chance criterion value which gives the expected hit ration under arbitrary classification based on the "proportion of observations in one of the two groups" (p. 765).

$$\underline{C} = p^2 + (1-p)^2$$

where

$\underline{C}$ = the proportional chance criterion value
p = the proportion of observations in one of the two groups (decimal quantity)

Methodology Summary

This chapter presented the methodology used to study of differences between determinants of engineer and non-engineer responses to dissatisfaction. Across-sectional survey method (i.e., questionnaires were administered at one time to the entire sample) was used, which drew scales from the work of other researchers. The scale content validity was assessed by a group of

knowledgeable experts in the high-tech field. The data was collected with an anonymous, self-administered questionnaire, which was first pilot tested on a small group of company employees.

Sample representativeness was evaluated through comparison of the population's and respondents' demographic characteristics. Factor analysis was performed to verify the distinctness of the variables and develop the final scales used in the statistical analysis. Descriptive statistics were calculated for all final scales. An internal consistency reliability analysis was performed. Normality and multicollinearity were analyzed to verify the assumptions that underlie regression and discriminant analysis.

Ten multiple regression analyses, followed by ten multiple regression analysis using backward elimination, were performed on each behavior for engineers and non-engineers to find the major determinants of each behavior. Finally, a group of heavy users of each behavior were selected and a discriminant analysis was performed on each employee behavior (exit, voice, active loyalty, passive loyalty, and neglect) using engineers and non-engineering professionals as the compared groups.

The results obtained using this methodology are detailed in the following chapter which is organized in two major sections: results confirming the methodology, and results for testing the hypotheses.

CHAPTER 4

RESULTS AND ANALYSIS

The results of this study are presented in two sections. First, results of the research methodology are presented: survey response rate, response bias, sample representativeness, data screening, factor analysis, descriptive statistics, reliability analysis, scale normality, and multicollinearity analysis. The second section contains the results of the *t* tests and regression analysis, which were used to evaluate each hypothesis.

Methodological Analysis

The analyses reported in this section pertain to the methodology used to conduct this study: survey response rate, response bias, sample representativeness, data screening, factor analysis, descriptive statistics, reliability analysis, scale normality, and multicollinearity analysis. These analyses support the results that are then used to evaluate each hypothesis.

Survey Responses

The results reported in this section show that the response rate achieved in the study is acceptable, that there is no significant response bias, and that the respondents demographically represent the population from which they were drawn.

Response Rate

Table 7 contains the survey response rate data. The first mailing contained 413 surveys, 15 of which were addressed to employees who had left the company but had not been removed from the employee database. Thus, a total of 398 surveys were sent to active employee addresses. The initial response rate was 69.6%, based on return of 277 surveys. Of the returns, 3 were

unusable due to excessive number (more than 35%) of unanswered questions, and 8 were unusable because the respondent did not indicate his or her profession. Of usable responses, only three surveys contained more than 12% but not more than 25% unanswered questions. The final response rate was 66.8%, based on 266 usable survey responses.

Table 7

Calculation of Response Rate

Response Group	Number of Surveys	Percentage
Total surveys mailed	413	
Employees left company	15	
Sub total	398	
Total returned	277	69.6% of 398
Unusable returned surveys	11	
Total usable surveys	266	66.8% of 398

Demographic characteristics and professional groups in this sample are reported in Table 8. The engineering respondents were overwhelmingly male (89.3% of respondents), Caucasian (52.3%) and Asian (45%) employees between 34 and 44 years (50.4% of respondents). The results of a z-test (test characteristic and significance) on the demographic characteristics of these two groups are also reported in Table 8.

Non-engineering respondents were primarily male (69.9%) Caucasians (73.8%) between 34 and 44 years (45.8%). Respondents included 118 engineers and 148 non-engineers, resulting in response rates of 57.6% for engineers (based on 205 expected engineers) and 76.7% for non-engineers (based on 193 expected non-engineers). These rates are calculated based on the *self-identified* profession divided by the total survey recipients *expected* to be in each profession. Recipients were pre-categorized based on job title. However, some recipients may have identified

themselves in a profession other than the one they were expected to be in. In particular, most field applications engineers (14% of expected engineers) have BS degrees in electrical engineering, but report to sales management. Many of these individuals identified themselves as sales professionals, instead of engineers as expected. This situation may have skewed the professional group response rates.

Table 8

Demographic Characteristics and Professional Composition of Respondents

Group	Category	Engineers	Non-Engineers	z	p
Number cases		118	148	n/a	n/a
Response rate		57.6 % (of 205)	76.7 % (of 193)	n/a	n/a
Gender	Male	89.3 %	69.9 %	11.395	0.000
	Female	10.7 %	30.1 %	-11.395	0.000
Average age	< 24 years	1.8 %	0 %	4.880	0.000
	25 – 34 years	31.9 %	20.8 %	6.127	0.000
	34 – 44 years	50.4 %	45.8 %	2.222	0.026
	45 – 54 years	14.2 %	25.7 %	-6.861	0.000
	> 55 years	1.8 %	7.6 %	-6.404	0.000
Ethnicity	Caucasian	52.3 %	73.8 %	-10.825	0.000
	Asian	45.0 %	19.9 %	13.090	0.000
	Other	2.8 %	6.4 %	-4.062	0.000
Tenure	< 1.9 years	43.0 %	34.5 %	4.219	0.000
	2.0 – 6.9 years	38.3 %	25.9 %	6.446	0.000
	7.0 – 14.9 years	17.8 %	33.8 %	-8.726	0.000
	> 15 years	0.9 %	5.8 %	-6.324	0.000
Professional group		78 % engineers 22 % engineering managers	20 % administrative 9 % managers 34% marketing 37% sales		

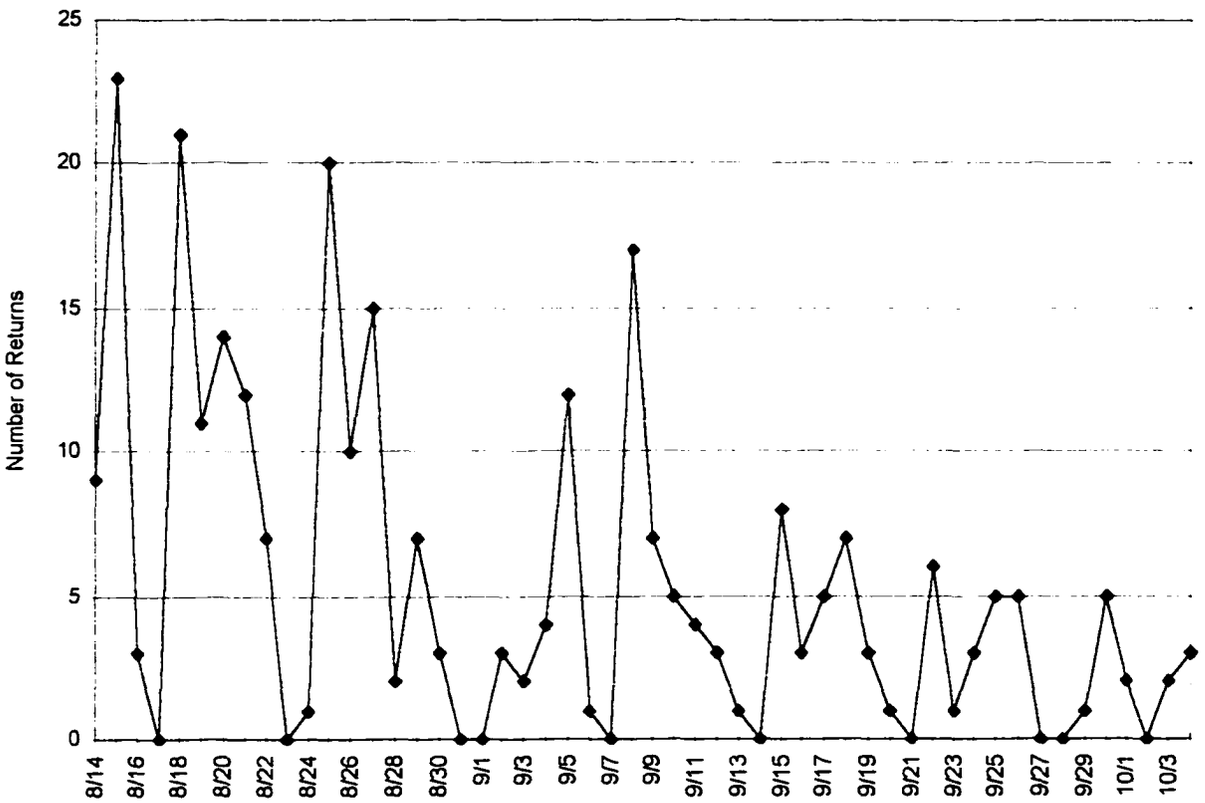


Figure 6. Number of survey responses received each day.

Response Bias

Response bias was evaluated using wave analysis (Creswell, 1994). The comparison quantity, 35, was selected because it exceeds the minimum of 30 data points recommended for statistical analysis (Sudman, 1976, p. 87) and because it represents the total of responses arriving on an integer number of days. As shown in Figure 6, the first 35 responses were received between August 14 and 16, while the last 35 arrived between September 19 and October 4.

A two independent-samples *t* test was used to evaluate response bias on all survey questions. The results are reported in Table 9. Based on acceptable Levene tests for equality of variances, results for equal variances were reported (Norusis, 1997, p. 238).

A respondent/nonrespondent response bias test was considered for this study to examine whether nonrespondent "responses would have substantially changed the overall results of the survey" (Creswell, 1994, p. 123). This technique was discarded after the pilot test due to the sensitivity of employees to the survey questions. Pilot test subjects were extremely reluctant to provide demographic information on the anonymous surveys due to concern that this information could connect them with their survey responses. When asked to comment on the proposed response bias test, they indicated that they would be unlikely to respond honestly to the questions asked, especially those about intent to search or neglect. As a result of the pilot test, the alternate response bias test reported here was selected on the belief that it would result in a more accurate and complete evaluation.

Table 9

Response Bias Test on Early and Late Responders

	Early Responders (n = 35)		Late Responders (n = 35)		t test	
Item Code	M	SD	M	SD	t	p (2-tailed)
AIASSIST	4.37	1.35	3.8	1.35	1.77	0.08
AICARFUL	3.71	1.25	3.29	1.49	1.31	0.2
AIHAVE	4.69	1.47	4.23	1.42	1.32	0.19
AUFREEDM	5.29	1.02	4.71	1.13	2.23	0.03
AUINPUT	4.37	1.44	4.23	1.55	0.4	0.69
AUPART	4.4	1.19	4.77	1.44	-1.18	0.24
CSFRNDLY	5.29	1.36	5.49	1.31	-0.62	0.53
CSLOOK	4.76	1.16	4.6	1.29	0.56	0.58
CSWELONG	4.34	1.41	4.14	1.46	0.58	0.56
CVDEFINE	3.94	1.51	4.24	1.37	-0.84	0.4
CVLEAD	3.6	1.35	3.34	1.53	0.74	0.46
CVSTRATG	3.89	1.49	3.83	1.42	0.16	0.87
ECBALNCE	4	1.33	3.74	1.4	0.79	0.43
ECFAIL	3.57	1.36	4	1.46	-1.27	0.21
ECGUIDE	4.03	1.25	3.74	1.42	0.89	0.37
ECINPIRE	4.06	1.28	3.6	1.75	1.25	0.22
ECNEEDS	3.66	1.33	3.49	1.42	0.52	0.6
ECWORK	3.69	1.16	3.26	1.48	1.35	0.18
EXJOBOUT	2.03	1.15	1.97	1.27	0.2	0.84
EXPLENTY	2.46	1.22	2.43	1.22	0.1	0.92
EXQUICK	2.66	1.26	2.57	1.54	0.25	0.8
FAEDUC	4.4	1.14	3.91	1.54	1.5	0.14
FAEFFORT	4.11	1.43	3.74	1.42	1.09	0.28
FARESP	4.34	1.19	4	1.63	1.01	0.32
GREXPAND	4.71	1.31	4.34	1.51	1.06	0.29
GRFUTURE	4.53	1.54	4.77	1.54	-0.65	0.52
GRIMPROV	5.23	1.17	4.8	1.62	1.27	0.21
GRTRAIN	4.37	1.29	3.97	1.42	1.23	0.22
ICCOMMIT	4.83	1.22	4.49	1.42	1.08	0.28
ICEFORTS	3.63	1.35	3.4	1.22	0.74	0.46
ICPUSH	4.54	1.27	4.74	1.44	-0.62	0.54
INCHANGS	3.97	1.72	4.23	1.54	-0.66	0.51
INNUMGRS	6.2	1.32	6.09	1.36	0.36	0.72
INREORG	3.69	1.28	3.54	1.29	0.47	0.64
JVCREATE	5	1.41	5.11	1.41	-0.34	0.74
JVNEW	5.49	1.01	4.97	1.6	1.61	0.11
JVOVER	4	1.19	4	1.26	0	1
LACONFID	6.2	0.83	6.49	0.95	-1.34	0.19
LADUTY	5.32	1.27	5.97	1.07	-2.29	0.03
LAEXTRA	5.74	1.17	6.03	1.1	-1.05	0.3
LALATE	5.74	1.46	5.94	1.14	-0.64	0.52

(table continues)

Table 9 (continued)

Response Bias Test on Early and Late Responders

	Early Responders (n = 35)		Late Responders (n = 35)		t test	
Item Code	M	SD	M	SD	t	p (2-tailed)
LAPUBLIC	5.17	1.1	5.51	1.5	-1.09	0.28
LPCLOTH	5.63	1.33	4.86	1.77	2.06	0.04
LPCRITIC	3.74	1.77	3.17	1.65	1.4	0.17
LPDOING	3.89	1.23	3.79	1.32	0.3	0.77
LPGOOD	5.29	1.02	5.11	1.39	0.59	0.56
LPTIME	3.18	1.4	2.31	1.35	2.61	0.01
MEBETTER	4.46	1.29	3.97	1.68	1.35	0.18
MELIVED	4.26	1.2	3.97	1.58	0.85	0.4
METHOT	4.83	1.4	4.6	1.42	0.68	0.5
NEBREAK	5.77	1.26	5.89	1.11	-0.4	0.69
NECARE	5.89	1.16	6.09	1.31	-0.68	0.5
NEPAYME	6.23	1.17	6.54	0.78	-1.33	0.19
NESICK	6.49	0.98	6.8	0.47	-1.71	0.09
PRADVNCE	3.77	1.57	3.49	1.72	0.72	0.47
PRCHANCE	3.89	1.47	3.57	1.6	0.86	0.39
PRPLENTY	3.37	1.37	3.46	1.62	-0.24	0.81
PRPROFSN	4.09	1.54	3.97	1.89	0.28	0.78
RAGOALS	4.83	1.36	4.74	1.34	0.27	0.79
RAKNOW	4.86	1.44	4.14	1.44	2.08	0.04
RAUNCRTN	4.74	1.62	4.97	1.58	-0.6	0.55
RCCNFLCT	4.51	1.77	3.57	1.56	2.36	0.02
RCJUDGMT	5.2	1.3	4.66	1.68	1.51	0.14
RCSTYLES	3.83	1.54	3.11	1.62	1.89	0.06
SEFRUSTR	2.8	1.8	3.23	1.8	-1	0.32
SERECENT	2.69	1.86	2.71	1.86	-0.06	0.95
SETHINK	2.57	1.72	3.29	1.76	-1.72	0.09
SEYEAR	3.37	2.33	4.2	2	-1.6	0.11
SKFORMAL	2.46	1.27	1.91	0.89	2.08	0.04
SKTRANSF	2.83	1.15	2.71	1.18	0.41	0.68
SUCOMFY	5.17	1.36	4.46	1.85	1.84	0.07
SUIMPROV	4.46	1.29	3.6	1.5	2.56	0.01
SUTECH	4.86	1.75	4.54	1.54	0.8	0.43
SUTREAT	5.14	1.14	3.91	1.84	3.36	0
SUXPLAIN	4.77	1.4	4.03	1.4	2.22	0.03
VODISCUS	3.49	1.95	3.34	1.49	0.34	0.73
VOIDEA	4.94	1.41	5.06	1.45	-0.33	0.74
VOJOIN	5.14	1.57	5.29	1.2	-0.43	0.67
VOSPEAK	4.57	1.65	4.49	1.42	0.23	0.82
WK2MUCH	4.26	1.69	3.74	1.7	1.27	0.21
WKBALNCE	4.26	1.74	4	1.88	0.59	0.55
WKSTRESS	4.77	1.72	4.2	1.73	1.39	0.17

Ten of the 82 questions showed significant differences in mean scores for early and late responders ($t > |2.034|$, $\alpha = 0.05$). These questions, the variable they measure, t statistic, and means are reported in Table 10. Questions 8 and 28 were reverse coded, indicated by the "(R)" in the Question column. Comparison of the variables measured by these ten questions shows that three of the items (26, 38, and 48) measured supervisory relations, two items (8 and 24) measured role stress, and two measured passive loyalty (74 and 78). The late responders indicated significantly lower satisfaction with supervisory relations, higher role stress, and lower autonomy. The late responders also indicated lower tendency toward passive loyalty and a higher tendency toward active loyalty. The mean difference on the transferable skills question (reverse coded) indicates that late responders felt their education was *more* transferable than did early responders.

As shown in Tables 11 and 12, early and late responders differ significantly in two of the four demographic variables: tenure ($t = -2.44$, $p = 0.02$) and ethnicity ($\chi^2 = 23.07$, $p = 0.000$). At the time of the survey, the early responders had been employed for an average of 2.6 years, while the late responders had been employed at the company for an average of 5.2 years. Table 13 contains the breakdown of ethnicity, age, and gender of early and late responders. This comparison shows that late responders were more likely to be Caucasian and more likely to withhold demographic information.

This brief analysis indicates that late responders were slightly less satisfied than early responders, especially regarding supervisory relationships. They may have been busier (based on higher role stress and higher active loyalty scores) than the early responders. However, the late responders did not differ significantly from early responders on 89% of the survey questions. Thus, this test indicates that there is some evidence of a response bias in the data, and results concerning supervisor support should be taken with caution.

Table 10

Response Bias: Differences Between Early and Late Responders

Question	Variable	*t*	Early Mean	Late Mean
8) I receive conflicting requests or priorities from different sources within ABC (R)	Role Conflict	2.36	4.51	3.57
24) I know exactly what is expected of me	Role Ambiguity	2.08	4.86	4.14
26) My manager treats me in a way that motivates me to give my best effort.	Supervisory Relations	3.36	5.14	3.91
28) My formal education would be useful at many companies besides ABC (R)	Transferable Skills	2.08	2.46	1.91
38) My manager clearly explains what is expected of me.	Supervisory Relations	2.22	4.77	4.03
42) I have a great deal of freedom over how I do my job	Autonomy	2.23	5.29	4.71
48) My manager shows me how to improve my performance.	Supervisory Relations	2.56	4.46	3.60
74) I would enjoy wearing clothing (tee shirt, etc.) that bears ABC's name or symbol	Passive Loyalty	2.06	5.63	4.86
78) Most problems at work will go away with time	Passive Loyalty	2.61	3.18	2.31
79) I do things above and beyond the call of duty without being asked	Active Loyalty	-2.29	5.32	5.97

Table 11

t test of Tenure for Early and Late Responders

	Early Responders		Late Responders		*t* test	
	M	*SD*	*M*	*SD*	*t*	*p*
Tenure	2.65	3.55	5.18	4.74	-2.44	0.020

Table 12

Chi-Square Test Results for Demographics of Early and Late Responders

Demographic	k-1	χ^2 (α=0.05)	χ^2 (Actual)	df	P
Ethnicity	2	7.38	23.07	2	0.000
Age	3	9.35	4.58	3	0.206
Gender	1	5.02	0.08	1	0.781

Table 13

Demographic Breakdown of Early and Late Responders

Demographic	Categories	Early Responders	Late Responders
Ethnicity	Caucasian	12	20
	Asian	22	8
	Other	0	2
Age	25-34	14	9
	35-44	12	16
	45-54	4	4
	Other	2	2
Gender	Female	1	7
	Male	25	24

Representativeness of Respondents

A series of chi-square tests were used to determine if survey respondents represented the population from which they were drawn. The tests showed that, in each of the four demographic categories, the respondents were not significantly different from the population. Thus, the results of this study may be generalized to the population from which the sample was drawn.

Table 14 contains the test statistics including chi-square value for $\alpha = 0.05$, actual chi-square value, degrees of freedom, and significance. In all cases, the calculated $\chi 2$ value falls below the test statistic and the *p*value is greater than 0.05. Thus, these results failed to reject the null hypothesis that sample and population demographics were equivalent.

Table 15 contains further information on the population and respondents. In this table, the categories used for the chi-square analysis of each demographic variable are shown along with the counts in each category for the population, the expected distribution in the respondents, and the actual counts among respondents. In all cases, the population counts total to 468, however the total counts of each variable for respondents may be less than the total of 266 returns because some respondents skipped some demographic questions. Thus, the expected distribution was calculated based on the percentage distribution in the population and the total number of responses to each demographic question (Aczel, 1996, p. 671).

Table 14

Chi-Square Test Results for Responses Versus Population

Demographic	k-1	χ^2 (α=0.05)	χ^2 (Actual)	df	p
Ethnicity	2	7.38	5.52	2	0.063
Age	3	9.35	2.34	3	0.504
Gender	1	5.02	1.37	1	0.242
Tenure	3	9.35	5.21	3	0.157

Table 15

Demographic Breakdown of Population, Expected and Actual Responses

Demographic	Categories	Population	Expected	Actual
Ethnicity	Caucasian	269	144	161
	Asian	179	95	77
	Other	20	10	11
Age	25-34	136	74	66
	35-44	214	118	123
	45-54	85	47	53
	Other	33	18	15
Gender	Female	84	46	53
	Male	384	211	203
Tenure	<1.9 yrs	209	111	95
	2yr-6.9yr	127	68	78
	7yr-14.9yr	109	58	66
	>15 yrs	23	12	10

Data Screening

Prior to factor analysis, the data were screened to test for normality, outliers, and skewed distributions. Transformations were attempted where problems were found. The number of occurrences of each unique value for each question was first examined to verify that the data contain no unexpected values (SPSS® Base 7.5 Applications Guide, 1997, p. 4). Unanswered questions were coded "0" in the database. Histograms and box plots were created for each survey question, excluding missing data, to provide a visual tool for evaluating normality. All outliers were checked against the database and original survey forms. No data entry errors were uncovered, but three surveys were found where the respondents identified themselves as working in a functional job that is not considered a professional occupation: secretary (two surveys) and

maintenance manager (one survey). One of these surveys had been entered into the database twice. These surveys were removed from the data set and box plots were recalculated without them.

Evaluation of box plots for all survey items except demographics showed that the data for 75% of the survey items exhibited a fairly normal distribution. Six items were fairly skewed (CVLEAD, XINSTR_R, MGRCOOP, JVNEW, LAPUBLIC, and SETHINK), seven items were very skewed (CSFRNDLY, CSLOOK, EXPLENTY, CGFUTURE, XINMGRS, LADUTY, and LALATE), and seven items were extremely skewed (EXJOB_R, LACONFID, LAEXTRA, NECARE, NEPAYME, NESICK, and NEBREAK). All skewed items were treated with various transformations (square root, inverse square root, square, natural log, and log), but none improved the normality of the distribution. The items were left unchanged in further analysis.

Confirmatory Factor Analysis on Dependent Variable Scales

Confirmatory factor analysis was performed on the twenty-two dependent variable survey items to evaluate if the five behaviors were empirically separable. The factor analysis shown in Table 16 indicates that the items yield a fairly clean four-factor structure, with most of the twenty-two items loading on the appropriate factor. The analysis used the principal component analysis extraction method and varimax rotation. The rotation converged in eight iterations.

This factor analysis indicates that the four behaviors from Farrell and Rusbult's (1992) EVLN model are empirically distinct, while the Active Loyalty behavior postulated by Withey and Cooper (1992) loads on the same factor as Neglect. These results may indicate that neglect and active loyalty are opposite expressions of the same underlying construct. Although active loyalty and neglect loaded on the same factor, they loaded at opposite extremes meaning, "the variables are related to that factor in opposite directions" (Kim & Mueller, 1978, p. 77). It is possible that these

behaviors correlate to different aspects of job dissatisfaction, just as job satisfaction and dissatisfaction are caused by different underlying factors (Herzberg, 1966). Pearson's correlation between these two variables was -0.390 ($p < 0.001$), below the criteria for multicollinearity (Cooper & Emory, 1995). Thus, these two variables were examined separately in this study.

Table 16

Factor Analysis for Dependent Survey Questions

	Factor[a]				
	1	2	3	4	5
LACONFID		**.555**			-.204
LADUTY	.220	**.562**	.220	.318	
LAEXTRA		**.603**	.257	.206	
LALATE		**.539**	.286		-.151
LAPUBLIC		.270	**.683**	.198	
LPCLOTH			**.659**		
LPCRITIC	-.273		**.291**		.179
LPDOING	-.243		**.503**	-.276	.335
LPGOOD		.186	**.748**	.156	
LPTIME		-.205			.872
NEBREAK	.293	**-.420**		-.307	.150
NECARE	.531	**-.514**		-.215	
NEPAYME	.336	**-.639**	-.251		
NESICK	.216	**-.684**	.266		-.240
SEFRUSTR	**.698**	-.238			
SERECENT	**.743**				
SETHINK	**.842**		-.241		
SEYEAR	**.811**	.235			
VODISCUS	.165			**.650**	-.290
VOIDEA		.234	.263	**.594**	
VOJOIN		.309	.372	**.500**	
VOSPEAK				**.712**	

[a]Factor loadings given for factors with absolute value greater than 0.150.

The questions corresponding to the final dependent variable scales derived from the factor analysis are listed in Table 17. This factor analysis indicates that most of the questions designed to measure the dependent variables do contribute to the appropriate factor. A few items did not work as expected. For example, the question coded LPCRITIC (I think that employees shouldn't criticize their company) did not load significantly on any of the five factors.

Four of the items expected to measure *active loyalty* (LaConfid, LaDuty, LaExtra, and LaLate) loaded on Factor 2 at 0.555, 0.562, 0.603, and 0.539. LaPublic loaded most strongly on Factor 3 (Passive Loyalty). Loadings on other factors fell below 0.318. The Cronbachs alpha resulting from this scale was 0.652.

Four of the items expected to measure *passive loyalty* (LpCloth, LpCritic, LpDoing, and LpGood) loaded strongly on Factor 3 at 0.659, 0.291, 0.503, and 0.748. Loadings on all other factors fell below 0.335. While the loading for LpCritic was weak (0.291), it represented the strongest loading on any factor for this item. LaPublic also loaded strongly on Factor 3 at 0.683. LpTime loaded most strongly on Factor 5 (unused). Cronbach's alpha for the resulting scale using the passive loyalty items alone was 0.458. The addition of LaPublic raised it to 0.557, and the removal of LpCloth, LpCritic, LpDoing, and LpTime increased it to 0.737. Thus the final passive loyalty scale was comprised of LaPublic and LpGood. These two items were kept together because they measured the same concept, saying good things about the company, and because the passive loyalty scale as designed was too weak to use reliably in the analysis. The weakness of this scale has been reported in other EVLN studies (Withey & Cooper, 1992).

All items expected to measure *neglect* (NeBreak, NeCare, NePayme, and NeSick) loaded strongly on Factor 2 at -0.420, -0.514, -0.639, and –0.684. Loadings on all other factors fell below .336 except for NeCare, which also loaded, strongly on Factor 1. Cronbach's alpha for this scale was 0.717 after removal of NeSick and NeBreak.

Table 17

Survey Items for Dependent Variables Organized by Underlying Factors

Factor	Load	Item	Question Description
1	.698	SeFrustr	When I have a really frustrating day, I think of quitting
	.743	SeRecent	I have recently spent some time looking for another job
	.842	SeThink	I often think about quitting
	.811	SeYear	In the past year I have seriously considered taking a position in another company
2a	.555	LaConfid	I treat company information in the strictest confidence
	.562	LaDuty	I do things above and beyond the call of duty without being asked
	.603	LaExtra	I usually give something extra when the organization needs it
	.539	LaLate	Even with careful planning, I understand that I sometimes have to work late to get the job done
2b	-.514	NeCare	Most days I just don't care much about my work
	-.639	NePayme	I care very little about what happens to ABC as long as I get a paycheck
3	.683	LaPublic	I actively support ABC in public
	.503	LpGood	I generally say good things about ABC even when other people criticize it
4	.594	VoIdea	When I think of an idea that will benefit ABC, I make a determined effort to implement it
	.500	VoJoin	I willingly join in efforts to improve working conditions at ABC
	.712	VoSpeak	When upper managers don't act on serious problems, I am willing to speak up and push for improvements

All items expected to measure *search* (SeFrustr, SeRecent, SeThink, and SeYear) loaded most strongly on Factor 1 at 0.698, 0.743, 0.842, and 0.811. Loadings on all other factors fell below 0.241. Cronbach's alpha for this scale was 0.818.

All items expected to measure *voice* (VoDiscus, VoIdea, VoJoin, and VoSpeak) loaded most strongly on Factor 4 at 0.650, 0.594, 0.500, and 0.712. Loadings on all other factors fell below 0.372. Cronbach's alpha for this scale, after eliminating VoDiscus, was 0.614.

All items removed from scales due to their impact on Cronbach's alpha (LpCloth, LpCritic, LpDoing, LpTime, NeSick, NeBreak, and VoDiscus) were eliminated from further analysis because they did not appear to measure a unique constructs, because they were all standard measures, and because they loaded properly with the other items but did not improve the scale reliability. These items are listed in Table 18.

Table 18

Survey Items Eliminated from Dependent Variable Scales

Item	Question
LpCloth	I would enjoy wearing clothing (tee shirt, jacket, pin) that bears ABC's name or symbol
LpCritic	I think that employees shouldn't criticize their company
LpTime	Most problems at work will go away with time
LpDoing	The people in charge of this company generally know what they're doing
NeBreak	I find myself taking longer breaks or socializing with coworkers more than I should
NeSick	Sometimes when I just don't feel like working I will call in sick
VoDiscuss	I sometimes discuss poor working conditions with my manager and/or with other upper managers at ABC

Confirmatory Factor Analysis on Independent Variable Scales

Confirmatory factor analysis was performed on the 59 survey items designed to measure the independent variables. Previous studies (Curry et al., 1986; Mueller et al., 1994; Price & Mueller, 1981; Wallace, 1995b) demonstrated high reliability and good convergent and discriminant validity for the fourteen Price-Mueller model variables. However, factor analysis is an important step to take before further analysis of the data due to the population used in this study. Because the high-tech industry is underrepresented in employee attachment literature (Cramer, 1993), the reliability and validity of the scales have not been sufficiently assessed. It is possible

that high-tech employees interpreted some of the items differently than did the populations upon which the scales were developed. This expectation is supported by the pilot test which resulted in adjustment of many of the items included in the questionnaire. Moreover, this study includes seven new variables expected to influence high-tech employee behavior. While the pilot test supported the inclusion of these variables, factor and reliability analysis in a larger sample size is important to more robustly evaluate these new scales.

As evident in the following discussion, the factor analysis results were applied within the theoretical framework to build the scales, for "if the results of a factor analysis are interpreted without theoretical guidance, it can lead to misleading conclusions concerning the validity of measuring instruments" (Carmines & Zeller, 1979, p. 63). Some items were removed from scales in cases where they were shown to reduce the scale's reliability by substantially lowering the average interitem correlation (p. 46).

Thirty separate factor analyses were performed, based on a combination of the extraction and rotation methods supported by SPSS version 7.5 statistical software package, and the most discriminating version was selected. The results that are reported in this study used principal component analysis extraction method and varimax rotation. The rotation converged in fourteen iterations. The factor analysis showed that the 59 survey questions, which were expected to measure 19 independent variables, loaded on 14 factors, 12 of which resembled the expected independent variables. The factor analysis results are presented in Table 19 and the survey questions for each factor are listed in Table 20. A discussion of each factor and the subsequent scale development follows.

Table 19

Factor Analysis for Independent Survey Questions[a]

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Aiassist	.224	**.772**								.180				
Aicarful	**.660**	.187	.210					.211						
Aihave	**.413**	.198				.289		.242						.473
Aufreedm		.158		.233	-.196		.502	-.275		.266	**.340**			
Auinput	.278	.293	.240				.270			.207	**.494**			.226
Aupart_r								.170			**.735**			
Csfrndly				.258	-.167							**.690**	.166	.171
Cslook								-.187				**.743**		-.157
Cswelong	.174	.205		.226							.269	**.576**		
Cvdefine	**.688**			.181									.367	
Cvlead	**.808**													
Cvstratg	**.716**	.208												
Ecbalnce	**.727**		.164											.169
Ecguide	**.756**						.176							-.153
Ecinpire	**.585**	.320	.211							.153				-.227
Eifail_r	.241				-.152			**.608**			.196			
Eineeds	**.686**				-.242						.165		-.214	
Eiwork	**.647**		.192		-.189			.202						
Exjob_r									**.681**				.224	
Explenty									**.784**					
Exquick									**.785**					
Faeduc		.216	.242	**.796**										
Faeffort		.211	.176	**.845**										
Faresp		.175		**.885**										
Grexpand	.160	.192	.423	.267		**.330**				.334	.285			
Grfuture	.159		.153			**.713**								
Grimprov	.192	.340	.186	.309		**.381**				.235	.322			
Grtrain	.186	.387		.158		**.463**				.196			-.371	
Iccommit	.294	.377			-.203	.196					.207		**.441**	

[a]Factor loadings given for factors with absolute value greater than 0.150 (table continues)

Table 19 (continued)

Factor Analysis for Independent Survey Questions[a]

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Iceforts	**.656**							.202						
Icpush_r	**.350**						.158	.662						
Inchang			-.357		.295	.192		-.326			-.279	.199		
Inmgrs		-.218	-.174		.506		-.170	-.164					-.393	
Instr_r	-.483		-.411		.178						-.278			
Jvcreate						.185	.159			**.768**				
Jvnew		.214	.348			.185				**.552**		.169		-.311
Jvover										**.762**				
Mebetter	.285		.307			.452	**.382**				.374			
Melived	.375		.238	.190		.305	**.455**				.327			
Methot_r	.186					.422	**.506**	.343						
Pradvnce	.284	.196	**.769**	.239										
Prchance	.311		**.753**	.203			.162							
Prplenty	.277	.201	**.739**	.248		.155								
Ragoals		-.441	-.251				**-.224**					-.169		-.541
Raknow_r	-.181	-.518					**-.511**							
Rauncrt	-.156	-.340					**-.682**	-.179						
Rccnflct	-.226	-.152			.311	.188		**-.615**						
Rcjdgmt					.374		-.519	**-.194**						
Rcstyles					.297			**-.498**		.168			.455	
Skformal	-.157						.155	-.255	**.499**	.268				.290
Sktransf		.156				**.725**				.166				
Sucomfy		**.710**				.167					.186			
Suimprov		**.793**		.160										
Sutech	.181	**.598**		.233									.331	-.192
Sutreat		**.747**	.182	.163		.181	.151							
Suxplain		**.804**					.213					.165		
Wk2much	-.183				**.766**									
Wkbal_r	-.357	-.212		-.230	**.534**						-.248	-.211		
Wkstress					**.758**					.150				

[a]Factor loadings given for factors with absolute value greater than 0.150

Table 20

Survey Items for Independent Variables Organized by Underlying Factors

Factor	Load	Item Code	Question
Factor 11 Autonomy	.340	AuFreedm	I have a great deal of freedom over how I do my job
	.494	AuInput	I have the appropriate amount of input into what happens on my job
Factor 1a Climate	.660	AiCarful	ABC is careful to develop the systems and procedures needed to operate smoothly as an organization
	.413	AiHave	I have the systems, procedures, and/or tools I need to achieve my objectives
	.686	EiNeeds	Major change efforts at ABC are driven by a clear understanding of customer and/or employee needs
	.647	EiWork	People at ABC know how to work together to achieve needed changes in the organization
	.656	IcEforts	Different departments at ABC coordinate efforts and/or support each other to benefit the company overall
	.350	IcPush	When problems arise between departments at ABC, people push more for their own interests than for the overall company benefit
Factor 12 Coworker Support	.690	CsFrndly	To what extent are the people in your immediate group friendly?
	.743	CsLook	To what extent do you look forward to being with the people in your work group each day?
	.576	CsWelong	To what extent do the people in your work group take an appropriate interest in your well-being?
Factor 1b Executive Leadership	.808	CvLead	ABC's executive team provides the leadership ABC needs to clarify our corporate vision
	.688	CvDefine	Senior management has a clearly defined vision for ABC
	.716	CvStratg	ABC's strategic direction is clearly communicated
	.727	EcBalnce	ABC's executives show a good balance of concern for short-term profitability and long-term success
	.756	EcGuide	I am confident senior management can guide ABC successfully into the coming decade
	.585	EcInpire	ABC's leaders inspire employees to give their best for the company

(table continues)

Table 20 (continued)

Survey Items for Independent Variables Organized by Underlying Factors

Factor	Load	Item Code	Question
Factor 9 External Opportunity	.784	ExPlenty	There are plenty of good jobs outside ABC that I could have
	.785	ExQuick	There is at least one good job outside of ABC that I could begin very quickly if I were to leave my job here
	.681	ExJob_R	Finding a job outside ABC would be difficult for me
Factor 4 Fair Pay	.796	FaEduc	To what extent are you fairly rewarded taking into account the education and training you have had?
	.845	FaEffort	To what extent are you fairly rewarded for the amount of effort that you put forth?
	.885	FaResp	To what extent are you fairly rewarded considering the responsibilities that you exercise?
Factor 6 Growth Opportunity	.330	GrExpand	I have the opportunity to expand the scope of my job
	.713	GrFuture	Working at ABC has prepared me well for future jobs
	.381	GrImprov	I have opportunities to improve my knowledge at ABC
Factor 10 Job Variety	.768	JvCreate	How creative does your job require that you be?
	.552	JvNew	To what extent does your job require that you keep learning new things?
	.762	JvOver	To what extent does your job require that you do the same things over and over?
Factor 7a Met Expectations	.382	MeBetter	My experiences at ABC have been better than I originally expected
	.455	MeLived	ABC has lived up to the expectations I had when I first entered
Factor 3 Promotion Chances	.769	PrAdvnce	I have the opportunity to advance at ABC
	.753	PrChance	I have a good chance to get ahead at ABC
	.739	PrPlenty	There are plenty of promotion opportunities for me at ABC

(table continues)

Table 20 (continued)

Survey Items for Independent Variables Organized by Underlying Factors

Factor	Load	Item Code	Question
Factor 7b Role Ambiguity	-.224	RaGoalsr	I have clear planned goals and objectives for my job
	-.511	Raknow_R	I know exactly what is expected of me
	-.682	RaUncrt	I am sometimes uncertain exactly what I am responsible for in my job
Factor 8 Role Conflict	-.625	RcCnflctr	I receive conflicting requests and/or priorities from different sources within ABC
	-.498	RcStylsr	I have to spend effort to accommodate the styles and demands of the different groups I work with.
Factor 2 Supervisor Support	.772	AiAssist	My manager assists in developing the procedures and/or infrastructure needed to help me work efficiently
	.710	SuComfy	I feel comfortable talking with my manager about problems in our relationship
	.793	SuImprov	My manager shows me how to improve my performance
	.747	SuTreat	My manager treats me in a way that motivates me to give my best effort
	.804	SuXplain	My manager clearly explains what is expected of me
Factor 5 Work Overload	.766	Wk2much	During the past three months, my workload has been entirely too much for me to handle
	.758	WkStress	The stress in my job is beginning to create problems for me at home

All three of the original items for *autonomy* (AuFreedm, AuInput, and AuPart_R) loaded on Factor 11 at loadings of 0.340, 0.494, and 0.735. All but one of the loadings on other factors fell below 0.293. AuFreedm loaded at 0.502 on Factor 7 (role ambiguity / met expectations); higher than its loading on Factor 11. Cronbach's alpha analysis indicated that the scale was more reliable when AuPart_R was removed; $\alpha = 0.612$ with AuPart_R and $\alpha = 0.639$ without the item. AuPart_R was eliminated from further analysis because it does not appear to measure a construct different than autonomy, based on the facts that it is a standard measure for ambiguity, loaded properly with the other items, but did not improve the scale reliability for this population.

The *climate* scale was developed from six items which loaded strongly on Factor 1: AiCarful and AiHave from *adequacy of infrastructure*, EiNeeds and EiWork from *effectiveness of implementing change* and IcEforts and IcPush_R from *interdepartmental cooperation*. Evaluation of these items indicated that they measure overall organizational issues rather than the executive actions described in Factor 1, so they were combined in a separate scale (Factor 0) under the variable name *climate*. The loadings for this scale were 0.660, 0.413, 0.686, 0.647, 0.656, and 0.350. All other loadings for these items, except two, fell below 0.289. The Cronbach's alpha for the climate scale was 0.813. Three of the items developed to measure the variables that loaded on *climate* (AiAssist, EiFail_R, and IcCommit) did not load on the factor. AiAssist loaded most strongly on Factor 2 (supervisor support), while EiFail_R and IcCommit loaded most strongly on Factor 8 (role conflict). EiFail_R and IcCommit were kept as separate independent variable because they may measure unique constructs, they are not standard measures and they did not load with the other items as expected. AiAssist will be discussed under supervisor support.

The three original items for *coworker support* (CsFrndly, CsLook, and CsWelong) loaded on Factor 12 with loadings of 0.690, 0.743, and 0.576. All other loadings for these three items fell below 0.269. The resulting Cronbach's alpha for this scale was 0.670.

The *executive leadership* scale was developed from six items measuring two of the seven new variables, *clarity of vision* (CvDefine, CvLead, and CvStratg) and *executive credibility* (EcBalance, EcGuide, and EcInspire), loaded strongly on Factor 1 at 0.688, 0.808, 0.716, 0.727, 0.756, and 0.585. All other loadings fell below 0.367. Cronbach's alpha was 0.810 for the three clarity of vision items and 0.756 for the three executive credibility items. The Pearson's correlation between the two variables was 0.725 ($p < .001$) suggesting that the measures may not assess distinct constructs. When the six items were combined, the Cronbach's alpha rose to 0.869. On the basis of this empirical evidence and a reexamination of the items, it was concluded that all six items were measuring a single construct rather than the two distinct constructs that had been intended.

Both executive leadership and climate loaded strongly on Factor 1. The Pearson's correlation between these scales was 0.743, close to the 0.80 criteria indicating multicollinearity (Cooper & Emory, 1995). While this correlation value and the factor analysis may indicate that climate and executive leadership measure the same underlying factor, it was decided to keep the two factors separate based on "substantive knowledge about the data" (Kim & Mueller, 1978a, p. 43). Moreover, the combination of the climate and executive leadership scales is not appropriate because it reduces the corrected interitem correlations (Carmines & Zeller, 1979). Separate, the correlations range from 0.463 to 0.790, combined, the correlations range from 0.442 to 0.760. Thus, it was decided that the scales should be kept separate in further analysis.

All three items for *external opportunity* (ExJob_R, ExPlenty, and ExQuick) loaded strongly on Factor 9 at 0.681, 0.784, and 0.785. Loadings on all other factors fell below 0.224. The Cronbach's alpha value for this scale was 0.707. SkForml also loaded on Factor 9 at 0.499. Addition of this item increased alpha to 0.717, but reduced the interitem correlations, so it was not

included in the scale. SkForml was also kept as a separate independent variable because it may measure a unique construct, based on the facts that it is not a standard measure for met expectations and it did not load with the other skills transferability item as expected.

All three items for *fairness of pay* (FaEduc, FaEffort, and FaResp) loaded strongly on Factor 4 at 0.796, 0.845, and 0.885. Loadings on all other factors fell below 0.242. The Cronbach's alpha value for this scale was 0.931.

The four items for *growth opportunity* (GrExpand, GrFuture, GrImprov, and GrTrain) loaded on Factor 6 at 0.330, 0.713, 0.381, and 0.463. While three of these loadings are weak, they are the largest loading for each item, except for GrExpand which loaded on Factor 3 at 0.423. Remaining loadings on other factors fall below 0.395. SkTransf also loaded strongly on Factor 4 at 0.725, but will not be included in the scale because it is expected to measure size of job investment, not satisfaction. The Cronbach's alpha value for this scale was 0.734, excluding GrTrain.

The three items developed to measure *instability* (InChange, InNumgs, and InRorg_r) did not load strongly on any factor. Cronbach's alpha for a scale combining the three items is an unacceptably low 0.487. The instability scale items were developed through expert input, focus group discussions, and pilot tests (Fowler, 1993, p. 94). Clearly, the scale needs further refinement. Because the concept of instability is not reflected in any of the other scales, all three items were entered individually in subsequent analysis in the expectation that one or more of them would provide the basis for a scale that could be used to evaluate instability in high-tech firms.

All three items for *job variety* (JvCreate, JvNew, and JvOver) loaded strongly on Factor 10 at 0.768, 0.552, and 0.762. Loadings on all other factors fell below 0.348. The Cronbach's alpha value for this scale was fairly weak at 0.663.

All three items for *met expectations* (MeBetter, MeLived, and MeThot_R) loaded on Factor 7 at 0.382, 0.455, and 0.506. While MeBetter loaded more strongly on Factor 6 (growth) at

0.452, it does not fit conceptually so it was not merged with the growth scale. Cronbach's alpha for this scale was 0.845 (excluding MeThot_R) indicating that the two remaining items are sufficiently similar to provide a scale for met expectations. MeThot_R was eliminated from further analysis because it does not appear to measure a construct different than met expectations, based on the facts that it is a standard measure for the scale, it loaded properly with the other items, but did not improve the scale reliability for this population.

All three items for *promotion opportunity* (PrAdvnce, PrChance, and PrPlenty) loaded strongly on Factor 3 at 0.769, 0.753, and 0.739. Loadings on all other factors fell below 0.311. The Cronbach's alpha value for this scale was 0.919.

All three items for *role ambiguity* (RaGoals, RaKnow_R, and RaUncrt) loaded with mixed results on Factor 7 at –0.224, -0.511, and –0.682. Loadings on all other factors, except for three, fell below 0.340 (absolute value). Despite the mixed support for Factor 7, Cronbach's alpha value for this scale was 0.745, high enough to retain the scale as designed.

Two of the three items for *role conflict* (RcCnflct and RcStyles) loaded most strongly on Factor 8 at -0.615 and –0.498. RcJdgmnt loaded most strongly on Factor 7 (role ambiguity) Excluding RcJdgmnt, the scale resulted in a Cronbach's alpha of 0.637, a barely acceptable value. RcJdgmnt was not included in the scale or future analysis because it did not contribute to either role ambiguity or role conflict. Role conflict, though weakly intercorrelted will remain in further analysis for exploratory purposes.

The results of the factor analysis for role ambiguity, role conflict, and workload were not as expected based on prior results from Brooke et al. (1988) who reported role conflict and role ambiguity to load on the same factor and Gaertner and Nollen (1989) who found role conflict, role ambiguity, and workload to load on the same factor. In this study, intercorrelations between these three factors are moderate to weak: 0.399 between role conflict and workload, 0.253 between role

conflict and role ambiguity, and 0.180 between role ambiguity and workload. Because these empirical data do not parallel previous findings, the three variables were left as separate scales.

All five items of the *supervisor support* scale (SuComfy, SuImprov, SuTech, SuTreat, and SuXplain) loaded strongly on Factor 2 with loadings of 0.710, 0.793, 0.598, 0.747, and 0.804. Loadings on all other factors fell below 0.331. AiAssist also loaded most strongly on Factor 2 at 0.772. When included in the reliability calculation for Factor 2, AiAssist increased the value of Cronbach's alpha ($\alpha = 0.892$ with; 0.870 without). Because AiAssist evaluates an aspect of the supervisor's behavior, it was included in Factor 2. Dropping SuTech further improved Cronbach's alpha ($\alpha = 0.900$). SuTech was eliminated from further analysis because it does not appear to measure a construct different than autonomy, it is a standard measure for ambiguity, loaded properly with the other items, but did not improve the scale reliability for this population.

All three items for *work overload* (Wk2much, WkBal_R, and WkStress) loaded strongly on Factor 5 at 0.766, 0.534, 0.758. Loadings on all other factors fell below 0.357 (absolute value). The Cronbach's alpha value for this scale was 0.750. Removal of WkBal_R improved interitem correlations and increased alpha to 0.759. WkBal_R was eliminated from further analysis because it does not appear to measure a construct different than workload, based on the facts that it is a standard measure for the scale, it loaded properly with the other items, but it did not improve the scale reliability for this population.

The items eliminated from the scales as just described are listed in Table 21. The items that did not fit cleanly into the factor analysis and which were evaluated individually against the employee behaviors are listed in Table 22.

Table 21

Survey Items Eliminated from the Study

Item Code	Question Text
AuPart_R	My job rarely allows me to take part in making decisions that affect me
SuTech	My manager has the technical knowledge needed to guide my activities
MeThot_R	Generally, my work at ABC has not been what I thought it would be
WkBal_R	Reorganizations at ABC generally improve work efficiency and/or productivity
RcJdgmtr	I am often asked to do things in my job that are against my better judgment
GrTrain	ABC has provided me with adequate training for my job

Table 22

Survey Items Entered Individually in the Study

Scale Name	Item Code	Question Text
Change failure	EiFail_R	At ABC, we fail to make important changes because we do not foresee implementation problems
Manager cooperation	IcCommit	My department's management demonstrates their commitment to cooperating with other groups in ABC
Too many changes	InChangr	Organizational changes at ABC occur too frequently
Too many managers	InNumgsr	I am frustrated by the number times I have been assigned to a different manager since joining ABC
Efficient reorgs	InRorg_R	Reorganizations at ABC generally improve work efficiency and/or productivity
Education utility	SkFormIr	My formal education would be useful at many companies besides ABC
Firm-specific skills	SkTranf	The skills and knowledge I have learned on the job at ABC would transfer easily to most other organizations

Descriptive Statistics and Reliability Analysis

As described in the previous section, development of scales for dependent and independent variables was guided by the factor analysis and "substantive knowledge about the data" (Kim & Mueller, 1978a, p. 43). Scale development was further aided by iterative calculation of Cronbach's alpha. That is, in cases where scale reliability (indicated by Cronbach's alpha) would significantly improve through the elimination of one of the items, the item was eliminated and the scale alpha was recalculated (Carmines & Zeller, 1979). The resulting scales and their constituent items were shown earlier in Table 17 for dependent variables and Table 20 for independent variables.

Final scales names, descriptive statistics, and reliability estimates are listed in Table 23 for all employees. Reliabilities estimated by unstandardized Cronbach's alpha for multi-item scales range from 0.637 to 0.931 with an average of 0.756. Cronbach's alpha is not listed for one-item scales. Carmines and Zeller (1979, p. 51) propose a general acceptability rule of 0.80 for widely used scales. In this study, the widely used scales (used in many studies, not necessarily on the same population assessed in this study) include: autonomy, coworker support, external opportunity, fairness of pay, growth opportunity, job variety, promotion chances, role ambiguity, role conflict, supervisor support, work overload, neglect, passive loyalty, search, and voice. Reliability estimates for four of these fifteen scales exceeded the 0.80 rule, six fell between 0.70 and 0.79, and the remaining seven fell between 0.639 and 0.670.

Comparison of Tables 7 and 23 show how the reliability estimates achieved in this study compare to those recorded in previous research. Generally, the final scales in this study included fewer items than those reported previously, so lower reliabilities are expected (Carmines & Zeller, 1979).

Table 23

Descriptive and Reliability Statistics: All Employees

Scale	# Items	Range	Min	Max	Mean	Std. Dev.	α
Independent Variables							
Autonomy	2	6	1	7	4.66	1.15	.639
Change failure	1	6	1	7	3.63	1.36	n/a[a]
Climate	6	5	1	6	3.47	0.96	.813
Coworker support	3	6	1	7	4.78	1.02	.670
Education utility	1	6	1	7	5.84	1.18	n/a[a]
Efficient reorg's	1	6	1	7	4.63	1.27	n/a[a]
Executive leadership	6	5.33	1.17	6.5	3.78	1.12	.869
External opportunity	3	5.67	1.33	7	5.75	0.99	.707
Fairness of pay	3	6	1	7	4.16	1.44	.931
Firm-specific skills	1	5	1	6	2.92	1.14	n/a[a]
Growth opportunity	3	5.67	1.33	7	4.65	1.10	.734
Job variety	3	5.33	1.67	7	4.77	1.05	.663
Manager cooperation	1	6	1	7	4.64	1.45	n/a[a]
Met expectations	2	6	1	7	4.12	1.33	.837
Promotion chances	3	6	1	7	3.44	1.46	.919
Role ambiguity	3	6	1	7	3.34	1.19	.731
Role conflict	2	6	1	7	4.11	1.18	.637
Supervisor support	5	6	1	7	4.10	1.35	.900
Tenure	1	17.4	0.1	17.5	4.86	4.59	n/a[a]
Too many changes	1	6	1	7	4.31	1.59	n/a[a]
Too many managers	1	6	1	7	2.38	1.78	n/a[a]
Work overload	2	6	1	7	3.80	1.59	.750
Dependent Variables							
Active loyalty	4	5	2	7	6.02	0.74	.652
Neglect	2	5.5	1	6.5	1.89	1.05	.717
Passive loyalty	2	5.5	1.5	7	5.15	1.18	.737
Search	4	6	1	7	3.12	1.51	.818
Voice	3	5.33	1.67	7	4.93	1.03	.641

[a]No value for Cronbach's alpha because this is a one-item scale.

Scales that achieved much lower estimated reliability than reported in previous research include: autonomy with 0.639 in this study compared to 0.84 (Mueller et al., 1994); coworker support with 0.670 in this study compared to 0.85 (Mueller et al., 1994); and role conflict with 0.639 in this study compared to 0.82 (Rizzo, et. al., 1970). Scales that achieved reliabilities comparable to previous research include: external opportunity at 0.707 in this study compared to 0.761 (Price & Mueller, 1981); fairness of pay at 0.931 in this study compared to 0.91 (Mueller et al., 1994); growth opportunity at 0.763 in this study compared to 0.81 (Gaertner & Nollen, 1989); job variety at 0.663 in this study compared to 0.689 (Mueller et al., 1994); role ambiguity at 0.731 in this study compared to 0.780 (Gaertner & Nollen, 1989); supervisor support at 0.900 in this study compared to 0.872 (Gaertner & Nollen, 1989); neglect at 0.717 in this study compared to 0.69 and 0.79 (Rusbult et al., 1988): passive loyalty at 0.737 in this study compared to 0.70 (Rusbult et al., 1988); search at 0.818 in this study compared to 0.76 (Rusbult et al., 1988).

Three scales achieved much better reliabilities than previously recorded: promotion chances at 0.919 in this study compared to 0.853 (Price & Mueller, 1981), voice at 0.641 in this study compared to 0.57 (Rusbult et al., 1988), and work overload at 0.750 in this study compared to a test/retest value of 0.489 (Curry et al., 1986). The only other scale reported in previous research, but not "widely used," is active loyalty. The reliability estimate for this scale ($\alpha = 0.652$) exceeded the value of 0.530 reported by Withey and Cooper (1992, p. 234) who developed the scale. The met expectations scale was developed from two items reported previously, but not combined previously (Iverson & Roy, 1994; Kim et al., 1996). This new combined scale resulted in an estimated reliability of 0.837. Two of the new scales developed for this study, climate and executive leadership, resulted in very acceptable Cronbach's alpha reliability estimates of 0.813 and 0.869. As discussed earlier, the new instability scale resulted in an unacceptably low alpha of 0.487.

Multicollinearity Analysis

Multicollinearity was evaluated using Pearson's product-moment correlation coefficient because the data are scaled (Suskie, 1996, p. 101). As shown in Table 24, the absolute value of the Pearson's correlation coefficient between dependent variable scales range between 0.017 and 0.444 ($p < 0.001$ for coefficients greater than 0.100). None of these correlations approaches the 0.80 multicollinearity criterion suggested by Cooper and Emory (1995). Moderate-sized correlations exist between active loyalty and passive loyalty (0.420, $p < 0.001$) and active loyalty and voice (0.444, $p < .001$). The correlation between active and passive loyalty is much higher and opposite the -0.290 ($p < 0.001$) value reported by Withey and Cooper (1992). Correlations between dependent and independent variables are also shown in Table 24.

As shown in Table 25, all correlations between the final independent variable scales fall below the 0.80 criterion (Cooper & Emory, 1995), but four correlations approach this guideline. As discussed earlier, climate (Clmte) and executive leadership (ExLed) correlate at 0.743 ($p < .001$). Four moderate correlations include: supervisor support (Supr) and role ambiguity (RleA) at -0.629 ($p < .001$), growth (Grwth) and met expectations (MetE) at 0.590 ($p < .001$), autonomy (Atnmy) and growth at 0.555 ($p < .001$), and met expectations and autonomy at 0.550 ($p < .001$).

Table 24

Pearson Correlation Matrix for Scales Based on Dependent Variables in the Analysis (n=266)[a]

Independent Variable	Active Loyalty	Neglect	Passive Loyalty	Search	Voice
Active Loyalty	1				
Neglect	-.390	1			
Passive Loyalty	.420	-.403	1		
Search	.076	.391	-.216	1	
Voice	.444	-.277	.415	-.017	1
Autonomy	.079	-.241	.052	-.280	.160
Change failure	.033	.207	-.121	.277	.081
Climate	-.043	-.243	.133	-.453	.024
Coworker support	.138	-.239	.098	-.307	.107
Education utility	.358	-.235	.197	.045	.244
Efficient reorg's	-.073	-.166	.204	-.252	.102
Executive leadership	.027	-.275	.237	-.395	.037
External opportunity	.242	-.094	.131	.105	.227
Fairness of pay	-.055	-.014	-.047	-.224	-.037
Firm-specific skills	-.193	.132	-.113	.088	-.165
Growth opportunity	.117	-.240	.101	-.263	.196
Job variety	.247	-.286	.250	-.133	.309
Manager cooperation	.130	-.212	.141	-.236	.106
Met expectations	.079	-.369	.195	-.477	.089
Promotion chances	-.029	-.202	.082	-.359	.102
Role ambiguity	-.151	.362	-.052	.363	-.190
Role conflict	.258	.028	.044	.388	.111
Supervisor support	.023	-.191	.071	-.336	.034
Tenure	.143	-.052	-.011	.143	.036
Too many changes	.053	.030	-.078	.134	.067
Too many managers	.008	.122	-.113	.382	-.015
Work overload	.239	.079	-.033	.514	.140

[a]Correlation is significant at the 0.01 level (2-tailed) for all coefficients greater than 0.100.

Table 25

Pearson Correlation Matrix for Scales Based on Independent Variables (n=266)

#	Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Autnmy	1																				
2	ChgFail	-.093	1																			
3	Climate	.337	-.423	1																		
4	Cowrkr	.355	.002	.258	1																	
5	EdUtil	.203	.130	-.100	.030	1																
6	EffOrg	.322	-.213	.547	.178	-.160	1															
7	ExeLead	.327	-.320	.743	.274	-.102	.468	1														
8	ExtOpp	.064	.056	-.052	.009	.405	-.096	.044	1													
9	FairPay	.388	-.177	.338	.381	-.073	.263	.303	-.166	1												
10	FirmSkil	-.318	.013	-.132	-.147	-.203	.010	-.159	-.124	-.170	1											
11	Growth	.555	-.193	.398	.353	.129	.319	.429	.163	.448	-.493	1										
12	JobVar	.373	-.057	.161	.207	.232	.149	.216	.150	.239	-.292	.516	1									
13	MgrCop	.395	-.132	.322	.277	.052	.205	.375	-.036	.228	-.276	.341	.200	1								
14	MetExp	.550	-.274	.487	.372	.065	.371	.502	.064	.390	-.306	.590	.275	.323	1							
15	Promo	.398	-.232	.518	.283	-.007	.468	.494	.008	.455	-.229	.582	.309	.255	.510	1						
16	RoleAmb	-.480	.180	-.375	-.401	-.072	-.146	-.369	-.037	-.259	.256	-.334	-.215	-.332	-.443	-.340	1					
17	RoleCon	-.165	.373	-.491	-.082	.142	-.336	-.231	.094	-.229	-.053	-.087	.063	-.057	-.177	-.246	.253	1				
18	Suprv	.497	-.167	.383	.412	.062	.180	.392	.048	.428	-.272	.475	.258	.448	.445	.428	-.629	-.242	1			
19	Tenure	-.107	.236	-.264	.018	-.028	-.178	-.194	-.168	-.110	-.041	-.167	-.082	-.036	-.051	-.298	-.030	.218	-.159	1		
20	TooChng	-.185	.265	-.165	.021	-.016	-.208	-.053	-.040	-.044	-.005	-.083	.005	-.049	-.153	-.191	.099	.339	-.095	.305	1	
21	TooMgrs	-.264	.174	-.254	-.229	.006	-.266	-.239	.077	-.323	.104	-.189	-.062	-.293	-.293	-.230	.266	.298	-.308	.206	.260	1
22	Wrkload	-.162	.244	-.335	-.217	.091	-.177	-.215	.140	-.232	-.040	-.036	.101	-.162	-.168	-.062	.180	.399	-.182	.132	.187	.380

Normality Evaluation of Final Scales

Box plots for each of the final independent variables that resulted from the factor analysis were evaluated to assess normality. Engineers and non-engineers were plotted separately to show the spreads and variances across groups. These plots were examined to evaluate within-group distributions of each scale. Most of the scales show reasonable normality. However, two scales were especially problematic: XINUMGRS, which was skewed significantly to the high end of the scale; and XSKFORML, which was skewed significantly to the high end of the scale. Several transformations were attempted on these items (square root, inverse square root, square, natural log, and log), but none improved the normality of the distribution. For this reason, the items were left unchanged in the remainder of the data analysis. Variances are poorest on coworker support (XCOWORKER), change success (XEIFAL_R), and instability-structure (XINREOR_r).

Summary of Methodological Analysis

The analyses reported in this section indicate that the data collected in this study are sufficiently robust and unbiased to support the testing of hypotheses. With respect to the survey responses, the response rate achieved in the study is acceptable, there is no significant response bias, and the respondents demographically represent the population from which they were drawn. Data screening verified the inclusion or exclusion of outlying data points, confirmed the accuracy of the data transferred from the surveys to the computer database, and indicated that the data were sufficient normal. Confirmatory factor analysis of the twenty-two dependent variable survey questions indicated that the five behaviors (exit, voice, neglect, passive loyalty, and active loyalty) were empirically separable. Confirmatory factor analysis was also performed on the 59 survey questions that were expected to measure nineteen independent variables. This analysis resulted in fourteen independent factors, twelve of which resembled the expected independent variables.

Reliability analysis using Cronbach's coefficient alpha indicated that the scales resulting from the factor analysis demonstrated high reliability and good convergent and discriminant validity. Multicollinearity analysis showed that the final dependent and independent variable scales were empirically distinct. Finally the final scales were shown to be sufficiently normality for both engineers and non-engineering professionals.

Regression Analysis Results for Hypotheses Testing

Having determined that the scales resulting from the data collected in this study were sufficiently normal, empirically separable, and free of bias: the hypotheses were evaluated using *t* tests and regression analysis.

Descriptive Statistics and *t* tests for Engineers and Non-Engineers

Descriptive statistics for engineers and non-engineering groups are reported in Table 26 along with a *t* test statistic for each scale. This test statistic is used to evaluate the difference between two means with unequal variances (Aczel, 1996). For a two-tailed test, the rejection region at $\alpha = 0.05$, the rejection region lies above +1.96 or below –1.96. The results of this test indicate that a significant difference between the means of the two groups is observed in ten of the twenty-five scales. Among independent variables, engineers are more satisfied than non-engineers with climate ($t = 3.85$, $p = 0.000$), executive leadership ($t = 2.33$, $p = 0.021$), growth opportunity ($t = 3.90$, $p = 0.004$), job variety ($t = 3.39$, $p = 0.001$), promotion chances ($t = 4.27$, $p = 0.000$), and supervisor support ($t = 2.34$, $p = 0.020$). Engineers are also less frustrated with the frequency of organizational changes ($t = -2.37$, $p = 0.018$), the impact of reorganizations ($t = -2.60$, $p = 0.010$), and the level of role conflict ($t = -3.56$, $p = 0.000$).

Table 26

Descriptive Statistics: Employee Groups

	Engineers (n = 117)		Non-Engineers (n = 145)		t test Results	
Scale	M	SD	M	SD	t	p^a
Independent Variables						
Autonomy	4.74	1.06	4.60	1.21	1.032	0.303
Change failure	3.71	1.50	3.57	1.23	0.829	0.408
Climate satisfaction	3.72	0.94	3.27	0.93	3.846	0.000
Coworker support	4.86	0.90	4.71	1.11	1.153	0.250
Education utility	5.79	1.20	5.88	1.16	-0.599	0.550
Efficient reorg's	4.40	1.26	4.81	1.26	-2.595	0.010
Executive leadership	3.95	1.10	3.63	1.11	2.325	0.021
External opportunity	5.83	0.90	5.68	1.06	1.207	0.229
Fairness of pay	4.28	1.32	4.05	1.54	1.281	0.202
Firm-specific skills	3.04	1.16	2.81	1.12	1.614	0.108
Growth opportunity	4.87	1.13	4.48	1.05	2.898	0.004
Job variety	5.01	0.95	4.58	1.09	3.388	0.001
Manager cooperation	4.53	1.38	4.73	1.51	-1.087	0.278
Met expectations	4.27	1.26	4.00	1.37	1.664	0.097
Promotional chances	3.85	1.34	3.10	1.47	4.273	0.000
Role ambiguity	3.31	1.16	3.37	1.22	-0.406	0.685
Role conflict	4.32	1.42	4.91	1.24	-3.561	0.000
Supervisor support	4.31	1.14	3.93	1.48	2.339	0.020
Too many changes	4.05	1.62	4.52	1.55	-2.372	0.018
Too many managers	2.43	1.81	2.33	1.75	0.456	0.649
Tenure	3.84	3.93	5.65	4.91	-3.217	0.001
Work overload	3.83	1.60	3.77	1.59	0.307	0.759
Dependent Variables						
Active loyalty	5.90	0.80	6.12	0.67	-2.497	0.013
Neglect	1.90	1.06	1.87	1.06	0.223	0.824
Passive loyalty	5.06	1.12	5.21	1.22	-1.022	0.308
Search	2.93	1.37	3.28	1.60	-1.859	0.064
Voice	4.88	1.05	4.97	1.02	-0.694	0.488

[a]2-tailed significance

Among employee behaviors, engineers are less likely to exhibit active loyalty (t = -2.50, p = 0.013), but equally as likely to exhibit the other three behaviors as non-engineers. Another way to examine each group's propensity to use each behavior is to consider the percentage of respondents who scored at 4.0 (agree somewhat) or higher on the items that make up each behavioral scale. These results are shown in Table 27. Consistent with the t tests, only 25.6% of engineers scored above 4.0 on search behavior, compared to 36.6% of non-engineers. The difference between engineers and non-engineers on active loyalty is much less dramatic: 97.4% for engineers compared to 99.3% for non-engineers. Finally a difference in voice behavior emerges from the percentage data: 82.9% of engineers scored at 4.0 or higher compared to 88.3% of non-engineers. Thus, while the t test did not indicate a difference in voice behavior for the two groups, examination of the percentage data shows some difference on voice behavior.

Table 27

Percentage of Engineers and Non-Engineers scoring above 4.0 for each Behavior

	Active loyalty	Neglect	Passive loyalty	Search	Voice
Engineers	97.4%	7.7%	88.0%	25.6%	82.9%
Non-Engineers	99.3%	7.6%	89.7%	36.6%	88.3%

Regression Analysis

Twenty separate multiple linear regressions were performed to examine the determinants of each of the five behaviors for engineers and non-engineers.

The original regression results for each behavior are reported in Tables 29, 31, 33, 35, and 37. These full regression models are presented to establish the strength with which the independent variables in this study explained the variance in each behavior. Best-fit models were also created

for each behavior using backward elimination to identify the most significant correlates for each professional group. The best-fit models were those that optimized both explanatory power and parsimony. These models are presented in Tables 30, 32, 34, 36, and 38. In each of these tables, standardized beta coefficients, *t* statistics and the associated significance are reported along with the R^2 and adjusted R^2 values.

The adjusted R-square values reported in the previous five sections are compared to others reported for the EVLN behaviors in Table 28. As seen in this table, the variance explained in the present study is meets or exceeds those reported previously.

Table 28

Adjusted R^2 Values for EVLN Behaviors in This Study and Previous Studies

Behavior		Active loyalty	Neglect	Passive loyalty	Search	Voice
This Study	Engineer	0.380	0.282	0.194	0.524	0.249
	Non-engineer	0.342	0.387	0.285	0.453	0.176
Rusbult et al. (1988)		-	0.025	0.123	0.335	0.082
Withey & Cooper (1992)		0.190	-	0.26	-	-
Withey & Cooper (1989)		-	0.28	0.05	0.23	0.00

These variance values also compare favorably to previous research on each employee behavior. .The adjusted R^2 for search in this study (0.524 for engineers and 0.453 for non-engineers) also compares to values reported in previous research: 0.11 for job search (Bluedorn, 1982); 0.25, 0.27, and 0.32 for intent to stay (Mueller & Price, 1990); 0.165 for intent to leave (Mueller & Price, 1989); and 0.24 for intent to stay (Price & Mueller, 1981). The adjusted R^2 for neglect in this study (0.282 for engineers and 0.387 for non-engineers) compared to Brooke and

Price's (1989) reported a best-fit R^2 from LISREL analysis of 0.216 for absence. The adjusted R^2 for passive loyalty in this study (0.524 for engineers and 0.453 for non-engineers) compared to 0.33 for organizational commitment (Mueller & Price, 1990), and 0.493 and 0.469 for organizational commitment (unadjusted R^2) (Wallace, 1995a).

Active Loyalty

The regression results for active loyalty are reported in Tables 29 and 30. For engineers, the variance explained is 0.317 (adjusted R^2) for the original model and 0.380 for the best-fit model. For non-engineers, the variance explained is 0.328 (adjusted R^2) for the original model and 0.342 for the best-fit model. The best-fit model contains ten significant correlates for active loyalty in engineers and nine significant correlates for active loyalty in non-engineers.

The regression analysis identified six job satisfaction factors most important to active loyalty in engineers. Active loyalty in engineers was associated with increasing climate satisfaction ($\beta = 0.257$, $p = 0.081$), efficient reorganizations ($\beta = 0.128$, $p = 0.178$), job variety ($\beta = 0.309$, $p = 0.001$), role conflict ($\beta = 0.224$, $p = 0.015$), and work overload ($\beta = 0.165$, $p = 0.094$); and confidence in executive leadership ($\beta = -0.208$, $p = 0.102$). Thus, active loyalty among engineers is associated with satisfaction with the company's climate, having high variety in work activities, facing a high workload, and expecting little support from executives.

Four job satisfaction factors are associated with active loyalty in non-engineers. For this group, active loyalty increases as climate satisfaction ($\beta = 0.112$, $p = 0.172$), job variety ($\beta = 0.157$, $p = 0.072$), and work overload ($\beta = 0.231$, $p = 0.003$) increased; and as growth opportunities ($\beta = -0.245$, $p = 0.030$) decreased. Thus, active loyalty among non-engineers is associated with a satisfying organizational climate, high variety in work activities, facing a high workload, and having low access to growth opportunities.

Table 29

Original Linear Regression Models: Active Loyalty

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	0.252	2.385	0.019	0.161	1.723	0.088
Fairness of pay	-0.297	-2.681	0.009	0.108	1.117	0.266
Firm-specific skills	0.021	0.199	0.843	-0.155	-1.538	0.127
Tenure	0.067	0.632	0.529	0.202	2.242	0.027
Alternatives						
Education utility	0.159	1.666	0.100	0.421	4.384	0.000
External opportunity	0.147	1.419	0.160	0.121	1.390	0.168
Job Satisfaction						
Autonomy	-0.050	-0.389	0.698	-0.137	-1.249	0.214
Change failure	-0.078	-0.762	0.448	-0.036	-0.364	0.717
Climate satisfaction	0.250	1.539	0.128	0.088	0.626	0.533
Efficient reorganizations	0.148	1.335	0.186	0.042	0.418	0.677
Executive leadership	-0.268	-1.844	0.069	0.036	0.308	0.758
Growth opportunity	-0.062	-0.451	0.653	-0.234	-1.669	0.098
Job variety	0.326	2.819	0.006	0.165	1.772	0.079
Manager cooperation	0.034	0.319	0.750	0.128	1.370	0.173
Met expectations	0.059	0.479	0.633	-0.084	-0.762	0.448
Promotion chances	-0.028	-0.218	0.828	-0.079	-0.700	0.486
Role ambiguity	-0.055	-0.436	0.664	-0.080	-0.712	0.478
Role conflict	0.277	2.379	0.020	-0.063	-0.646	0.519
Supervisor support	0.058	0.473	0.638	-0.124	-1.073	0.286
Too many changes	0.015	0.148	0.883	-0.108	-1.284	0.202
Too many managers	-0.082	-0.738	0.463	-0.064	-0.712	0.478
Work overload	0.188	1.615	0.110	0.312	3.498	0.001
R^2	0.466			0.441		
Adjusted R^2	0.317			0.328		

Table 30

Best-Fitting Linear Regression Models: Active Loyalty

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	0.275	3.018	0.003	0.135	1.675	0.096
Fairness of pay	-0.306	-3.331	0.001			
Firm-specific skills				-0.150	-1.593	0.114
Tenure				0.174	2.330	0.021
Alternatives						
Education utility	0.181	2.094	0.039	0.373	4.218	0.000
External opportunity	0.116	1.301	0.196	0.145	1.806	0.073
Job Satisfaction						
Autonomy						
Change failure						
Climate satisfaction	0.257	1.764	0.081	0.112	1.375	0.172
Efficient reorganizations	0.128	1.359	0.178			
Executive leadership	-0.208	-1.651	0.102			
Growth opportunity				-0.245	-2.195	0.030
Job variety	0.309	3.294	0.001	0.157	1.814	0.072
Manager cooperation						
Met expectations						
Promotion chances						
Role ambiguity						
Role conflict	0.244	2.489	0.015			
Supervisor support						
Too many changes						
Too many managers						
Work overload	0.165	1.693	0.094	0.231	3.076	0.003
R^2	0.441			0.387		
Adjusted R^2	0.380			0.342		

Neglect

The regression results for neglect are reported in Tables 31 and 32. For engineers, the variance explained is 0.261 (adjusted R^2) for the original model, increasing to 0.282 for the best-fit model. For non-engineers, the variance explained is 0.342 (adjusted R^2) for the original model, increasing to 0.387 for the best-fit model. The best-fit model contains nine significant correlates for neglect in engineers and nine significant correlates for neglect in non-engineers.

The regression analysis identified six job satisfaction factors most important to neglect in engineers. Neglect in engineers was associated with increasing change failure ($\beta = 0.118$, $p = 0.050$), and role ambiguity ($\beta = 0.254$, $p = 0.017$); and decreasing satisfaction with reorganization efficiency ($\beta = -0.188$, $p = 0.077$), job variety ($\beta = -0.181$, $p = 0.080$), met expectations ($\beta = 0.188$, $p = 0.077$), and role conflict ($\beta = -0.215$, $p = 0.036$). Thus, neglect among engineers is associated with dissatisfaction over organizational changes, clarity and conflict in their work roles, job variety, and generally unmet expectations.

Six job satisfaction factors are associated with neglect in non-engineers. For this group, neglect increases as autonomy ($\beta = 0.178$, $p = 0.069$), change failure ($\beta = 0.119$, $p = 0.122$), and role ambiguity ($\beta = 0.145$, $p = 0.105$) increased; and as satisfaction with executive leadership ($\beta = -0.193$, $p = 0.020$), job variety ($\beta = -0.354$, $p = 0.000$), and met expectations ($\beta = -0.195$, $p = 0.035$) decreased. Thus, neglect among non-engineers is associated with dissatisfaction over organizational changes, executive leadership, variety and clarity of role expectations, and generally unmet expectations. Non-engineers with higher autonomy also showed higher levels of neglect.

Table 31

Original Linear Regression Analysis: Neglect

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	-0.145	-1.321	0.190	-0.090	-0.971	0.334
Fairness of pay	0.185	1.608	0.112	0.275	2.871	0.005
Firm-specific skills	-0.171	-1.584	0.117	0.035	0.356	0.722
Tenure	0.042	0.380	0.705	-0.176	-1.970	0.051
Alternatives						
Education utility	-0.205	-2.072	0.042	-0.241	-2.542	0.012
External opportunity	0.121	1.123	0.265	-0.024	-0.280	0.780
Job Satisfaction						
Autonomy	0.012	0.087	0.931	0.160	1.475	0.143
Change failure	0.255	2.388	0.019	0.145	1.477	0.143
Climate satisfaction	-0.070	-0.414	0.680	0.038	0.273	0.785
Efficient reorganizations	-0.243	-2.115	0.038	0.040	0.400	0.690
Executive leadership	0.222	1.470	0.146	-0.221	-1.903	0.060
Growth opportunity	-0.107	-0.751	0.455	0.169	1.222	0.224
Job variety	-0.160	-1.335	0.186	-0.393	-4.275	0.000
Manager cooperation	-0.085	-0.763	0.448	0.063	0.679	0.499
Met expectations	-0.272	-2.116	0.038	-0.212	-1.942	0.055
Promotion chances	0.201	1.506	0.136	-0.104	-0.930	0.354
Role ambiguity	0.234	1.793	0.077	0.113	1.020	0.310
Role conflict	-0.171	-1.410	0.163	0.024	0.249	0.804
Supervisor support	-0.034	-0.264	0.793	0.008	0.074	0.941
Too many changes	-0.126	-1.183	0.240	0.037	0.443	0.658
Too many managers	0.058	0.500	0.618	0.035	0.397	0.692
Work overload	-0.143	-1.179	0.242	0.134	1.515	0.133
R^2	0.422			0.453		
Adjusted R^2	0.261			0.342		

Table 32

Best-Fitting Linear Regression Models: Neglect

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support						
Fairness of pay	0.174	1.885	0.063	0.275	3.447	0.001
Firm-specific skills	-0.146	-1.491	0.139			
Tenure				-0.161	-2.072	0.040
Alternatives						
Education utility	-0.194	-2.162	0.033	-0.256	-3.276	0.001
External opportunity						
Job Satisfaction						
Autonomy				0.178	1.833	0.069
Change failure	0.188	1.985	0.050	0.119	1.556	0.122
Climate satisfaction						
Efficient reorganizations	-0.211	-2.195	0.031			
Executive leadership				-0.193	-2.355	0.020
Growth opportunity						
Job variety	-0.181	-1.767	0.080	-0.354	-4.526	0.000
Manager cooperation						
Met expectations	-0.188	-1.786	0.077	-0.195	-2.132	0.035
Promotion chances						
Role ambiguity	0.254	2.428	0.017	0.145	1.635	0.105
Role conflict	-0.215	-2.127	0.036			
Supervisor support						
Too many changes						
Too many managers						
Work overload				0.152	2.085	0.039
R^2	0.346			0.434		
Adjusted R^2	0.282			0.387		

Passive Loyalty

The regression results for passive loyalty are reported in Tables 33 and 34. For engineers, the variance explained is 0.100 (adjusted R^2) for the original model, increasing to 0.194 for the best-fit model. For non-engineers, the variance explained is 0.245 (adjusted R^2) for the original model, increasing to 0.285 for the best-fit model. The best-fit model contains eight significant correlates for passive loyalty in engineers and nine significant correlates for passive loyalty in non-engineers. The regression analysis identified six job satisfaction factors most important to passive loyalty in engineers. Passive loyalty in engineers was associated with perceptions of increased reorganization efficiency ($\beta = 0.434$, $p = 0.000$), job variety ($\beta = 0.123$, $p = 0.231$), and promotion chances ($\beta = 0.153$, $p = 0.188$), role conflict ($\beta = 0.204$, $p = 0.048$), and supervisor support ($\beta = 0.176$, $p = 0.100$); and decreased autonomy ($\beta = -0.181$, $p = 0.102$). Thus, passive loyalty among engineers is associated with perceptions of efficient organizational change and satisfaction with several aspects of the individual's work: variety, supervisor's support, and promotion opportunity. However, passive loyalty in engineers decreased as autonomy increased.

Seven job satisfaction factors are associated with passive loyalty in non-engineers. For this group, passive loyalty increases as executive leadership ($\beta = 0.112$, $p = 0.172$), job variety ($\beta = 0.157$, $p = 0.072$), and met expectations ($\beta = 0.231$, $p = 0.003$) increased; and as autonomy ($\beta = -0.245$, $p = 0.030$), growth opportunity ($\beta = -0.245$, $p = 0.030$), promotion chances ($\beta = -0.245$, $p = 0.030$), and change frustration ($\beta = -0.245$, $p = 0.030$) decreased. Thus, passive loyalty among non-engineers is associated with satisfaction with executives and the frequency of organization change, as well as satisfaction with job variety and generally met expectations. However, passive loyalty in non-engineers was also associated with low autonomy and low opportunities for growth and promotion.

Table 33

Original Linear Regression Analysis: Passive Loyalty

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	0.046	0.382	0.703	-0.002	-0.020	0.984
Fairness of pay	-0.216	-1.700	0.093	-0.085	-0.831	0.408
Firm-specific skills	-0.062	-0.519	0.605	-0.108	-1.015	0.313
Tenure	-0.015	-0.123	0.902	0.109	1.135	0.259
Alternatives						
Education utility	0.178	1.629	0.107	0.206	2.028	0.045
External opportunity	-0.146	-1.233	0.221	0.110	1.191	0.236
Job Satisfaction						
Autonomy	-0.217	-1.459	0.148	-0.132	-1.140	0.257
Change failure	-0.081	-0.689	0.493	0.006	0.055	0.956
Climate satisfaction	-0.126	-0.677	0.501	-0.005	-0.036	0.972
Efficient reorganizations	0.439	3.458	0.001	0.057	0.540	0.591
Executive leadership	0.033	0.195	0.846	0.348	2.804	0.006
Growth opportunity	0.054	0.342	0.734	-0.260	-1.752	0.083
Job variety	0.114	0.863	0.391	0.377	3.828	0.000
Manager cooperation	-0.025	-0.203	0.840	-0.034	-0.347	0.729
Met expectations	0.069	0.488	0.627	0.180	1.535	0.128
Promotion chances	0.109	0.738	0.463	-0.163	-1.361	0.176
Role ambiguity	-0.038	-0.266	0.791	0.220	1.859	0.066
Role conflict	0.220	1.648	0.103	-0.028	-0.271	0.787
Supervisor support	0.140	0.989	0.326	0.160	1.310	0.193
Too many changes	-0.027	-0.231	0.818	-0.177	-1.990	0.049
Too many managers	-0.051	-0.400	0.690	-0.056	-0.589	0.557
Work overload	0.024	0.180	0.858	0.035	0.373	0.710
R^2	0.296			0.372		
Adjusted R^2	0.100			0.245		

Table 34

Best-Fitting Linear Regression Models: Passive Loyalty

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support						
Fairness of pay	-0.201	-1.911	0.059			
Firm-specific skills						
Tenure						
Alternatives						
Education utility	0.131	1.388	0.168	0.220	2.400	0.018
External opportunity				0.111	1.271	0.206
Job Satisfaction						
Autonomy	-0.181	-1.652	0.102	-0.186	-1.958	0.053
Change failure						
Climate satisfaction						
Efficient reorganizations	0.434	4.185	0.000			
Executive leadership				0.333	3.685	0.000
Growth opportunity				-0.200	-1.769	0.079
Job variety	0.123	1.206	0.231	0.357	3.923	0.000
Manager cooperation						
Met expectations				0.204	1.928	0.056
Promotion chances	0.153	1.326	0.188	-0.169	-1.685	0.094
Role ambiguity						
Role conflict	0.204	2.000	0.048			
Supervisor support	0.176	1.664	0.100			
Too many changes				-0.173	-2.277	0.025
Too many managers						
Work overload						
R^2	0.258			0.334		
Adjusted R^2	0.194			0.285		

Search

The regression results for search are reported in Tables 35 and 36. For engineers, the variance explained is 0.469 (adjusted R^2) for the original model, increasing to 0.524 for the best-fit model. For non-engineers, the variance explained is 0.419 (adjusted R^2) for the original model, increasing to 0.466 for the best-fit model. The best-fit model contains ten significant correlates for search in engineers and nine significant correlates for search in non-engineers.

The regression analysis identified five job satisfaction factors most important to search in engineers. Search in engineers was associated with increasing role conflict ($\beta = 0.149$, $p = 0.078$), managerial changes ($\beta = 0.183$, $p = 0.042$), and work overload ($\beta = 0.262$, $p = 0.002$); and decreasing met expectations ($\beta = -0.308$, $p = 0.000$) and change frequency ($\beta = -0.129$, $p = 0.099$). Thus, search among engineers is associated with generally unmet expectations, high role conflict and work overload, and frustration over managerial changes and change frequency.

Eight job satisfaction factors are associated with search in non-engineers. For this group, search increases as reorganization efficiency ($\beta = 0.134$, $p = 0.093$), role conflict ($\beta = 0.112$, $p = 0.140$), and work overload ($\beta = 0.459$, $p = 0.000$) increased; and as satisfaction with executive leadership ($\beta = -0.131$, $p = 0.107$), job variety ($\beta = -0.093$, $p = 0.178$), met expectations, ($\beta = -0.331$, $p = 0.000$), promotion chances ($\beta = -0.254$, $p = 0.003$), and change frequency ($\beta = -0.125$, $p = 0.072$) decreased. Thus, search among non-engineers is associated with dissatisfaction over role conflict, workload, job variety, met expectations, and promotion chances. It is also associated with perceptions of poor executive leadership and organizational change.

Table 35

Original Linear Regression Analysis: Search

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	-0.095	-1.024	0.309	0.005	0.054	0.957
Fairness of pay	0.122	1.254	0.214	0.200	2.225	0.028
Firm-specific skills	0.108	1.183	0.240	-0.076	-0.814	0.417
Tenure	0.236	2.548	0.013	-0.029	-0.347	0.729
Alternatives						
Education utility	-0.032	-0.379	0.706	0.004	0.041	0.967
External opportunity	0.287	3.149	0.002	-0.033	-0.405	0.687
Job Satisfaction						
Autonomy	0.005	0.043	0.966	0.029	0.287	0.775
Change failure	0.071	0.778	0.439	-0.060	-0.646	0.520
Climate satisfaction	0.079	0.550	0.584	0.018	0.140	0.889
Efficient reorganizations	0.018	0.180	0.857	0.141	1.516	0.133
Executive leadership	0.022	0.174	0.863	-0.150	-1.377	0.171
Growth opportunity	-0.051	-0.424	0.673	-0.020	-0.153	0.879
Job variety	-0.034	-0.332	0.740	-0.103	-1.198	0.234
Manager cooperation	-0.020	-0.215	0.830	0.027	0.315	0.753
Met expectations	-0.321	-2.944	0.004	-0.327	-3.185	0.002
Promotion chances	0.015	0.134	0.894	-0.274	-2.613	0.010
Role ambiguity	-0.010	-0.095	0.925	0.053	0.513	0.609
Role conflict	0.182	1.775	0.080	0.126	1.390	0.167
Supervisor support	0.014	0.124	0.901	-0.010	-0.091	0.928
Too many changes	-0.137	-1.520	0.132	-0.109	-1.401	0.164
Too many managers	0.181	1.852	0.068	0.060	0.718	0.475
Work overload	0.267	2.596	0.011	0.451	5.439	0.000
R^2	0.585			0.517		
Adjusted R^2	0.469			0.419		

Table 36

Best-Fitting Linear Regression Models: Search

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	-0.094	-1.183	0.240			
Fairness of pay	0.123	1.505	0.136	0.195	2.543	0.012
Firm-specific skills	0.121	1.666	0.099			
Tenure	0.220	2.724	0.008			
Alternatives						
Education utility						
External opportunity	0.258	3.437	0.001			
Job Satisfaction						
Autonomy						
Change failure						
Climate satisfaction						
Efficient reorganizations				0.134	1.692	0.093
Executive leadership				-0.131	-1.626	0.107
Growth opportunity						
Job variety				-0.093	-1.354	0.178
Manager cooperation						
Met expectations	-0.308	-3.899	0.000	-0.331	-4.267	0.000
Promotion chances				-0.254	-2.979	0.003
Role ambiguity						
Role conflict	0.149	1.780	0.078	0.112	1.484	0.140
Supervisor support						
Too many changes	-0.129	-1.665	0.099	-0.125	-1.812	0.072
Too many managers	0.183	2.063	0.042			
Work overload	0.262	3.111	0.002	0.459	6.325	0.000
R^2	0.562			0.503		
Adjusted R^2	0.524			0.466		

Voice

The regression results for voice are reported in Tables 37 and 38. For engineers, the variance explained is 0.144 (adjusted R^2) for the original model and 0.249 for the best-fit model. For non-engineers, the variance explained is 0.107 (adjusted R^2) for the original model and 0.176 for the best-fit model. The best-fit model contains eight significant correlates for voice in engineers and six significant correlates for voice in non-engineers.

The regression analysis identified seven job satisfaction factors most important to voice in engineers. Voice in engineers was associated with increasing change failure ($\beta = 0.163$, $p = 0.096$), efficient reorganizations ($\beta = 0.168$, $p = 0.090$), growth opportunity ($\beta = 0.174$, $p = 0.129$), and job variety ($\beta = 0.188$, $p = 0.084$); and decreasing role ambiguity ($\beta = -0.464$, $p = 0.000$)., supervisory support ($\beta = -0.305$, $p = 0.009$), and satisfaction in executive leadership ($\beta = -0.196$, $p = 0.092$). Thus, voice among engineers is associated with satisfaction with growth opportunity, role clarity, and reorganization efficiency, but with dissatisfaction in supervisors, executives, and organizational changes.

Three job satisfaction factors are associated with voice in non-engineers. For this group, voice increases as reorganization efficiency ($\beta = 0.139$, $p = 0.106$), job variety ($\beta = 0.260$, $p = 0.004$), and work overload ($\beta = 0.153$, $p = 0.065$) increased. Thus, voice among non-engineers is associated with satisfaction in the individuals job and organizational changes, but with an excessive workload.

Table 37

Original Linear Regression Analysis: Voice

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support	0.052	0.435	0.665	0.026	0.241	0.810
Fairness of pay	-0.052	-0.422	0.674	-0.111	-0.997	0.321
Firm-specific skills	-0.008	-0.070	0.944	-0.070	-0.600	0.549
Tenure	0.021	0.180	0.858	0.096	0.920	0.360
Alternatives						
Education utility	0.025	0.235	0.815	0.197	1.777	0.078
External opportunity	0.125	1.079	0.284	0.022	0.223	0.824
Job Satisfaction						
Autonomy	0.057	0.396	0.693	-0.065	-0.518	0.606
Change failure	0.114	0.995	0.323	0.015	0.129	0.898
Climate satisfaction	0.000	0.001	0.999	0.179	1.101	0.273
Efficient reorganizations	0.183	1.478	0.143	0.197	1.706	0.091
Executive leadership	-0.223	-1.369	0.175	-0.158	-1.169	0.245
Growth opportunity	0.146	0.955	0.343	-0.088	-0.543	0.588
Job variety	0.143	1.109	0.271	0.271	2.532	0.013
Manager cooperation	0.081	0.679	0.499	0.131	1.212	0.228
Met expectations	0.014	0.103	0.918	-0.072	-0.567	0.572
Promotion chances	-0.014	-0.095	0.924	0.006	0.046	0.963
Role ambiguity	-0.458	-3.253	0.002	-0.117	-0.905	0.368
Role conflict	0.002	0.016	0.987	0.090	0.795	0.428
Supervisor support	-0.323	-2.333	0.022	-0.062	-0.469	0.640
Too many changes	0.102	0.893	0.375	0.034	0.356	0.722
Too many managers	-0.033	-0.267	0.790	-0.028	-0.269	0.788
Work overload	0.068	0.521	0.604	0.166	1.611	0.110
R^2	0.331			0.257		
Adjusted R^2	0.144			0.107		

Table 38

Best-Fitting Linear Regression Models: Voice

	Engineers			Non-Engineers		
Scales	β	*t*	P	β	*T*	p
Job Investments						
Coworker support						
Fairness of pay				-0.130	-1.508	0.134
Firm-specific skills						
Tenure				0.128	1.581	0.116
Alternatives						
Education utility				0.226	2.613	0.010
External opportunity	0.120	1.257	0.212			
Job Satisfaction						
Autonomy						
Change failure	0.163	1.682	0.096			
Climate satisfaction						
Efficient reorganizations	0.168	1.714	0.090	0.139	1.630	0.106
Executive leadership	-0.196	-1.703	0.092			
Growth opportunity	0.174	1.532	0.129			
Job variety	0.188	1.748	0.084	0.260	2.939	0.004
Manager cooperation						
Met expectations						
Promotion chances						
Role ambiguity	-0.464	-4.026	0.000			
Role conflict						
Supervisor support	-0.305	-2.651	0.009			
Too many changes						
Too many managers						
Work overload				0.153	1.865	0.065
R^2	0.308			0.214		
Adjusted R^2	0.249			0.176		

Regression Results Summary

The significant correlates from the backward elimination regression analyses are summarized in Table 39 for engineers and in Table 40 for non-engineers. The hypothesized sign for each relationship is shown in these tables on the first line of each category: job investments, alternatives, and job satisfaction. The regression coefficient is reported for job investments and alternatives. For job satisfaction factors, the variable name and the sign of significant coefficients are given. An "(R)" notation is listed for variables where the factor is defined as a dissatisfier rather than a satisfier. In these cases, the sign of the correlation shown is the reverse of that reported in the regression analysis results.

Table 39

Comparison of Model and Backward Regression Coefficients for Engineers

	Neglect	Search	Active Loyalty	Passive Loyalty	Voice
Job Investments					
MODEL	(-)	(-)	(+)	(+)	(+)
Coworker support		-0.094	0.275		(0.052 ns)
Fairness of pay	0.174	0.123	-0.306	-0.201	(-0.052 ns)
Firm-specific skills	-0.146	0.121			
Tenure		0.220			(0.021 ns)
Alternatives					
MODEL	(-)	(+)	(+)	(-)	(+)
Education utility	-0.194	0.258	0.181	0.131	
External opportnty			0.116		0.120
Job Satisfaction					
MODEL	(-)	(-)	(+)	(+)	(+)
	Role ambiguity (0.254)	Met expectations(-0.308)	Job variety (0.309)	Efficient reorg's (0.434)	Role ambiguity (-0.464)
	Role conflict (-0.215)	Workload (0.262)	Climate satsfcn (0.257)	Role conflict (0.204)	Spvsr support (-0.305)
	Efficient reorg's (-0.211)	2 many mgrs (0.183)	Role conflict (0.244)	Autonomy (-0.181)	Exec leadership (-0.196)
	Met expectations(-0.188)	Role conflict (0.149)	Exec leadership (-0.208)	Spvsr support (0.176)	Job variety (0.188)
	Change failure (0.188)	2 many changes (-0.129)	Workload (0.165)	Promo chances (0.153)	Growth (0.174)
	Job variety (-0.181)		Efficient reorg's (0.128)	Job variety (0.123)	Efficient reorg's (0.168)
					Change failure (0.163)

Table 40

Comparison of Model and Backward Regression Coefficients for Non-Engineers

	Neglect	Search	Active Loyalty	Passive Loyalty	Voice
Job Investments					
MODEL	(-)	(-)	(+)	(+)	(+)
Coworker support			0.135		
Fairness of pay	0.275	0.195			-0.130
Firm-specific skills		(-0.079 ns)	-0.150	(-0.108 ns)	
Tenure	-0.161		0.174	(0.109 ns)	0.128
Alternatives					
MODEL	(-)	(+)	(+)	(-)	(+)
Education utility	-0.256		0.373	0.220	0.226
External opportnty		(0.033 ns)	0.145	0.111	
Job Satisfaction					
MODEL	(-)	(-)	(+)	(+)	(+)
	Job variety (-0.354)	Workload (0.459)	Growth (-0.245)	Job variety (0.357)	Job variety (0.260)
	Met expectations (-0.195)	Met expectations(-0.331)	Workload (0.231)	Exec leadership (0.333)	Workload (0.153)
	Exec leadership (-0.193)	Promo chances (-0.254)	Job variety (0.157)	Met expectations (0.204)	Efficient reorg's (0.139)
	Autonomy (0.178)	Efficient reorg's (0.134)	Climate satsfcn (0.112)	Growth (-0.200)	
	Workload (0.152)	Exec leadership (-0.131)		Autonomy (-0.186)	
	Role ambiguity (0.145)	2 many changes (-0.125)		2 many changes (-0.173)	
	Change failure (0.119)	Role conflict (0.112)		Promo chances (-0.169)	
		Job variety (-0.093)			

Hypothesis 1: Job Investments

Four job investment measures were used in this study: two psychological measures of coworker support and tenure, and two economic measures of firm-specific skills and fairness of pay (Withey & Cooper, 1992). As shown earlier in Tables 39 and 40, coworker support emerged as a significant correlate three times, fairness of pay emerged seven times, firm-specific skills was seen three times, and tenure arose four times. Consistent with Hypothesis 1, at least one of these measures emerged as a significant correlate in the direction predicted by the model: high job investments increased constructive behaviors and decreased destructive behaviors.

As a job investment, *coworker support* measures psychological costs of leaving friendships formed in the workplace (Rusbult et al., 1988). The strongest correlations involving coworker support concern its relationship to active loyalty ($\beta = 0.275$ for engineers; $\beta = 0.135$ for non-engineers). These results support the findings of Organ and Lingl (1995), who reported that coworker satisfaction explained 7% of the variance in organizational citizenship behavior among manufacturing employees ($\Delta R^2 = 0.069$, $p < 0.01$). Consistent with the findings of Withey and Cooper (1992), this study also found that active loyalty was "associated with high psychological exit costs . . . but low economic exit costs (i.e., skill specificity and sunk costs)" (Withey & Cooper, 1992, p. 236), while passive loyalty is associated more with economic than psychological costs. In the present study, coworker support and tenure correlated positively with active loyalty while firm-specific skills and fairness of pay correlated negatively.

In all but one significant correlation, *tenure* weakly supported Hypothesis 1, with regression coefficients between 0.128 and 0.174. Employees with longer employment at the company exhibited increased constructive behaviors and lower destructive behaviors. The strongest correlation was found between tenure and search ($\beta = 0.220$ for engineers), where employees with

longer tenure were more likely to search. The relationship between *firm-specific skills* and employee behaviors was inconclusive and weak, with all significant regression coefficients falling below 0.150. The direction of correlation supported Hypothesis 1 for neglect behavior, but not for active loyalty and search. These results contradict those of previous researchers who found increased loyalty and decreased search behavior with lower transferable skills (Allen & Meyer, 1990; Mueller & Price, 1990). The *fairness of pay* scale correlated as predicted by Hypothesis 1 in all cases. The two strongest correlations were with active loyalty ($\beta = 0.306$ among engineers) and neglect ($\beta = -0.275$ among non-engineers). These findings are consistent with previous research in organizational commitment (Allen & Meyer, 1990; Wallace, 1995a, 1995b) and intent to stay (Curry et al., 1986; Mueller et al., 1994).

Hypothesis 2: Quality of Alternatives

Two measures of alternatives were used in this study: education utility and external opportunity. Consistent with Hypothesis 2, all significant correlations in all behaviors except one showed the expected relationships. Higher alternatives correlated positively with active behaviors (search, voice, and active loyalty) and negatively with passive behaviors (neglect). The relationship between education utility and employee behaviors was especially strong for non-engineers where significant regression coefficients ranged between 0.220 and 0.373. In contrast, significant correlations for engineers ranged between 0.131 and 0.258. Education utility was one of the strongest correlates of employee behavior, emerging in 8 out of 10 possible relationships.

However, the relationship between alternatives and *passive loyalty* directly, and significantly, contradicts the EVLN model for both engineers ($\beta = 0.131$ for education utility) and non-engineers ($\beta = 0.220$ for education utility and $\beta = 0.111$ for external opportunity).

Hypothesis 3: Job Satisfaction

Consistent with Hypothesis 3, at least one significant measure of job satisfaction correlated to each behavior for both engineers and non-engineers in the direction predicted by the model. Thus, increased job satisfaction was associated with higher tendency toward constructive behaviors (voice, passive loyalty, and active loyalty) and lower tendencies toward destructive behaviors (neglect and search).

Fifty-nine significant correlations emerged in the backward elimination regression analysis between the five employee behaviors and sixteen job satisfaction variables. To simplify the discussion of these results, seven categories were formed: job variety, organizational change, work stress, climate, met expectations, growth, and autonomy. The scales that comprise each category are listed in Table 41 along with the number of significant correlations that resulted for each job satisfaction variable. Only one of the job satisfaction variables, manager cooperation, did not result in any significant correlations. Manager cooperation was a one-item variable that did not load strongly on any factor during the factor analysis.

Among engineers, eight of the sixteen job satisfaction variables resulted in strong correlations where the regression coefficient exceeded 0.230: climate satisfaction, efficient reorganizations, job variety, met expectations, role ambiguity, role conflict, supervisor support, and workload. Among non-engineers, six of the sixteen job satisfaction variables resulted in strong correlations where the regression coefficient exceeded 0.230: executive leadership, growth, job variety, met expectations, promotion chances, and workload. Three of these strong correlates are shared between engineers and non-engineers: job variety, met expectations, and workload. Each of the job satisfaction categories and strong correlates will be discussed in detail in the conclusions chapter.

Table 41

Categories of Significant Correlations of Job Satisfaction Scales and Employee Behaviors

Job Satisfaction Category	Total Correlations in Category	Job Satisfaction Variables	Number Correlations for Variable
Job variety	9	Job variety	9
Organizational change	12	Efficient reorg's	6
		Change failure	3
		Too many changes	3
Work stress	14	Workload	6
		Role conflict	5
		Role ambiguity	3
Climate	10	Executive leadership	5
		Climate satisfaction	2
		Supervisor support	2
		Too many managers	1
Met expectations	5	Met expectations	5
Growth opportunity	6	Growth	3
		Promotion chances	3
Autonomy	3	Autonomy	3
Total	59		59

The overall level of satisfaction among employees in this study was fairly low. Based on the interpretation of the Likert scale described below, and as shown in Table 42, engineers were dissatisfied on 31% of the job satisfaction variables, satisfied to some extent on 63% of the variables, and satisfied on 6% of the variables. Non-engineers were dissatisfied on 38% of the job

satisfaction variables, satisfied to some extent on 56% of the variables, and satisfied on 6% of the variables. The one satisfactory scale for both groups was the one-item *too many mangers* variable measured by the question "I am frustrated by the number times I have been assigned to a different manager since joining ABC."

The above results were based on the 7-point Likert scale used in this study where a score of 1 was assigned to the "not at all" response, a score of 4 to the "to some extent" response, and a score of 7 to the "to a great extent" response. For variables with positively worded questions (e.g., Senior management has a clearly defined vision for ABC), a score of 5.1 or above on the Likert scale indicates strong satisfaction; a score between 4.0 and 5.1 indicates a moderate level of satisfaction; and a score below 3.99 indicates dissatisfaction. For negatively worded questions (e.g., My job rarely allows me to take part in making decisions that affect me), satisfaction is indicated by scores below 2.9, moderate satisfaction is scored between 3.0 and 3.9, and dissatisfaction is scored above 4.0.

Table 42

Average Score on Job Satisfaction Scales for Engineers and Non-Engineers

Category	Engineers		Non-Engineers	
	Number of Variables	Percent	Number of Variables	Percent
Dissatisfied	5	31%	6	38%
Satisfied to some extent	10	63%	9	56%
Satisfied	1	6%	1	6%
TOTAL SCALES	16	100%	16	100%

Hypothesis 4: Different Job Satisfiers for EVLN Behaviors

The summary of significant correlations between job satisfaction variables and employee behaviors, presented earlier in Tables 40 and 41, showed that different satisfaction variables were significant for different behaviors, thereby rejecting Null Hypothesis 4. As Leck and Saunders (1992) had argued, different facets of dissatisfaction led to different behaviors. In this study, neglect and search were associated with dissatisfaction factors, but active loyalty, passive loyalty, and voice were all associated with both satisfiers and dissatisfiers. Results for engineers and non-engineers were very similar for neglect and search, but different for active loyalty, passive loyalty, and voice. The most significant correlations ($b > 0.230$) between job satisfaction variables and employee behaviors are listed in Table 43 to help discern patterns behind these differences.

Neglect was associated primarily with dissatisfaction at the task level, as evidenced by correlates with role conflict, role ambiguity, job variety, workload, and autonomy. To a lesser extent, neglect was associated with dissatisfaction with organizational stability and efficiency (efficient reorganization, change failure, and met expectations).

Search was associated with excessive workload and unmet expectations, which seemed to measure a general level of dissatisfaction. Lack of promotion chances also correlated strongly with search for non-engineers.

Passive loyalty was associated with a general satisfaction with both the job and company leadership (job variety, executive leadership, and met expectations) in non-engineers. Among engineers, passive loyalty was most strongly associated with efficient reorganization and role conflict.

In engineers, voice was associated with satisfaction in task-related areas (role ambiguity, job variety) and dissatisfaction with leadership (supervisor support, executive leadership, change failure). Among non-engineers, voice was associated with job variety.

Active loyalty in engineers appeared to be mainly a positive response to satisfaction, with strong associations to job variety and climate satisfaction. Among non-engineers, active loyalty seemed more a coping response to excessive workload and lack of growth opportunities.

Table 43

Hypothesis 4: Differences between JS factors for EVLN behaviors with $\beta > 0.230$

Behavior	Model	Engineers	Non-Engineers
Neglect	(-)	(-) Role ambiguity (R)	(-) Job variety
Search	(-)	(-) Met expectations (-) Workload (R)	(-) Met expectations (-) Workload (R) (-) Promotion chances
Active Loyalty	(+)	(+) Climate satisfaction (+) Job variety (+) Role conflict/variety	(-) Workload (R) (-) Growth
Passive Loyalty	(+)	(+) Efficient reorganizations	(+) Job variety (+) Executive leadership
Voice	(+)	(+) Role ambiguity (R) (-) Supervisor support	(+) Job variety

Discriminant Analysis Results for Hypothesis Testing

In this study, discriminant analysis is used to interpret "the ways in which groups differ—that is, is one able to 'discriminate' between the groups on the basis of some set of characteristics, how well do they discriminate, and which characteristics are the most powerful discriminators" (Klecka, 1980, p. 9). Discriminant analysis was performed for each employee behavior (active loyalty, passive loyalty, search, voice, and neglect) using engineers and non-engineers as the two groups of interest. Thus, the discriminant analysis examined how engineers and non-engineers *with a tendency to enact a given behavior* differ. Cases were selected for analysis only if the respondent indicated a strong propensity to enact the behavior.

Heavy User Selection

Prior to discriminant analysis, groups of employees who could be classified as heavy users of each behavior were selected. This selection was first attempted following Withey and Cooper's (1989) procedure of classifying individuals as "heavy users of one response if they had a . . . standardized score greater than or equal to one on the response and had standardized scores of less than one on each of the other three responses" (p. 531). This procedure identified 40 heavy users: 6 active loyalists, 12 neglecters, 9 passive loyalists, 6 searchers, and 7 voicers. The total of 40 heavy users out of a sample of 252 individuals (16%) is about half that achieved by Withey and Cooper's (1989) who selected 81 heavy users out of a sample size of 266 (30%). The difference in the number of heavy users identified may be due to differences in the items used to measure each behavior, different populations, and differences in normality of the behavioral responses.

Because of the low number of heavy users identified and the poor normality among some of the behavioral scales, an alternate selection criteria was employed, using the standardized median value instead of 1.0. This effort resulted in even fewer selections due to the direction of

skew in the data (e.g., the median was lower than 1.0 for three of the behaviors). The definition of a "heavy user" was then relaxed from one that showed strong use of a behavior and weak use of other behaviors to an individual who showed strong use of one behavior ($x \geq 45\%$ percentile) and moderate use of the other behaviors ($x < 55\%$ percentile). Unfortunately, this method resulted in many cases being selected as heavy users for more than one behavior! Other percentiles were selection (i.e., $x(n=i) \geq 47\%$ percentile, $x(n \neq i) < 53\%$ percentile), but a sample with sufficient quantity of data points (more than 15 in each group for each behavior) for engineers and engineers could not be obtained without excessive overlap among the behaviors.

Alternative Heavy User Selection Method

The final selection method ignored interactions between behaviors and evaluated only responses to each behavior. Because interactions between behaviors are ignored, the discriminant analysis results may not be reliable and conclusions must be drawn with great caution. In this selection method, selected cases had to score higher than 4.0 (somewhat agree with the behavior) or be in the top 35% of respondents, whichever resulted in at least 30 cases per profession. A summary of the results is shown in Table 44.

Table 44

Discriminant Analysis Characteristics for Each Behavior

Measure	Active Loyalty	Neglect	Passive Loyalty	Search	Voice
Cases ≥ ...	6.5	4.0	6.0	4.0	5.33
# engineers	33	9	36	30	45
# non-engrs	58	11	53	53	61
Total	91	20	89	83	106

Assumptions for Discriminant Analysis

Klecka (1980, p. 11) lists eight assumptions that underlie discriminant analysis. The first six assumptions are data cases should belong to at least two mutually exclusive groups, there must be at least two cases per group, the discriminating variables must be measured at the interval or ratio level of measurement, the total number of cases must exceed the number of variables by two, "no variable may be a linear combination of other discriminating variables" (p. 9), and two variables which are "perfectly correlated cannot be used at the same time" (p. 9). All six of these assumptions were met in this study. The two groups examined, engineers and non-engineers, were mutually exclusive. As seen earlier in Table 44, the number of cases per group exceeded two for each behavior and the total number of cases for each behavior exceeded 22 (the number of variables, 20, plus 2). All variables were measured with Likert scales, which are considered to represent interval data (Suskie, 1996, p. 35). Tables 17 and 20, presented earlier, showed that each item was used in only one scale. Thus, none of the variables share linear combinations with other variables. Also, Table 25 showed that none of the variables were perfectly correlated.

The two final assumptions were those of equal covariance matrices and multivariate normal distribution. The normality of the scales used in the analysis was discussed earlier. Most of the scales showed sufficient normality, except change success (in non-engineers), education utility (in both groups), instantly-managers (both groups), and instability-structure (engineers). Some departures from normality are acceptable in discriminant analysis because it "when this assumption is violated, the computed probabilities are not exact, but they may still be quite useful if interpreted with caution " (Klecka, 1980, p. 10).

Discriminant analysis also requires group covariance matrices to be equal to "provide maximum separation among the groups" (Klecka, 1980, p. 61). Tables 45 through 49 contain covariance matrices for discriminating variables resulting from the discriminant analysis on each of

the five employee behaviors: active loyalty, neglect, passive loyalty, search, and voice. In most cases, the signs for each covariance pair were the same across both groups and covariance magnitude differences fell below 10X. Thus covariance matrices were reasonably equivalent (SPSS, 1997, version 7.5®). The degree of departure from normality and covariance equality affected was assumed to be acceptable based on evidence that "discriminant analysis is a rather robust technique which can tolerate some deviation from these assumptions. In addition, not all of the aspects of discriminant analysis require these assumptions" (Klecka, 1980, p. 61).

Table 45

Covariance Matrices: Active Loyalty

Group	Factor	Promotion Chances	Instability-Managers	Climate Satisfaction
Engineers	Promotion chances	1.74		
	Too many managers	-1.36	3.84	
	Climate satisfaction	0.62	-1.03	1.12
Non-Engineers	Promotion chances	2.46		
	Too many managers	-0.79	3.39	
	Climate satisfaction	0.93	-0.54	1.08

Table 46

Covariance Matrices: Neglect

Group	Factor	Education utility	Executive leadership	Role conflict
Engineers	Education utility	4.444		
	Executive leadership	-1.843	1.262	
	Role conflict	-.375	.406	1.500
Non-Engineers	Education utility	3.833		
	Executive leadership	-.991	.355	
	Role conflict	1.111	-.226	1.067

Table 47

Covariance Matrices: Passive Loyalty

Group	Factor	External opportunity	Fairness of pay	Promotion chances
Engineers	External opportunity	.921		
	Fairness of pay	-.153	2.286	
	Promotion chances	.516	1.120	2.101
Non-Engineers	External opportunity	.591		
	Fairness of pay	-.230	2.389	
	Promotion chances	-.285	1.546	2.457

Table 48

Covariance Matrices: Search

Group	Factor	Promotion chances	Change Success	Job Variety
Engineers	Promotion chances	2.27		
	Change failure	0.66	2.67	
	Job variety	0.67	0.23	1.21
Non-Engineers	Promotion chances	2.10		
	Change failure	0.53	1.65	
	Job variety	0.51	0.54	1.56

Table 49

Covariance Matrices: Voice

Group	Factor	Job variety	Manager cooperation	Promotion chances	Role conflict
Engineers	Job variety	.620			
	Manager cooperation	.281	1.965		
	Promotion chances	.293	.911	2.045	
	Role conflict	.206	-.212	-.345	2.074
Non-Eng	Job variety	1.036			
	Manager cooperation	.412	2.515		
	Promotion chances	.428	.744	2.295	
	Role conflict	.144	-.227	-.526	1.447

The results for the discriminant analyses performed on each behavior follow. Each table of results contains the discriminating variables that resulted from the analysis along with several measures of analysis success along with their standardized canonical discriminant function coefficients. The coefficients indicate the relative contribution of the variable to the overall discrimination (SPSS, 1997, version 7.5®, p. 224). Two classification results are reported: percent of cases correctly classified for the original group and for cross-validation and a leave-one-out cross-validation statistic. Both values are given because the former statistic may be overly optimistic. The cross-validation statistic is calculated using a method where "each case is classified into a group according to the classification functions computed from all the data *except* the case being classified" (p. 228). Thus, the cross-validation statistic is expected to be less optimistic than the original classification percentage. A chi-square statistic, transformed from Wilks' lambda, is reported along with the degrees of freedom and significance. This statistic indicates the level of significance in the difference between the two groups' centroids. The chi-square test statistic for the appropriate degrees of freedom is also shown for comparative purposes. The mean score on each discriminating variable for engineers and non-engineers, the results of a z-test between these two means, and the z-statistic and two-tailed significance are also reported in these tables.

Discriminant Analysis: Active Loyalty

The *t* test reported earlier in Table 26 indicated that engineers are less likely to exhibit active loyalty behavior than non-engineers are ($t = -2.497$, $p = 0.013$). Discriminant analysis between the 33 engineers and 58 non-engineers most likely to exhibit active loyalty behavior indicates a significant difference between the groups ($\chi^2 = 20.756$, $p = 0.000$, df = 3). Thus, a significant difference may be said to exist between engineers and non-engineers in their use of active loyalty behavior.

Table 50

Discriminant Analysis Results for Active Loyalty

	Discriminant	z test Comparison of Means			
Factor	*D*	*M* (engineers)	*M* (non-engrs)	*z*	*p*
Climate satisfaction	0.336	3.89	3.26	2.809	0.006
Too many managers	0.602	2.70	2.34	0.857	0.394
Promotion chances	0.857	4.25	2.96	4.074	0.000
% Correctly classified	76.9 %				
Cross-validation	74.7 %				
χ^2	20.756				
p	0.000				
df	3				

Employees having a strong propensity to enact active loyalty behavior comprised 34.2% of the sample and provided a mean response of 6.5 or greater on the active loyalty scale. This group of employees included 33 engineers (30% of all engineers) and 58 non-engineers (39% of all non-engineers). Table 50 contains the results of the discriminant analysis for active loyalty. The factors most useful in discriminating between engineers and non-engineers are climate satisfaction, frustration with frequency of managerial change, and promotion chances. These three factors result in 76.9% correct classification overall and 74.7% correct cross-validated classification. The proportional chance criterion for this factor is 53.77%, 20.93 percentage points below the reported classification percentage. The chi-square value for the active loyalty analysis was 20.756 (p = 0.000), greater than the test statistic of 7.81 (df = 3, α = 0.05). These results indicate that the three factors significantly discriminate between engineers and non-engineers for active loyalty.

The discriminant analysis for active loyalty indicated that climate satisfaction, promotion chances, and dissatisfaction with managerial change discriminated best between the employees

most likely to exhibit active loyalty behavior, resulting in a 74.7% cross-validated correct classification rate. In this subgroup (n = 91), engineers were significantly less dissatisfied with the climate than non-engineers were (t = 2.809, p = 0.006), significantly more satisfied with promotion changes than non-engineers were (t = 4.074, p = 0.000), and slightly more satisfied with number of managerial changes than non-engineers were (t = 0.857, p = 0.394). Compared to the full sample, the high active loyalty engineers were more satisfied with their promotion chances (z = 1.550, p = 0.121) and slightly more satisfied with the climate (z = 0.847, p = 0.395) and managerial changes (z = 0.697, p = 0.484). Compared to the full sample of non-engineers, the high active loyalty subgroup were insignificantly different in satisfaction with promotional changes (z = -0.584, p = 0.562), climate (z = -0.064, p = 0.952), and managerial changes satisfaction (z = 0.025, p = 0.976).

Discriminant Analysis: Neglect

The t test reported in Table 26 indicated no significant difference between the mean response of engineers and non-engineers on the neglect scale (t = 0.233, p = 0.824). The extremely close frequencies reported in Table 27 (7.7% for engineers, 7.6% for non-engineers) support the t test results. However, discriminant analysis between the 9 engineers and 11 non-engineers most likely to exhibit neglect behavior indicated a significant difference (χ^2 = 16.565, p = 0.001, df = 3) between the subset of employees. Thus, while the total sample of does not show a difference in their propensity to neglect, differences do exist between the individuals most likely to neglect.

Employees having a strong propensity to enact neglect behavior comprised 7.5% of the sample and provided a mean response of 4.0 or greater on the neglect scale. This group of employees included 9 engineers (7.6% of all engineers) and 11 non-engineers (7.4% of all non-engineers). Table 51 contains the results of the discriminant analysis for neglect.

Table 51

Discriminant Analysis Results for Neglect

	Discriminant	t test Comparison of Means			
Factor	D	M (engineers)	M (non-engrs)	t	p
Executive leadership	1.423	3.70	2.53	2.873	0.010
Role conflict	-0.732	4.00	5.41	-2.779	0.012
Education utility	1.179	5.22	5.64	-0.460	0.651
% Correctly classified	90 %				
Cross-validation	85 %				
χ^2	16.565				
p	0.001				
df	3				

The factors most useful in discriminating between engineers and non-engineers are confidence in executive leadership, role conflict, and education utility. These three factors result in 90.0% correct classification overall and 85.0% correct cross-validated classification. The proportional chance criterion for this factor is 50.5%, which is 34.5 percentage points below the resulting classification. The chi-square value for the neglect analysis was 16.565 ($p = 0.001$), greater than the test statistic of 7.81 ($df = 3$, $\alpha = 0.05$). These results indicate that the three factors discriminate between engineers and non-engineers for neglect.

The discriminant analysis results indicated that education utility, executive leadership, and role conflict discriminated most strongly between employees most likely to exhibit neglect behavior, resulting in an 85% cross-validated correct classification rate. In this small group ($n = 20$), non-engineers perceived significantly more role conflict ($t = -2.779$, $p = 0.012$), significantly lower satisfaction with executive leadership ($t = 2.873$, $p = 0.010$), and were slightly more satisfied

with the external utility of their formal education (not significant at t = -0.460, p = 0.651). These results were taken with caution due to the very small group size.

Compared to the total sample of each profession, highly neglectful engineers were slightly (but not significantly) less satisfied in all three discriminating factors: education utility (z = -0.801, p = 0.424), executive leadership (z = -0.646, p = 0.516), and role conflict (-0.749, p = 0.453). Compared to the full sample of non-engineers, the highly neglectful group perceived greater role conflict (z = 1.515, p = 0.131), was significantly less satisfied with executive leadership (z = -4.834, p = 0.000), and perceived lower external utility of their formal education (z = -0.411, p = 0.696). Thus, for the subset of employees likely to neglect, low satisfaction with executive leadership was extremely important to non-engineers, while insufficient role conflict (job variety interpretation) was extremely important to engineers.

Discriminant Analysis: Passive Loyalty

The t test reported in Table 26 indicated no significant difference between the propensity for engineers and non-engineers to enact passive loyalty behavior (t = -1.022, p = 0.308). The frequencies reported in Table 27 (88% for engineers, 89.7% for non-engineers) support the t test results. Discriminant analysis between the 36 engineers and 53 non-engineers most likely to exhibit passive loyalty behavior indicated a significant difference (χ^2 = 18.006, p = 0.000, df = 3) between the subset of employees. Thus, while the total sample of engineers and non-engineers does not show a difference in their propensity for passive loyalty behavior, differences do exist between the individuals most likely to be passively loyal. Employees having a strong propensity to enact passive loyalty behavior comprised 33.5% of the sample and provided a mean response of 5.0 or greater on the passive loyalty scale. This group of employees included 36 engineers (30.5% of all engineers) and 53 non-engineers (35.8% of all non-engineers).

Table 52

Discriminant Analysis Results for Passive Loyalty

	Discriminant	z test Comparison of Means			
Factor	*D*	*M* (engineers)	*M* (non-engrs)	z	*p*
External opportunity	0.749	5.58	6.04	-2.122	0.037
Promotion chances	-1.075	4.16	3.16	2.984	0.004
Fairness of pay	0.685	4.20	4.11	0.257	0.798
% Correctly classified	71.9 %				
Cross-validation	70.8 %				
χ^2	18.006				
p	0.000				
df	3				

Table 52 contains the results of the discriminant analysis for passive loyalty. The factors most useful in discriminating between engineers and non-engineers are external opportunity, fairness of pay, and promotion chances. These three factors result in 71.9% correct classification overall and 70.8% correct cross-validated classification. The proportional chance criterion for this factor is 51.82%, which is 18.98 percentage points below the resulting classification. The chi-square value for the passive loyalty analysis was 18.006 ($p = 0.000$), greater than the test statistic of 7.81 ($df = 3$, $\alpha = 0.05$). These results indicate that the three factors discriminate between engineers and non-engineers for passive loyalty.

Discriminant analysis results indicated that external opportunity, fairness of pay, and promotion chances discriminated most strongly between the employees most likely to be passively loyal, resulting in an 70.8% cross-validated correct classification rate. In this subgroup ($n = 89$), engineers perceived significantly lower external opportunities than did non-engineers ($t = -2.122$, p

= 0.037), significantly higher promotion chances (t = 2.984, p = 0.004), and equivalent satisfaction with pay fairness (t = 0.257, p = 0.798).

Compared to the total sample of each profession, engineers high in passive loyalty perceived significantly fewer external opportunities (z = -1.408, p = 0.159), slightly higher promotion chances (z = 1.153, p = 0.795), and equivalent satisfaction with pay fairness (z = -0.303, p = 0.764). Compared to the full sample of non-engineers, non-engineers high in passive loyalty perceive significantly higher external opportunity (z = 2.158, p = 0.012) and equivalent satisfaction with pay fairness (z = 0.224, p = 0.826) and promotion chances (z = 0.235, p = 0.810). Thus, for the subset of employees most likely to be passively loyal, external opportunity and promotion chances were more important to non-engineers.

Discriminant Analysis: Search

The t test reported in Table 26 indicated that engineers were less likely to exhibit search behavior than non-engineers are (t = -1.859, p = 0.064). The frequencies reported in Table 27 (25.6% for engineers, 36.6% for non-engineers) support the t test results. Discriminant analysis between the 30 engineers and 53 non-engineers most likely to exhibit search behavior indicated a barely significant difference (χ^2 = 7.794, p = 0.050, df = 3) between the subsets of employees. Thus, while the total sample of engineers and non-engineers does show a difference in their propensity for search behavior, only minor differences exist between the individuals most likely to search.

Employees having a strong propensity to enact search behavior comprised 31.2% of the sample and provided a mean response of 4.0 or greater on the search scale. This group of employees included 30 engineers (25.4% of all engineers) and 53 non-engineers (35.8% of all non-engineers). Table 53 contains the results of the discriminant analysis for search.

Table 53

Discriminant Analysis Results for Search

	Discriminant	z test Comparison of Means			
Factor	*D*	*M* (engineers)	*M* (non-engrs)	z	*p*
Promotion chances	0.724	3.38	2.63	2.226	0.029
Change failure	0.577	3.13	3.37	-0.712	0.478
Job variety	0.526	4.94	4.47	1.735	0.087
% Correctly classified	68.3 %				
Cross-validation	67.1 %				
χ^2	7.794				
p	0.050				
df	3				

The factors most useful in discriminating between engineers and non-engineers are change success, job variety, and promotional chances. These three factors result in 68.3% correct classification overall and 67.1% correct cross-validated classification. The proportional chance criterion for this factor is 53.84%, which is 13.26 percentage points below the resulting classification. The chi-square value for the search analysis was 7.794 ($p = 0.050$), just below the test statistic of 7.81 ($df = 3$, $\alpha = 0.05$). These results indicate that the three factors *do not* discriminate strongly between engineers and non-engineers for search.

The discriminant analysis results for search indicated that change success, job variety, and promotion chances discriminated most strongly between the employees most likely to exhibit search behavior, resulting in an 67.1% cross-validated correct classification rate. In this subgroup ($n = 83$), non-engineers perceived significantly lower promotion chances ($t = 2.226$, $p = 0.029$), significantly lower satisfaction with job variety ($t = 1.735$, $p = 0.087$), and were equally satisfied with change success (not significant at $t = -0.712$, $p = 0.478$).

Compared to the total sample of each profession, engineers most likely to search were less satisfied in all three discriminating factors: change success (z = -1.776, p = 0.075), job variety (not significant at z = -0.337, p = 0.734), and promotion chances (z = -1.561, p = 0.119). Compared to the full sample of non-engineers, the subgroup most likely to search were similarly less satisfied in all three discriminating factors: change success (z = -0.973, p = 0.332), job variety (z = -0.565, p = 0.569), and promotion chances (z = -2.011, p = 0.044). Thus, for the subset of employees most likely to search, promotion chances were slightly more important for non-engineers, change success was more important for engineers, and job variety was more important for non-engineers.

Discriminant Analysis: Voice

The t test reported in Table 26 found no significant difference between the propensity for engineers and non-engineers to voice (t = -0.694, p = 0.488). However, the frequencies reported in Table 27 (82.9% for engineers, 88.3% for non-engineers) indicate that engineers use voice somewhat less than do non-engineers. Discriminant analysis between the 45 engineers and 61 non-engineers most likely to exhibit voice behavior indicated a significant difference (χ^2 = 20.469, p = 0.000, df = 4) between the subsets of employees. Thus, a limited difference may be said to exist between the use of voice among engineers and non-engineers.

Employees having a strong propensity to enact voice behavior comprised 39.8% of the sample and provided a mean response of 5.33 or greater on the voice scale. This group of employees included 45 engineers (38.1% of all engineers) and 61 non-engineers (41.2% of all non-engineers). Table 54 contains the results of the discriminant analysis for voice. The factors most useful in discriminating between engineers and non-engineers are manager cooperation, job variety, role conflict, and promotional chances. These three factors result in 71.4% correct classification overall and 67.9% correct cross-validated classification.

Table 54

Discriminant Analysis Results for Voice

	Discriminant	z test Comparison of Means			
Factor	D	M (engineers)	M (non-engrs)	z	p
Job variety	0.500	5.25	4.79	2.959	0.004
Manager cooperation	-0.499	4.67	4.82	-0.579	0.563
Promotion chances	0.626	4.49	5.09	-2.744	0.007
Role conflict	-0.563				
% Correctly classified	71.4 %				
Cross-validation	67.9 %				
χ^2	20.469				
p	0.000				
df	4				

The proportional chance criterion for this factor is 51.7%, which is 16.2 percentage points below the resulting classification. The chi-square value for the voice analysis was 20.469 (p = 0.000), greater than the test statistic of 9.49 (df = 4, α = 0.05). These results indicate that the three factors discriminate between engineers and non-engineers for voice.

The discriminant analysis results for voice indicated that job variety, managerial cooperation, promotion chances, and role conflict discriminated most strongly between the employees most likely to exhibit voice behavior, resulting in an 70.9% cross-validated correct classification rate. In this subgroup (n = 106), engineers were significantly more satisfied than non-engineers with job variety (t = 2.959, p = 0.004), significantly more satisfied with promotion chances (t = 4.287,p = 0.000), perceived significantly less role conflict (t = -2.744, p = 0.007),and had equivalent satisfaction with managerial cooperation (t = -0.57, p = 0.563).

Compared to the total sample of each profession, engineers highly in voice were slightly more satisfied in all four discriminating factors: job variety (z = 1.617, p = 0.105), managerial cooperation (z = 0.550, p = 0.582), promotion (z = 1.221, p = 0.222), and role conflict (z = 0.676, p = 0.497). Compared to the full sample of non-engineers, the highly voice group was significantly more satisfied with job variety (z = 1.336, p = 0.180); but equally satisfied with managerial cooperation (z = 0.369, p = 0.711, promotion (z = 0.000, p = 1.000), and role conflict (z = 0.842, p = 0.401). Thus, for the subset of employees likely to voice, job variety and promotional chances are more important to engineers, while role conflict is more important to non-engineers.

Hypothesis 5: Engineers versus Non-Engineers

As shown earlier in Table 26, t tests between the mean scores of engineers and non-engineers on each independent variable indicated that the two groups differ significantly in ten of the twenty factors. Engineers are more satisfied than non-engineers with climate (t = 3.85, p = 0.000), executive leadership (t = 2.33, p = 0.021), growth opportunities (t = 2.898, p = 0.004), job variety (t = 3.39, p = 0.001), met expectations (t = 1.664, p = 0.097), promotion chances (t = 4.27, p = 0.000), and supervisor support (t = 2.34, p = 0.020). Engineers are also less frustrated with the frequency of organizational changes (t = -2.37, p = 0.018), the impact of reorganizations (t = -2.60, p = 0.010), and the level of role conflict (t = -3.56, p = 0.000). Thus, engineers are generally more satisfied than their non-engineering colleagues.

Summary of Results and Analysis

The results reported in this chapter indicate that the data collected in this study are sufficiently free of bias and normally distributed to support advanced statistical analysis. Empirically separate scales were developed for each dependent and independent variable and were

shown to meet guidelines for reliability and validity. These scales were then used in *t* test and regression analysis to test the four hypotheses of this study. The majority of the results support the four hypotheses, although several unexpected findings emerged. Overall, the modified EVLN model developed in this study was supported by the data. Interpretation of these results and a discussion of the implications of these findings will be presented in the following chapter.

Farrell and Rusbult's (1992) EVLN model was supported for both engineers and non-engineers. Overall, each hypothesis was supported by significant findings for most behaviors. In support of Hypothesis 1, higher job investments were associated with higher tendencies toward constructive behaviors (voice and active loyalty) and lower tendencies toward destructive behaviors (search and neglect). In support of Hypothesis 2, higher alternatives correlated positively with active behaviors (search, voice, and active loyalty) and negatively with passive behaviors (neglect). In support of Hypothesis 3, increased job satisfaction was significantly associated with higher tendency toward constructive behaviors (voice, passive loyalty, and active loyalty) and lower tendencies toward destructive behaviors (neglect and search). In support of Hypothesis 4, significantly different job satisfaction factors emerged for engineers and non-engineers on each behavior.

The following chapter contains a discussion of the interpretation and implications of these findings. The results and their implications are discussed in greater detail, especially for job satisfaction factors and for differences between engineers and non-engineers. Interpretations are made to explain the findings within the context of the population and industry used in the study. Implications of the findings for companies, managers, employees, and researchers are then discussed.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The model developed in this study was used effectively to study employees' behavioral reactions to job satisfaction and dissatisfaction. All five null hypotheses were rejected by most of the findings. However, several contradictory results illuminated the processes underlying differences in attitudes and behaviors of engineers and non-engineering professionals.

Effectiveness of Model

EVLN and Price-Mueller Models Utility in High-Tech

The model developed for this study was strongly supported by the findings. As described earlier, the five behaviors (search, voice, active loyalty, passive loyalty, and neglect) were separately distinguishable. Moreover, the independent variables used in this study explained greater variance (adjusted R^2) in the behaviors than previously reported (values reported earlier in Table 28). Thus, this study upholds the use of the EVLN typology with a high-tech population, responding to Rusbult et al.'s (1998) appeal that "future investigators will need to assess the validity of the present [EVLN] model across varied employment settings" (p. 617). The utility of the EVLN model in the high-tech setting is not surprising considering the wealth of previously successful applications of Hirschman's (1970) basic EVL model: political parties, consumer attitudes, citizenship behavior, and romantic partners. However, this study expands the generality of this model as applied to employment situations.

This study also upheld the application of many of the Price-Mueller structural variables to a high-tech population, responding to Hom and Griffeth's (1995) appeal for the Price-Mueller

model to be applied to nonhospital based populations. Thus, this study has taken a significant step in expanding the generality of these variables. This study also validated the addition of new independent variables to the Price-Mueller model. Over 30% of the 59 significant correlations between job behaviors and job satisfaction factors involved new scales of climate satisfaction, executive leadership, and the multiple instability items. These results indicate that while certain factors may be needed to better explain the variance in behaviors for different populations, a basic group of employee behaviors and job satisfaction variables may exist that apply across employee populations.

As will be seen in later sections, the only behavior that did not emerge as previously defined was passive loyalty, a behavior which has proven to be troublesome in other studies (Leck & Saunders, 1992; Withey & Cooper, 1989), thereby initiating a controversy over how to best define passive loyalty. In response to this controversy, the model derived for this study included two types of loyalty: active and passive. The dependent variable factor analysis confirmed that the items designed to measure these two scales loaded on different factors, although one of the five active loyalty items loaded more strongly on the passive loyalty factor. The present study also supported Withey and Cooper's (1992) finding that active loyalty was significantly associated with higher psychological job investments and lower financial ones, while passive loyalty in non-engineers was associated (but not significantly) with lower psychological job investments and higher financial ones. This study further supported Withey and Cooper's finding that passive loyalty is associated with lower job satisfaction in some factors. However, in contrast to Withey and Cooper's inconclusive results, this study found both loyalties to be significantly associated with greater external opportunities.

The study also upheld the decision to keep active loyalty a separate behavior, a decision made during the factor analysis despite the fact that active loyalty and neglect loaded on the same

factor. The results of the regression and discriminant analysis support this choice based on the different variables that correlated strongly with the two behaviors. The opposite correlations between independent variables and these two behaviors support the assumption that neglect and active loyalty are conceptual opposites. For both engineers and non-engineers, active loyalty correlated positively to job investments, alternatives, and job satisfaction, while neglect correlated negatively to these three categories of determinants. Moreover, the strongest job satisfaction aspects associated with the two behaviors are largely different. Thus, the use of two types of loyalty in the EVLN model was supported. However, the weakness of the passive loyalty scale and the inconsistent correlations with independent variables indicates that the question of how to define passive loyalty is not answered in this study. As will be discussed in later sections, further work is needed to clarify the passive loyalty concept and measurement.

Executive Leadership and Climate Satisfaction

Both of the two new scales, executive leadership and climate, resulted in significant correlations. *Executive leadership* emerged significantly in 5 of the 10 regression analyses: active loyalty and voice for engineers; passive loyalty, neglect, and search for non-engineers. *Climate satisfaction* emerged twice—in active loyalty for both engineers and non-engineers. The most contestable decision made during scale development was maintaining a separation between executive leadership and climate satisfaction. These factors were closely correlated at a Pearson's coefficient of 0.725 ($p < .001$). Despite this high correlation, bordering on multicollinearity, the different behavior of the two scales supported the decision to keep them as separate factors in the analysis. Clearly, the inclusion of these two new scales, climate and executive leadership has expanded the understanding of what job factors are associated with employee behaviors, especially for engineers.

Instability Measures

The three instability items (efficient reorganization, too many changes, and too many managers) behaved differently in the regression analyses, as would be expected due to their poor reliability as a combined scale. However, these one-item measures emerged frequently as significant correlates to employee behavior: efficient reorganization emerged five times, too many changes emerged in three models, and too many managers emerged once.

The significant size and number of correlations between employee behaviors and these new items supports their inclusion in future studies of high-tech populations. However, as will be discussed in later sections, more work is needed to develop a reliable scale for instability. Because of the consistent and strong correlation of efficient reorganizations item with the behaviors, this study indicates that the most successful type of instability for scale development may concern attitudes toward reorganization success.

Hypothesis 1: Job Investments

As described in the previous chapter, at least one of the four measures of job investment correlated significantly with each behavior in the predicted direction. As measures of psychological investments, *coworker support* and *tenure* measured the strength of relationships between individuals, their peers, and the company. The increase in constructive behaviors with increased coworker support and tenure illustrates the importance of social relationships for both engineers and non-engineers.

Although engineers are sometimes viewed as a group concerned more with task than with relationship (Peck, 1993), the strong correlation between coworker support and active loyalty indicates the importance of peer relationships among engineers. This somewhat unexpected result

may arise because the workplace is the major source of friendships and social activity for engineers in high-tech companies (Hodson, 1994). While these findings do not indicate causality, there may be a reciprocal relationship between loyalty and coworker support. In such a relationship, employees who feel supported by coworkers are more likely to offer support in return, building stronger social bonds at work, increasing their investment in the firm, and increasing the probability that they will react to job dissatisfaction with constructive behaviors.

As a measure of economic investment in the company, *fairness of pay* reflected employees' desire for fair compensation for their efforts. Pay is an especially important predictor of job satisfaction in companies headquartered in California's Silicon Valley, where "there is much less emphasis on job security and pension plans. Making money is important . . . .the chance to 'win big' has to be built into the reward structure internally, or talent will seek [it externally]" (Delbecq & Weiss, 1988, p. 137). As members of a distinct professional group, pay may be especially important to engineers as it formalizes and legitimates the value a company places on the employees' services (Wallace, 1995a).

The results for firm-specific skills were inconclusive: the model was supported for neglect in engineers, but contradicted for active loyalty in non-engineers and search in engineers. These results may indicate that this one-item scale is not valid for high-tech workers. It may have measured more general skill development, rather than skills useful only at the present company. Also, the strong job market at the time of this study (Carnoy, 1997) may have unexpectedly affected the firm-specific skills measure in that any demonstrated skills may be perceived as valuable, or particular skills may be less important than experience and personal network. Alternatively, when an employee transfers to a high-tech competitor, firm-specific skills from their previous employer may be viewed as valuable as they provide insight into the competing firms'

practices. Hiring employees from competitors and customers is a common strategy used by high-tech companies to gain knowledge about other firms.

The model was also contradicted for search behavior among engineers. In this case, search increased with job investment measures of longer tenure and greater firm-specific skills. Engineers with longer tenure may be more likely to leave because their skill set has broadened and they are ready for a new challenge. It is common for engineers and other high-tech workers to receive calls from recruiters offering opportunities for advancement, work in start-up companies, or work in new divisions of established companies (Hodson, 1994). These frequent opportunities for change may entice some engineers away from an otherwise satisfactory situation. This finding could also be a result of the particular organization studied, the U.S. subsidiary of a Japanese multinational corporation. Watanabe and Yamaguchi's (1995) study of British subsidiaries of Japanese firms showed that perceptions of the company became increasingly negative in employees with longer tenure at the subsidiary due to language barriers, communication differences, and inherent structural problems. Disaffected employees tended to either leave the company or adapt with a resigned or apathetic attitude.

Hypothesis 2: Quality of Alternatives

Two measures of alternatives were used in this study: education utility and external opportunity. Consistent with the model, all significant correlations in all behaviors except one showed the expected relationships. These relationships were consistent with the model's assertion that outside alternatives increase active behaviors through reducing risk.

However, for both engineers and non-engineers, the relationship between alternatives and passive loyalty directly, and significantly, contradicted the model. The model predicted passive

loyalty (a low risk behavior) to decrease as external opportunities increase, but most EVLN studies have failed to report significant relationship between passive loyalty and quality of alternatives (Farrell & Rusbult,1992; Withey & Cooper, 1992).

In Withey and Cooper's (1989) study, (passively) loyal employees appeared to be resigned and entrapped, choosing to stay with an organization due to "bonds at the interpersonal level . . . [and accept] unavoidable workplace characteristics as their way of making peace with the workplace" (p. 536). As will be discussed later, the passive loyalists in this study exhibit both entrapped and more typically loyal characteristics. However, their awareness of high quality alternatives contradicts Withey and Cooper's (1989) conclusion that these individuals are entrapped by lack of opportunity. Instead, these high-tech workers may be entrapped by other factors not measured in this study, such as kinship responsibility (Kim et al., 1996) or the desire to minimize change in their life. One employee interviewed in this study expressed frustration over a delayed promotion while similar promotions were available in external opportunities. Despite this situation, the employee decided to remain at the company noting that changing jobs is difficult, and that his life was full due to a heavy workload and involvement in an MBA program.

The findings of this study may further indicate that passive loyalty is perceived as a high risk activity in the high-tech industry. With the generally high availability of alternatives, a choice to remain at the current company is a choice against other positions. High-tech employees understand that job changes usually bring financial benefits in the form of sign-on bonuses, stock options, and salary increases; so even passive loyalty may be a financially risky behavior in this environment.

Hypotheses 3: Job Satisfaction

Consistent with the model, at least one significant measure of job satisfaction correlated to each behavior for both engineers and non-engineers in the direction predicted by the model. That is, increased job satisfaction was associated with significantly higher tendency toward constructive behaviors (voice, passive loyalty, and active loyalty) and significantly lower tendencies toward destructive behaviors (neglect and search). These results were consistent with previous EVLN research which explained that employees who are "generally satisfied with their jobs should feel strongly motivated to restore good working conditions and may also feel optimistic about the possibilities for improvement" (Rusbult et al., 1988, p. 603).

As described earlier, 59 significant correlations emerged in the backward elimination regression analysis between the five employee behaviors and 16 job satisfaction variables. Only one item, manager cooperation, did not result in a significant correlation with any of the employee behaviors. Although this item did not load strongly on any one factor in the factor analysis, it was retained in the analysis for exploratory purposes. The lack of significant correlations between manager cooperation and the employee behaviors indicates that this item may have been poorly constructed and has low validity for the high-tech population.

The overall level of satisfaction among employees in this study was fairly low, with moderate to high levels of satisfaction resulting for only one (6%) of the job satisfaction variables: the *too many mangers* item ("I am frustrated by the number times I have been assigned to a different manager since joining ABC"). Because this study involved only one company, it was not possible to conclude whether this level of satisfaction was common in high-tech companies, if the company under study was unique, or if the high level of external opportunity in the job market reduced the overall level of satisfaction at the employee's present company.

The emergence of the majority of the job satisfaction variables as significant correlates to employee behaviors supported the use of these different aspects of job satisfaction to examine EVLN behaviors. However, some scales correlated to the behaviors more strongly than did others. The scales resulting in regression coefficients greater than 0.230 or less than –0.230 were climate satisfaction, efficient reorganizations, job variety, met expectations, role ambiguity, role conflict, supervisor support, and workload in engineers; and executive leadership, growth, job variety, met expectations, promotion chances, and workload among non-engineers. Three of these strong correlates are shared between engineers and non-engineers: job variety, met expectations, and workload. The job satisfaction results are discussed in the following seven sections: job variety, organizational change, work stress, climate, met expectations, growth, and autonomy.

Job Variety

Job variety emerged as the most frequent correlate to EVLN behaviors (9 out of 59 significant correlations). In each case, increases in job variety were associated with increases in constructive responses (active loyalty, passive loyalty, voice) and decreases in destructive responses (neglect and search). Job variety may hold such importance because it measures the level of challenge and interest available in the employee's work. Job variety and challenge is especially important to engineers' satisfaction (Garden, 1992; Jones, 1996; Keller, Julian, & Kedia, 1996).

The relationship between professional goals and organizational loyalty may also be at work in the job variety results. Professionals have been shown to be more loyal to their profession than to any particular organization (Baugh & Roberts, 1994; Wallace, 1995b). If high job variety serves to increase job challenge and achieve professional goals, the employee is more likely to act constructively to maintain a relationship with a company that is providing career-enhancing opportunities. As explained by Kim et al. (1996), "members of well-established professions usually

have internalized demanding standards...and they expect their employers to construct work organizations that measure up to these standards" (p. 969). In her study of lawyers, Wallace (1995a) further explained that "the most important corporatist characteristics are those that contribute to the fulfillment of lawyers' professionalism and their professional career" (p. 973).

Job Variety and Voice

The positive relationship between voice and job variety may exist because employees with high job variety feel that using voice is part of their job. The items used to measure job variety included perceptions that the employee's job required them to *learn new things* and *be creative*. Employees may believe that voicing solutions to problems observed in the workplace shows creativity. The professionalism of engineers and their self-definition as problem-solvers (Garden, 1992) may also play a role in their use of voice. Those engineers with high job variety may experience the intellectual challenge they desire in their work, and thereby feel more empowered to make suggestions about problems they face. High job variety may also exemplify and legitimize employees' power in the organization, and increase employees' expectation that using voice is likely to result in desired changes (Parker, 1993).

Job Variety and Destructive Behaviors

The relationship between job variety and neglect found in this study supports Farrell and Stamm's (1988) meta-analysis of the impact of task variety on neglect (measured by absence). Low job variety may lead to boredom and decreased interest and involvement in the work, which could easily lead to neglect behaviors such as "reduced interest of effort" (Farrell & Rusbult, 1992, p. 202). It is interesting that job variety did not correlate significantly with search behavior. The lack of such a finding may be due to the high external opportunities available to the employees in this study. In a weak job market, employees dissatisfied with job variety may be trapped at their company. However, in a market as dynamic as that in this study, employees with unacceptably low

job variety may have already left the company. Moreover, the strong correlation of low job variety and neglect (β = -0.354 for non-engineers) may be evidence of a temporal effect between the EVLN behaviors, where neglect may precede exit.

Change and Instability

Four factors in this study measured change at the organizational and managerial level: change failure, efficient reorganizations, too many changes, and too many managers. Three of these measures were designed to measure instability, but were evaluated as separate items in the analysis due to their poor reliability as a combined scale (α = 0.487). *Efficient reorganization* emerged in five regression models: active loyalty, neglect, passive loyalty and voice for engineers; and voice for non-engineers. *Too many managers* emerged in one model: search for engineers. *Change failure* emerged in three models: neglect for engineers, voice for engineers, and neglect for non-engineers. The results for these three job satisfaction factors are summarized in Table 55.

Table 55

Comparison of Measures of Change across Groups and Behaviors

Behavior	Engineers	β	Non-Engineers	β
Neglect	Change failure	0.188	Change failure	0.119
	Efficient reorganization	-0.211		
Search	Too many changes	-0.129	Efficient reorganization	0.134
	Too many managers	0.183	Too many changes	-0.125
Active loyalty	Efficient reorganization	0.128		
Passive loyalty	Efficient reorganization	0.434	Too many changes	-0.173
Voice	Change failure	0.163	Efficient reorganization	0.139
	Efficient reorganization	0.168		

Satisfaction with the efficiency and frequency of organizational change may influence employees' feelings of security and confidence. Frequent or poorly executed change efforts increase turbulence in the workplace, reducing productivity and causing confusion. The results of this study support research on organizational dependability, which was found to increase organizational commitment in engineers (Steers, 1977) and other workers (Allen & Meyer, 1990). Low satisfaction with the organizational environment (peer, supervisor, and cooperation) has also been shown to increase absenteeism, a form a neglect (Unden, 1996).

The results presented here extend those of Schellenberg (1996) who found that frequency of organizational change increased turnover in high-tech workers and caused frustration and confusion: "one individual claimed that a series of recent changes had left everyone asking, 'Who do we report to now?'" (p. 194). Schellenberg (1996) also argued that instability has special significance in the high-tech industry because

> Whereas the pressures of economic uncertainty are being felt in a wide range of sectors, high-tech firms are seen as especially vulnerable to environmental flux. Numerous accounts portray the normal condition of high-tech firms as one of chronic upheaval related to *constant restructure,* shifting job demands, and cycles of growth and decline. . . . even people who like change find the upheaval of high-tech work stressful. (p. 191)

Continuous change and advancement in technology further exacerbate this unrelenting turbulence in the high-tech industry. In such an environment, uncertainty inside an employee's company, division, or department may be difficult to handle because the individual's capacity to deal with complexity is already strained by the uncertainty in the industry.

In this study, non-engineers reacted more to change frequency while engineers reacted to change efficiency. Inefficient reorganizations may increase destructive behaviors in engineers because they reduce the stability of the work environment, frustrating engineers' desire for efficiency and structure (Gibson, 1996; Sherman, 1986). Engineers see themselves as professionals who apply their intelligence and creativity to solving problems (Hodson, 1994). They are

particularly frustrated when they are unable to solve problems due to obstacles beyond their control: inefficient systems, politics, conflicting instructions, lack of cooperation, "competition with co-workers and the negative atmosphere generated by office politics" (p. 270).

Frequency of Organizational Change

Interpretation of the *too many changes* results is complex. This variable emerged in three models: search for engineers, search for non-engineers, and passive loyalty for non-engineers. If this factor was a dissatisfier, the direction of correlation with search was opposite that predicted by the model. However, the item wording is "Organizational changes at ABC occur too frequently," and employees who disagreed with this statement were more likely to search. Thus, this item may actually measure *not enough* change instead of *too much* change. The results for the "not enough changes" interpretation may reflect the attitude of employees who feel that the organization is too static or inflexible. Support for this explanation is provided by a comment written on one employee's survey form:

> ABC was my first job out of college. When I started I was a lot more angry that things didn't change as fast as I wanted them to. I used to be unhappy with my manager and working conditions. Things have become much better. I have become more patient. Minus the stock plan, ABC isn't that bad!

In support of this conclusion, Virany, Tushman, and Romanelli's (1992) study of the impact of strategic reorientation (change in organizational strategy, structure, power distributions, and control practices) on company performance found that "in turbulent environments, either sustained stability or radical and frequent change was associated with failure" (p. 88). Thus, this variable may be measuring both extremes of organizational change.

Contradictory Results in Organizational Change Category

Two significant correlations in this category contradicted the model. In the first of the contradictory results, search increased as satisfaction with reorganization efficiency and change

frequency increased. This relationship may exist because the employees most satisfied with organizational changes may be strong performers who benefited from the changes. The organizational changes provide tangible evidence of their strengths and skills, thus increasing their attractiveness to other companies. The unexpected increase in engineers' voice behavior with perception of organizational change failure may indicate that engineers feel compelled to attack problems resulting from inefficient organizational changes. This characteristic may support the contention that engineers' actions are derived from professional standards. That is, engineers feel called to action when they see problems in their environment. Rather than discouraging them, these problems present opportunities for the engineers to create solutions, and thus feel a sense of accomplishment and purpose. This idea will be explored in greater detail in the section on executive leadership and organizational climate.

Work Stress

Three scales were used to measure work stress in this study: role ambiguity, role conflict, and work overload. The model predicted that as these dissatisfiers increase, destructive behaviors increase and constructive behaviors decrease. The results of this study supported the model for destructive behaviors, but not for constructive behaviors. All results for role ambiguity conform to the model. Two contradictory results concern workload in active loyalty and voice, and role conflict among engineers. These results in this category are summarized in Table 56.

The strong relationships between work stresses and destructive behaviors support previous research (Kim et al., 1996; Rizzo, House, & Lirtzman, 1970) and the contention that "insufficient information to perform the job adequately, conflicting or unclear expectations of peers, or ambiguity of performance evaluation methods . . . employees may feel less satisfied with their job and career, and less committed to their organizations" (Igbaria & Greenhaus, 1992, p. 37).

Table 56

Comparison of Measures of Work Stress across Groups and Behaviors

Behavior	Engineers	β	Non-Engineers	β
Neglect	Role ambiguity	0.254	Role ambiguity	0.145
	Role conflict	-0.215	Work overload	0.152
Search	Role conflict	0.149	Role conflict	0.112
	Work overload	0.262	Work overload	0.459
Active loyalty	Role conflict	0.244	Work overload	0.231
	Work overload	0.165		
Passive loyalty	Role conflict	0.204	-	-
Voice	Role ambiguity	-0.464	Work overload	0.153

Role Ambiguity

Consistent with the model, high role ambiguity increased neglect in both engineers and non-engineers. One engineer commented that neglect occurred in a situation where he was uncertain what was expected of him: "I don't understand the purpose of generating those plans. . . . Communication is the bottom line—from the top to tell the bottom exactly what they want. It's much more efficient that way." A non-engineer described confusion about his job due to the hypocrisy of his manager who "made a big deal about" the importance of a certain project and then failed to allocate funds to support the non-engineer's efforts to kick-off the project.

As stated before, engineers have a particularly high need for order and consistency in their work environment (Gibson, 1996) which is threatened by high role ambiguity. The strongest correlation in the regression analysis was that for engineers' role ambiguity and voice ($\beta = -0.464$). This finding further supports engineers' need for order and structure in work and environment. The

less the ambiguity, the higher the chance that engineers speak up about problems. Additional clarity in work roles may help engineers decide what problems they are responsible for and what they have the power to change. Increased control and predictability in the environment may also increase engineers' expectations that proposed solutions will work as expected.

Employees of the company examined in this study may experience additional role ambiguity and conflict due to lack of alignment between the management style expected by Western workers and that typical of Japanese managers. In general, "Japanese management culture, with its tendency towards ambiguity . . . leaves them [Western workers] with a feeling of insecurity and ambivalence" (Dirks, 1994, p. 252). Criteria for promotions and involvement in key decisions are also often unclear to Westerners (Pucik, 1994). Moreover, typical Japanese job descriptions "have shifting boundaries and sparse descriptions.... Rules and procedures, while numerous, are characteristically vague" (Lincoln, Kerbo, & Wittenhagen, 1995, p. 428). Together, these difficulties exacerbate problems caused by the uncertainty inherent in the high-tech industry.

Contradictory Findings: Workload and Role Conflict for Engineers

In this study, many of the significant correlations of engineer behaviors to workload and role conflict were unexpected. Increasing workload significantly increased both constructive active behaviors (active loyalty and voice) and destructive behaviors (search and neglect) in both engineers and non-engineers. Among engineers, increasing role conflict also unexpectedly increased constructive behaviors (voice and passive loyalty) and decreased neglect, while increasing search!

For the constructive behaviors, work overload may act less as a job dissatisfaction factor and more as a precondition for active loyalty behavior or a catalyst for voice behavior. The relationship with voice is consistent with Kowalski's (1996) finding that complaints serve as a control mechanism when dissatisfaction reaches a unacceptable level. These relationships may be understood better by examining employee comments.

In discussing reasons for active loyalty behavior, engineers explained that they often put in extra hours and give extraordinary effort when faced with deadlines, company demands, or difficult customer requirements. One engineering manager explained that "when you're supporting customers you promise something on a certain day and you have to spend a lot more time [to meet the schedule]." Another described his belief that he put in long hours because "for me, the company expected it, so we should do the best we can."

Role conflict appears to similarly catalyze constructive behaviors. Among the engineers in this study, increasing role conflict decreased neglect, increased active loyalty, and increased passive loyalty. It is possible that engineers derive satisfaction out of the challenge of meeting the demands of different groups and managing conflicting priorities. While these work stresses would discourage many employees, they may provide interest and challenge to engineers.

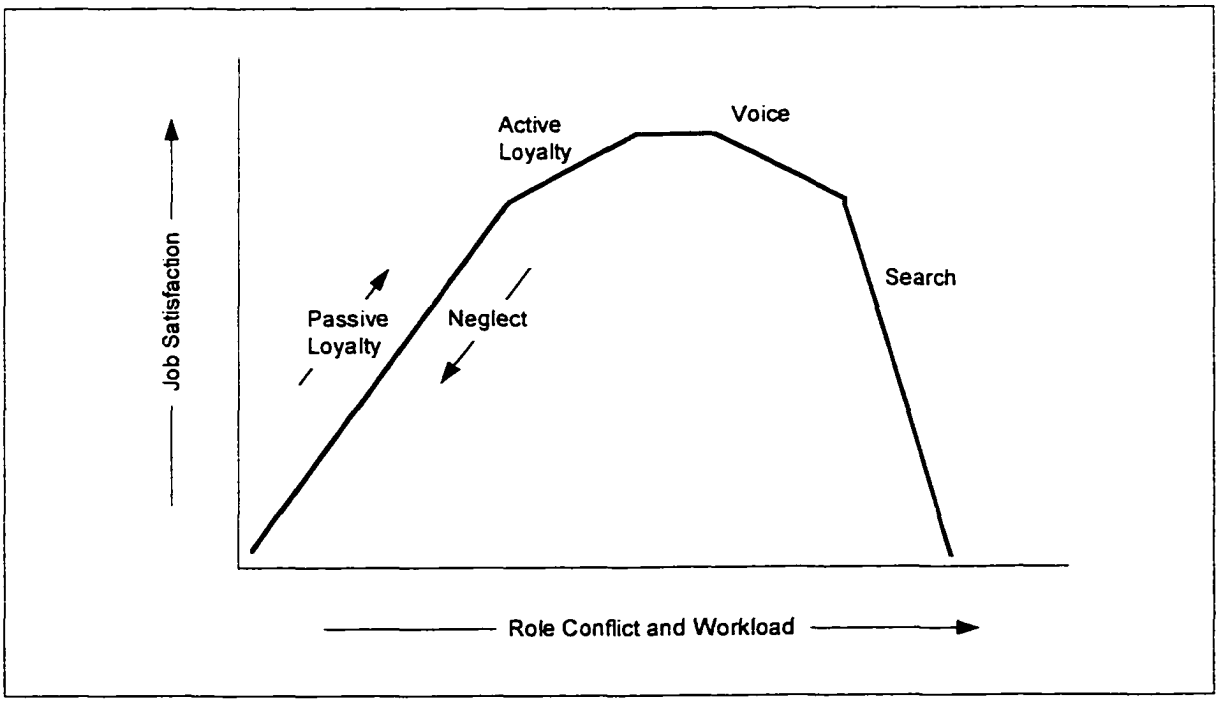


Figure 7. Possible behavior of role conflict and workload for engineers.

It is possible that the relationship between these factors and engineer behavior is not a simple linear one. Instead, it may follow a curve that reaches a threshold level before falling. That is, at low to moderate levels, role conflict may increase the challenge of work thereby increasing loyalty and decreasing neglect, but after the conflict and workload reach a certain point, the engineer is overloaded and looks to escape the work stress through search and exit This idea is shown graphically in Figure 7.

Organizational Climate and Leadership

Three variables are discussed in this section: organizational climate, executive leadership, and supervisor support. A summary of their behaviors is given in Table 57. Six of the nine significant correlations between these variables and the employee behaviors support the model. The contradictions are for executive leadership and supervisor support in relationship to active constructive behaviors (voice and active loyalty) among engineers. However, executive leadership conforms to the model for non-engineers' passive loyalty, neglect, and search: as satisfaction with executive leadership decreases, constructive behaviors decrease and destructive behaviors increase.

Climate Satisfaction

Climate satisfaction was significantly associated only with active loyalty. This relationship reflects the importance of congruency between employee and corporate attributes, including values and work styles. Satisfaction and comfort in the work environment increases this most constructive form of employee behavior because it minimizes conflict between employees' inner values and outer actions. Organ and Lingl (1995) also reported strong positive relationships between employees' organizational citizenship behavior (OCB) and consistency between personal values and work styles and those of the organization.

Table 57

Comparison of Climate-Related Job Satisfaction Variables across Behaviors and Groups

Behavior	Model	Engineers	β	Non-Engineers	β
Neglect	-			Executive leadership	-0.193
Search	-			Executive leadership	-0.131
Active loyalty	+	Climate satisfaction	0.257	Climate satisfaction	0.112
		Executive leadership	-0.208		
Passive loyalty	+	Supervisor support	0.176	Executive leadership	0.333
Voice	+	Executive leadership	-0.196		
		Supervisor support	-0.305		

This congruence between individual and institution is the positive resolution of what Buchanan (1974) called "loyalty conflicts." In this stage of socialization in the workplace, individuals may be concerned that "the organization is trying to dominate them, and subvert their individuality through a substitution of organization for personal values" (p. 536). Harris and Mossholder (1996) also reported a strong relationship between organizational climate, measured with items such as "The climate inside the company is participative and comfortable. High trust and openness exist" (p. 534), and organizational commitment. To the extent that individuals do not feel threatened or compromised, higher commitment to the organization results. George and Jones (1996) also found that the job satisfaction/turnover intent link was strongest when jobs did not help employees to attain terminal values.

Perceptions of high climate satisfaction are also important because they serve to reduce uncertainty in work activities, especially among engineers. Malik and Wilson (1995) reported that

the issue of a supportive climate "is an important one, especially for engineers who often need to deal with varying levels of task uncertainty in their efforts to solve task-related problems" (p. 201).

Engineers were significantly more satisfied with climate than were non-engineers (t = 3.846, p = 0.000), most likely because it was more supportive of them. At the time of the survey, the company was experiencing budget cuts in all departments and hiring freezes for most non-engineering positions. One non-engineering employee wrote the following comments on her survey: "In the support departments (i.e., non-engineering departments), the workload keeps increasing and increasing with no increase allowed for headcount resources. As a result, morale is very low due to the stressful work environment." Another non-engineer wrote:

> ABC is an excellent company to work for but at times it is difficult putting in 150% when others do not, or when management will not hire enough staff to support positions within ABC just as important as engineering. Support staff is critical whether it is the warehouse, traffic, sales, marketing.

In contrast, typical comments from engineers included: "ABC is an excellent place to work. ABC has a good image in U.S. and worldwide. Industry leader." Engineers' higher satisfaction with the organizational climate is consistent with their lower dissatisfaction with frequency of organizational changes and impact of reorganizations.

This phenomenon is not unusual in the high-tech industry where revenue growth is directly tied to quantity and quality of engineers. Thus, additional business can only be won and supported if the company has the engineering staff to manage additional projects. In times of turbulence, high-tech firms cut back first in non-engineering positions (Schellenberg, 1996).

Executive Leadership and Engineers

For non-engineers, relationships involving executive leadership were consistent with the model but emerged only in destructive or passive behaviors (search, neglect, and passive loyalty).

Among engineers, disappointment in executive leadership was unexpectedly associated with constructive, active responses (active loyalty and voice).

The contradictory findings for engineers may result from their strong professional identity described earlier. This professional identity appears to increase engineers' feeling that they are responsible to act regardless of the quality of their superiors. This conclusion supports that of Baugh and Roberts (1994) who found engineers to have a strong professional commitment that greatly overshadows their organizational commitment. This conclusion is further confirmed by the unexpected negative correlation of supervisor support and voice ($\beta = -0.305$, $p = 0.009$) and the unexpected positive correlation between change failure and voice ($\beta = 0.163$, $p = 0.096$). In all cases, failure of executives, supervisors, and organizational change catalyzed constructive behaviors in engineers. One of the engineers interviewed provided an example of this phenomenon:

> Engineer: Basically, this [using voice] is a given. . . . We've wasted a lot of resources and time. All the projects—if you put together the right team and manage it well—if you have all the ingredients to make it happen here (money, name, support) it can work. But we just don't have the right management. I talked to two groups of upper management that a project wasn't going anywhere—they should make a decision to cut their losses or [at least] do something like identify milestones clearly. I would give people the benefit of the doubt—[but] when sufficient time has elapsed (like 10 months) *do* something about it. At a start-up [company] you're on top of the issues every day.
> Interviewer: What gave you the confidence to bring up your concerns?
> Engineer: At my level I'm risking more than I could gain. But it's part of my internal makeup, straight from my goal to get the job done—do it the best, most efficient way.

These comments support the conclusion that engineers voice more when those they expect to take action (executives and supervisors) are inattentive. Again, engineers may be drawing on a belief that as professionals and experts, they are responsible for the success of the project regardless of their manager's actions. Instead of relying on management for guidance and authority, they follow their own code of a "right way" to do things. Empowered by this

professional standard, they speak up when projects are poorly defined or failing, especially when those with positional power fail to do so.

Executive Leadership and Non-Engineers

Non-engineers appeared to have significantly different expectations of and relationship to executives. Satisfaction with executive leadership was strongly associated with passive loyalty (β = 0.333), while dissatisfaction with executives was related to neglect and search behavior. Thus, non-engineers seem to separate themselves personally from the consequences of executive leadership. If non-engineers approve of executive actions, they stay with the company; if they disagree with executives they disengage. In either case, they do not appear to try and change the situation.

For example, confidence in company leaders may give employees a feeling of security that does not depend on their own actions. This conclusion is reflected in one of the items used to measure passive loyalty, "The people in charge of this company generally know what they're doing." It is also supported by the work of Wayne, Shore, and Liden (1997) who reported a strong positive relationship between affective commitment and perceived organizational support (measured by items such as "[Company] management cares about my general satisfaction at work").

The following comments exemplify how non-engineers view themselves as separate from problems: "[ABC] is . . . risk adverse which limits success and participation in North American driven markets" and "Too many plans are reactionary and ad hoc and subject to department 'pocket vetoes,' leading to noncompetitive or unsuccessful ventures."

The increase in non-engineers' neglect as confidence in executive leadership decreased supports Cropanzano, Howes, Grandey, and Toth's (1997) conclusion that psychological withdrawal behavior, such as daydreaming or chatting, correlated negatively with organizational politics, defined as an environment focused on competition and amassing power.

Non-engineers in the present study perceived this phenomenon among their executives. Many employees expressed frustration over constant rotation among Japanese expatriate executives. These changes appeared to increase confusion and reduce trust between the executives and the local employees. One non-engineer explained that his neglectful behavior resulted from dissatisfaction with an organizational culture that was underdeveloped, partially because of Japanese executives whose "executive positions are just a rotational stop on the ladder up." Another non-engineer noted that "With the senior management (Japanese) changing every 5 years, it is difficult to *have* a vision. Let alone communicating it. Also, it leaves little reason for them to *really* perform as they know after 5 years, there is another promotion for them." Further frustration was seen in the following comment from one non-engineer's survey form:

> A dollar target is not an acceptable corporate vision. Rather, it is a poor substitute for a lack of vision. Implementation of that "vision" is complicated when not properly motivated, or denied the tools to be successful. On a daily basis, we are reminded that more concern is given to corporate revenue targets than to the overall working environment.

As noted earlier in the discussion about climate satisfaction, non-engineering departments were facing greater budget cuts and hiring freezes than engineering departments. Many non-engineers felt undervalued and unsupported by executives.

Supervisor Support

The results for supervisor support were mixed and significant results emerged only for engineers. The model was supported in the correlation between supervisor support and engineers' passive loyalty, but contradicted in relation to engineers' voice. As in the case of lack of satisfaction with executive leadership, low supervisory support increased engineers' voice. Thus, the presence of supervisory support is associated with passive but constructive behavior, while its absence appears to catalyze active, constructive behaviors but not destructive behaviors. This pattern is consistent with engineers' perception of themselves as independent professionals. The

supportive actions of others influence them moderately, but problems caused by lack of support generate an active and direct response. The results for passive loyalty support those of findings of Wayne, Shore, and Liden (1997) who reported a strong correlation between affective commitment (measured by items such as "I am proud to tell others that I am part of [name of company]") and leader-member exchange (measured by items such as "I usually know where I stand with my manager").

Overall, engineers appeared either satisfied with their manager's capabilities or understanding of the reasons for poor managerial performance. The following comments are typical of those written on the surveys describing the relationship between engineers and their managers: "My boss does very good within the environment that exists," and "My manager does an excellent job considering the rules and environment he works in." Engineers also took responsibility for their role in problem situations, as one engineering manager explained:

> Now looking back, I see that we should have gone with a different market. I can't believe that they [management] picked that market. It was an example showing that management is loose about their marketing strategy—so you better understand your market and products well to make the right choices. I see that we need to improve both management and the people below to know the market and product better.

Clearly, this engineer was disappointed with his management, but instead of placing all the responsibility for the results on them, he took personal responsibility to "know the market and product better." Based on these comments, it appears that engineers felt that their managers understood them and their work, but were constrained by the organizational environment.

In contrast, non-engineers attributed their lack of satisfaction directly to their manager's behavior and abilities. Comments from non-engineers included the following: "My immediate manager is the main impediment to my job performance and satisfaction. I will end up leaving ABC because of his behavior" and "My manager does not understand my job." Other non-engineers attributed their lack of supervisor support to the fact that their direct manager was a

Japanese expatriate: "My manager is not comfortable with American-style managing. Did not actively participate in *required* career planning activities." Another non-engineer wrote:

> Please keep in mind the fact that individuals/people...can really make a difference. A good example of this is my manager. If it wasn't for him, I would have probably pursued other job opportunities in the past. He's a good manager. On the other hand, there are some managers that I know of, that I could never work for. They have bad reputations, and a high rate of employee turnover.

While many comments regarding management were written on the surveys, no significant correlations emerged between supervisor support and non-engineers' behaviors. Non-engineers were also significantly less satisfied with supervisory support than were engineers ($t = 2.339$, $p = 0.020$). This may indicate that although non-engineers were not satisfied with their supervisors, they have learned how to work within the organizational system regardless of the capabilities of their manager. This conclusion is supported the longer tenure and older age of non-engineers.

The different attitudes of engineers and non-engineers toward their managers may also reflect the degree of similarity between worker and boss. Almost all engineers were managed by supervisors with engineering backgrounds—technical experts who continued to perform engineering work in addition to their managerial responsibilities. Although engineers and their managers may come from different cultural backgrounds, such as those in this study, their common technical background provides them a basis of understanding and communication.

In contrast, non-engineering employees and managers may come from much more diverse backgrounds, both in terms of their areas of expertise and cultural expectations. The lack of a common experience and technical language reduces opportunities for bridging gaps of misunderstanding common in complex multicultural environments.

Met Expectations

The met expectations factor emerged significantly in five of the regression models: neglect and search in engineers; and neglect, passive loyalty, and search for non-engineers. Met expectations did not significantly correlate to either of the constructive, active behaviors (voice and active loyalty) for either engineers or non-engineers. Thus, met expectations appears to act as a general measure of job dissatisfaction. As met expectations declined, destructive and passive behaviors increased.

While the survey did not examine which specific expectations were not met, comments written on the questionnaires provide some examples: "It is unfortunate to see the number of people leaving for other companies. However, advancement opportunities are nonexistent for non-Asian Americans," "ABC would be a life long company for me except for *my manager*," and "The bonus program is subject to manipulation by the management and thus, it is *never* a fair system. It works only the way that senior management want!" These quotes indicate that expectations of promotions, management, and pay are unmet for employees who appear ready to leave the company. The emergence of met expectations as a key correlate of search is consistent with previous research (Iverson & Roy, 1994; Kim et al., 1996; Pearson, 1995). This interpretation may be further understood by examining common concerns among employees at Western subsidiary of a Japanese corporations. Pucik (1994) described the North American "headquarters" of the Japanese company he studied as a "semi-empty corporate shell, lacking power and resources to influence the decision making" (Pucik, 1994, p. 224). He further described the gap between Westerners' expectations and the Japanese organization style:

> Interviews with local executives again and again highlighted the general unhappiness of most American executives with their exclusion from the strategy formulation process. This was often attributed to the Japanese unwillingness to share strategic information because of their (often legitimate) fears that local managers may leave the firm and take the knowledge with them. Thus a vicious circle is created: local managers leave because they

> object to being excluded from the inner core, which then serves as a justification for the exclusion of their successors. (p. 235)

Neglect in engineers also correlated with unsuccessful organizational changes, high role ambiguity, and low role conflict. These factors may reflect additional important expectations that were not met. Comments written on the survey sheets also provide clarification. Engineers typically complained about career options: "Our company does not have structured career path including updated job descriptions." For engineers, neglect stemming from unmet expectations of career development is consistent with Hillard's (1991) finding that "engineers react to. . . overall difficulty in achieving their career aims . . . by reducing their commitment to their work" (p. 84).

Autonomy

All of the significant results for *autonomy* contradicted the model for both engineers and non-engineers. As autonomy increased, passive loyalty decreased and neglect increased. Autonomy was measured with two items: "I have a great deal of freedom over how I do my job," and "I have the appropriate amount of input into what happens on my job."

The increase in passive loyalty with lower autonomy may result from high-autonomy employees choosing a more active response (although autonomy was also negatively correlated with non-engineers active loyalty). On the other hand, combined with the increase in neglect with increased autonomy, these results may signal a more dysfunctional situation. The neglectful employees may actually be undermanaged. Comments written on the surveys support this idea: "My manager does have the ability to guide me but doesn't have the time to do it!" Another employee complained, "Some Japanese managers do not understand or make an effort to show appreciation for employees efforts or try to motivate. Basically they have high expectations and don't tell you how they feel about your performance or efforts." In the case of non-engineers,

passive loyalists are also associated with low growth and promotion opportunity. Thus, these individuals may indeed be neglected by their managers, and respond in kind with passive responses.

This is a reasonable scenario for the company in this study, the U.S. subsidiary of a large Japanese multinational corporation. In their study of these organizations, Lincoln, Kerbo, and Wittenhagen (1995) found that with time Japanese overseas subsidiaries assemble "a core of veteran local employees who make their peace with a traditional Japanese management regime and resign themselves to relatively unchallenging roles within it" (p. 431). Lack of job variety may also fuel this problem, increasing the tendency for neglect among both engineers and non-engineers. Alternatively, these employees may be poor performers who do not deserve greater autonomy.

These results may also indicate that the autonomy scale developed in other research may not work well for the high-tech population. Among high-tech employees, it may be more appropriate to measure a desire to *participate* and be involved in decision making rather than to have autonomy (Gibson & Whittaker, 1996; Hillard, 1991; Kline & Boyd, 1991; Myers, 1991).

Growth Opportunity and Promotional Chances

The significant correlations for growth and promotion opportunity were inconsistent. As job satisfiers, higher growth opportunity and promotion chances should increase constructive behaviors and decrease destructive behaviors. This was true for engineers and for search behavior among non-engineers. However all other significant correlations of promotion and growth for non-engineers contradicted the model. These relationships are summarized in Table 58.

The findings for search behavior in non-engineers are consistent with the interpretation of promotion opportunity as a job satisfaction factor. Increased search with decreased promotional chances is also a well-documented result in previous research (Gaertner & Nollen, 1992; Kalleberg & Reve, 1993; Kim et al., 1996).

Table 58

Opportunity Measures for all Groups and EVLN Behaviors (1)

Behavior	Engineers	β	Non-Engineers	β
Neglect				
Search			Promotion chances	-0.254
Active loyalty			Growth opportunity	-0.245
Passive loyalty	Promotion chances	0.153	Growth opportunity	-0.200
			Promotion chances	-0.169
Voice	Growth opportunity	0.174		

The desire for promotion may be especially strong among salespersons and managers whose "attachment to their organizations may be tied to challenging jobs that provide career development opportunities; those organizations unwilling or unable to provide such jobs may experience higher managerial turnover" (Stroh, Brett, & Reilly, 1994, p. 531). The relationship between growth opportunity and voice may be evidence that employees who feel validated by the organization feel either willing or responsible to step in and solve problems. The engineers may also perceive voice as a means to achieve promotions (Farr, Walesh, & Forsythe, 1997).

The contradictory findings for promotion and growth among non-engineers in all behaviors except search may indicate that, for non-engineers, the growth scale may be more a measure of external opportunity and individual marketability than job satisfaction. This interpretation is reasonable considering the items that loaded strongly on the growth scale factor: "I have the opportunity to expand the scope of my job," "Working at ABC has prepared me well for future jobs," and "I have opportunities to improve my knowledge at ABC." Alternatively, if growth is treated as a measure of job investment, the EVLN model would predict it to increase destructive behaviors. This is indeed the pattern seen for non-engineers. Finally, the finding that lower opportunity increased all behaviors except search may also support the premise that individuals

with fewer career choices inside the company are actually poor performers and have similarly limited opportunities outside the company. Thus, they must choose a behavior other than exit, and limited opportunities should increase these behaviors, as shown in this study.

Hypothesis 4: Different Job Satisfiers for EVLN Behaviors

Null Hypothesis 4 was rejected in this study, as different job satisfaction factors were found to correspond with different EVLN behaviors. This result is consistent with Pugh and Hickson's (1997) argument that "events that led to satisfaction were of quite a different kind from those that led to dissatisfaction." (p. 153). Leck and Saunders (1992) also contended that "although exit, patience, and neglect may be responses to dissatisfaction, they may not be responses to the same type of dissatisfaction" (p. 227). Also, Saunders (1992) argued that some studies show different employee behaviors to be "related to different facets of prior satisfaction, suggesting that both Hirschman's and Rusbult and Farrell's models need to examine type of dissatisfaction in more detail" (p. 189).

In this study, neglect and search were associated with dissatisfaction factors, but active loyalty, passive loyalty, and voice were all associated with both satisfaction and dissatisfaction factors. Active behaviors increased as employees perceived a need for their extra effort. Engineers perceived such a need when they saw organizational changes fail, while all employees were motivated by excessive workload. Passive behaviors increased where employees were neglected, due either to lack of management attention or low growth opportunities.

Constructive behaviors increased with job variety and satisfaction with the organization. Engineers were satisfied with the organization when they received its active support, while non-engineers' satisfaction appeared to result from contentedness with the plateau level they had

achieved. Destructive behaviors increased with work overload for all employees, with high role ambiguity among engineers, and with low growth opportunities among non-engineers.

These general relationships may be explained by Herzberg's (1966) argument that job satisfaction and job dissatisfaction are *not* opposites, but representative of different aspects of human nature. Job satisfaction results from the *content* of the work—achievement, recognition, responsibility, and advancement; while job dissatisfaction was results from *context* factors: unsatisfactory company policies, working conditions, security, and pay.

The EVLN model contends that destructive behaviors (exit and neglect) are associated with low job satisfaction, while constructive behaviors (voice and passive loyalty) are associated with high job satisfaction. Applying Herzberg's argument to this model would imply that destructive behaviors (exit and neglect) are associated with job *dissatisfaction*, while constructive behaviors (voice and passive loyalty) are associated with job *satisfaction*. Thus, content factors such as supervisor support should correlate positively on constructive behaviors while context factors such as workload should correlate positively on destructive behaviors. The alignment of factors and behaviors is shown in Table 59.

The majority of factors associated with constructive behaviors were, in fact, job satisfiers with positive correlations, while most of the factors associated with destructive behaviors are job dissatisfiers factors with positive correlations or job satisfiers with negative correlates. Overall, job dissatisfaction variables also increased passive behaviors. Because the independent variables used in this study were not designed to conform exactly to Herzberg's definition of job satisfiers and dissatisfiers, some of the variables show mixed results. Thus, Herzberg's premise is somewhat useful in explaining the patterns of correlation between job satisfaction variables and employee behaviors. However, the job satisfaction variables used in the study would have to be much more strictly crafted to enable a true test of Herzberg's theory.

Table 59

EVLN and Herzberg's Job Satisfaction/Dissatisfaction Distinction

Behavior	Possible Herzberg Content Factors (1)	Possible Herzberg Context Factors[a]
Active	2 - Job variety (+)	2 - Climate satisfaction (+)
Loyalty	2 - Workload/variety (+)	
	1 - Role conflict/variety (+)	
	1 - Efficient reorganizations (+)	
Passive	2 - Job variety (+)	1 - Not enough changes (+)
Loyalty	1 - Promotion chances (+)	1 - Supervisor support (+)
	1 - Role conflict/variety (+)	
	1 - Executive leadership (+)	
	1 - Efficient reorganizations (+)	
	1 - Met expectations (+)	
Voice	2 - Job variety (+)	1 - Change failure (+)
	1 - Growth (+)	1 - Supervisor support (-)
	1 - Executive leadership (-)	1 - Role ambiguity (-)
	2 - Efficient reorganizations (+)	1 - Workload (+)
Neglect	2 - Job variety (-)	2 - Change failure (+)
	1 - Executive leadership (-)	2 - Role ambiguity (+)
	1 - Efficient reorganizations (-)	1 - Workload (+)
	1 - Role conflict/variety (-)	
	2 - Met expectations (-)	
Search	1 – Promotion chances (-)	1 - Too many managers (+)
	1 - Job variety (-)	2 - Role conflict (+)
	1 – Executive leadership (-)	2 - Work overload (+)
	2 - Met expectations (-)	2 - Not enough changes (+)

[a]The signs, (+) and (-), shown after each factor indicates the direction of correlation found in the regression analysis.

Hypothesis 5: Engineers versus Non-Engineers

Differences between engineers and non-engineers are most evident in active, constructive behaviors. Similarities decreased as behaviors became more destructive. This result may be understood using the analysis in the previous section, which showed destructive behaviors to result mainly from dissatisfiers, or context issues. These context issues are likely to be similar for all employees in a given company. In contrast, the content factors that satisfy employees, and are associated with constructive behaviors, are likely to differ with professional role and expectations. The specific differences between engineers and non-engineers will be explained in the following section for each employee behavior.

Differences in Active Loyalists

As reported earlier, the engineers in this study scored themselves significantly lower than did non-engineers in active loyalty behavior, although both groups scored very high on this scale. The reasons that engineers scored themselves lower in active loyalty may be due to their age and tenure with the company. Engineers were younger (16% over 45 years) than non-engineers (33.3% over 45 years) and had worked at the company for a shorter period of time: 18.7% of engineers had worked at the company longer than 7 years, compared to 39.6% of non-engineers. These conclusions are consistent with those of Rusbult et al. (1988) who showed that tenure is a measure of job investment size and that higher job investment size is expected to increase the tendency to respond to dissatisfaction in constructive ways (voice and loyalty).

Engineering active loyalists emerged in this study as young individuals on their way up. Independent and self-sufficient, they appeared comfortable in the organizational environment, but dissatisfied with executive leadership and turnover in their direct management, possibly believing that they could do better, and deriving a sense of challenge and opportunity from this situation.

Promotional chances appear especially important to engineers high in active loyalty. This portrait is consistent with the high value placed on engineering talent in the company and in the industry. The challenges and opportunities inherent in the work and corporate environment appear to provide sufficient interest to keep these engineers at the company. However, sustained inefficiencies in organizational practices, missed promotions, or a drop in the challenge may be enough to unseat these active loyalists who are likely to be more dedicated to professional growth than to any one corporation.

In contrast, non-engineering active loyalists were older, had been with the company longer, and perceived fewer career opportunities. These individuals appeared to be autonomous, satisfied with their jobs, and unconcerned about further advancement. This portrait is consistent with Lincoln, Kerbo and Wittenhagen (1995) description of "a core of veteran local employees who [gather in Japanese overseas subsidiaries over time], make their peace with a traditional Japanese management regime, and resign themselves to relatively unchallenging roles within it" (p. 431).

Differences in Neglecters

As reported earlier, the engineers and non-engineers in this study scored similarly in neglect behavior, and both groups scored very low on this scale. The reasons for these low scores may be the desire for employees to present themselves positively. This is a form of response bias called *social desirability bias* (Fowler, 1993, p. 89).

Neglectful engineers emerged as individuals frustrated with perceived inefficiencies and monotonous work, while neglectful non-engineers appeared frustrated with excessive workload and disaffected with the organization and its leaders. This picture of neglectful engineers is consistent with two of engineers' most critical needs: structure and efficiency in their environment (Baugh & Roberts, 1994; Gibson & Whittaker, 1996) and challenge and interest in their work (Garden, 1992;

Hillard, 1991). When these needs are not met, it has been shown that engineers may become bored and detached, exhibiting neglect behaviors such as "reduced interest or effort" in their work (Farrell & Rusbult, 1992, p. 202).

Non-engineers' focus on excessive workload and confidence in executives is consistent with other findings. First, multiple comments on the questionnaires indicate that many non-engineering departments are understaffed and are of secondary importance to the company compared with engineering departments. For example, one employee explained, "In the support departments (i.e., non-engineering departments), the workload keeps increasing and increasing with no increase allowed for headcount resources. As a result, morale is very low due to the stressful work environment."

Differences in Passive Loyalists

As reported earlier, no significant difference was found in the propensity for engineers and non-engineers to enact passive loyalty behavior. Engineering passive loyalists appeared to perceive greater opportunities within the company than outside it. The increase in passive loyalty with lower autonomy and higher job variety indicates that passively loyal engineers have less personal authority, but high supervisor support and sufficient challenge in their work. Moreover, passively loyal engineers were satisfied with the efficiency of organizational changes.

Non-engineering passive loyalists emerged as individuals satisfied with their work variety and with executive leadership. Moreover, their expectations of their work situation were congruent with perceived reality. However, these employees perceived few internal promotion opportunities, insufficient change in the organization, and low autonomy. The apparent contradictions in this scenario may be clarified by Schellenberg's findings (1996). In her study of high-tech employees, she found that "craft workers [non-engineers] who thought they could find other work doubted that

they could match their current jobs for creativity, autonomy, and the chance to work with cutting edge technology. These workers were viewed as the most 'loyal' employees" (p. 198). The strong correlation of passive loyalty to job variety and executive leadership supports this argument. Thus, passive loyalty among non-engineers appears to increase for individuals who value their work activities and satisfaction with their leadership more than pay or promotion opportunities.

Alternatively, these individuals may resemble Withey and Cooper's (1989) description of the passive loyalist who was more entrapped and resigned than loyal. The passively loyal non-engineer may also be "biding their time, much like neglecters" (p. 536) in an undemanding position, unwilling to face the upheaval involved in changing employers or waiting for the right opportunity to appear.

Differences in Searchers

Results reported earlier indicated that engineers were less likely to exhibit search behavior than were non-engineers. The higher propensity for search behavior among non-engineers may be due to their greater visibility of and to the market. Schellenberg (1996) showed that employees who traveled more were more likely to search because travel increases "turnover by raising these boundary spanners' visibility to other firms and providing opportunities to scan the wider job market" (p. 206). By definition, the work of sales and marketing professionals (71% of non-engineers) requires a high amount of travel, bringing them into a great deal of contact with customers and competitors, and ensuring that they have a substantial amount of information about market trends.

In contrast, engineers may work several organizational layers away from the market and be much more focused on their work, receiving less input about market activity and relying more on friends in other companies for news about available jobs. Thus, despite the fact that the market for

engineers is stronger than that for non-engineers (Carnoy et al., 1997), engineers may have less visibility into the market. Engineers do perceive slightly higher external opportunity (mean of 3.95) than do non-engineers (mean of 3.63), but the difference in these means is not significant (t = 1.207, p = 0.229). The difference in search behavior may also be due to engineer's higher job satisfaction.

Engineers who were most likely to search were frustrated by inefficient organizational changes and too many managerial changes. This profile strongly supports Schellenberg's (1996) conclusion that instability increases turnover. These changes may be at the root of searching engineers' frustration with increased workload and role conflict, and the reason their expectations were not met. Compared to non-engineers, searching engineers perceived higher job variety and promotion opportunities, but these benefits were apparently not enough to keep the engineers satisfied. This conclusion provides further support for engineers' need for stability and order in their work environment (Gibson, 1996).

Searching non-engineers appeared most frustrated by the lack of internal promotion and career opportunities. This deficit was further compounded by low job variety, excessive workload, high role conflict, and lack of confidence in executive leadership. All of these frustrations combined to create unmet expectations among searching non-engineers.

Differences in Voicers

Results reported earlier indicate that engineers use voice somewhat less than do non-engineers. This lower use of voice among engineers may be due to their relative youth and shorter tenure. In interviews following the survey, one engineer indicated that she did not use voice in a certain situation because "I was young and a new member of the team."

As discussed earlier, voice among engineers appeared to be associated with perceptions of failed projects and managerial actions. These failures appeared to catalyze engineers' sense of professional duty, as they perceived the problems as opportunities to create solutions. High voicing engineers are further validated and supported by high job variety, high promotion and growth opportunities, and little role ambiguity. Thus, engineering voicers were clear on their work role, perceived opportunities for growth, and felt a personal responsibility to effect positive change in work projects.

In contrast, non-engineers appeared to voice primarily when overworked. Problems with their workload were exacerbated by high role conflict. While they perceived low job variety and low promotion opportunities, they appeared satisfied with organizational change effectiveness. Thus, their lack of personal opportunity may not be a problem for them. These voicing non-engineers may be confident in their role and value to the organization, using voice as a safety valve when workload rises above acceptable levels. This conclusion is consistent with the apparent challenges facing non-engineering departments as budgets and headcount are reduced at the company studied.

Discussion

The results of this study regarding relationships between job investments and employee behavior provide a great deal of guidance for companies hoping to attract and retain engineers in the competitive high-tech employment market. Both employers and employees can directly affect the level of satisfaction and the propensity to use constructive or destructive behaviors. The following discussion provides multiple recommendations to managers and employees at the company studied, in other high-tech firms, and in other industries. The extent of applicability of

these recommendations beyond the company studied can only be determined with additional investigation. Recommendations for future research based on the results of this study are presented after this discussion.

Job Investments and Employee Behaviors (Hypothesis 1)

In this study, active job investments (e.g., coworker support, firm-specific skills, and pay fairness) were shown to be especially important to engineers. Both employers and employees can directly affect satisfaction with coworker relationships, the development of marketable skills, and the perception of compensation fairness. Non-engineers' investment was determined mainly by length of employment. These four aspects of job investment are discussed in the following sections.

Coworker Support and Community in the Workplace

The emergence of coworker support as a strong positive correlate of active loyalty and negative correlate of search behavior among engineers emphasizes the importance of the social aspect of the work environment. This finding is especially compelling because it emerged for engineers, a professional group not widely associated with social interaction. Engineers are more stereotypically considered to be task focused—almost antisocial "nerds." This study shows them to be a group strongly motivated by positive coworker relationships. In fact, the interpersonal relationships formed at work have an effect beyond the individual level, as they increase organizational loyalty and attachment. That is, engineers are more likely to be outstanding workers when they are supported by positive relationships with their peers.

Companies eager to retain the services of engineers and maximize their productivity should develop opportunities for social interaction between employees. Activities such as inter- and intra-company sports teams, project kick-off and wrap-up parties, and offsite staff meetings over a

company-sponsored lunch, provide opportunities for employees to interact and develop bonds. These activities can be either work-related or completely unrelated to work.

Engineers' dependence on the workplace as a primary source of social relationships (Hodson, 1994) may be used to the mutual benefit of employers and employees. By creating opportunities to socialize, companies help engineers balance work and recreation while increasing the probability that these engineers will be loyal to the organization that recognizes and encourages a sense of community in the workplace. Increased social ties between workers can also strengthen their work relationship, improving conflict resolution and stabilizing the work environment.

As employees spend more and more time in the workplace, companies' roles expand from a purely economic realm into a social realm, where the company develops into a micro-community with professional and social relationships become less distinct. The recognition of the role of companies in employee's social lives is fast becoming an area of interest in contemporary management literature, exemplified by texts such as Building Community: The Human Side of Work (Manning, Curtis, & McMillen, 1996).

Company Investment in Employees' Marketable Skills

In addition to developing of a sense of community in the workplace, employers can increase employee loyalty by understanding the importance of helping engineers to build transferable skills, those that increase employees' value in the job market. This study showed that search decreased and active loyalty increased as the transferability of engineers' skills increased.

Regardless of company actions, engineers evaluate the worth of the skills they gain at a given company against those important to the general job market. Loyalty weakens when engineers perceive that skills they are learning are of low value to the market. For example, if most companies in an industry use computer databases to schedule meetings, engineers will resent time spent scheduling meetings through phone calls. They cannot present this activity as valuable to

other employers and imagine that their peers in other companies are spending their time developing more valuable and advanced skills, while they waste their time on low-tech activities.

Engineers who develop marketable skills at a company are not necessarily more likely to leave that company. As this study shows, they are more likely to stay, knowing that their skill set is being kept up-to-date or advancing with respect to their peers. Engineering professionals are especially keen to maintain a competitive, or at least a comparable, skill set. Engineers' dedication to their professional standard is stronger than their loyalty to any given company. If a company does not support the engineers' professional goals, the engineer is likely to look for an employer who can.

Pay Equity and Employee Loyalty

Another area of investment important to engineers and other high-tech professionals is pay equity. The management of compensation and nonfinancial benefits is a traditional responsibility of employers. This study supports the common belief that pay is important to employees. Pay is tangible evidence of the employee's value to the company. As with the development of marketable skills, many engineers are concerned more with pay *equity* than the actual level of pay. In a competitive market, compensation policies are subject to frequent change and employers must continuously monitor the level and type of compensation offered by competitors.

Nonfinancial benefits can also contribute to the perception of pay fairness. On-site services such as childcare, banking, dry cleaning, and concierge-type assistance are of tangible benefit to employees strapped for time to manage the details of daily life. Such services can also contribute to building a sense of community in the workplace. Employers who provide such services may be perceived as more employee-friendly and can stand out in a competitive employment market.

Employee Actions to Increase Investment

While the preceding discussion focused on employer actions that influence employees' job investment, individual actions can also impact satisfaction at work.

Engineers dissatisfied with their work environment but unwilling to expend the effort needed to change jobs can try to improve their satisfaction by initiating social activities among their coworkers. Company-sponsored events can provide a framework of official activities, but their benefit may be reduced if employees perceive them as contrived or required activities. Genuine friendships may be more easily developed one-on-one between peers with similar interests. Engineers may not be aware of the impact of peer relationships on their overall job satisfaction and company attachment, and so should improve their understanding of this issue.

With their high level of autonomy, engineers can also influence the development of marketable skills. Individuals can initiate projects that both interest them and provide opportunities for skill development. Instead of relying on the company to provide interesting work, engineers can proactively seek it, knowing best their own areas of expertise and development needs. The old employer-employee contract of lifetime employment and loyalty is being exchanged for a more equitable relationship where employees are responsible for their own career management. This concept is called "career self-reliance" and is especially possible in the high-tech field where individuals have many opportunities to choose their employer and work activities.

Employees with high career self-reliance can influence not only their career and skill set, but also their compensation package. Companies cannot be expected to fully predict the benefits of greatest interest to employees. Employees can help improve company offerings by ensuring that their preferences are communicated to policy makers. Suggestions for pay structure and nonfinancial benefits can be made to the Human Resources department. Employees can also act as an important source of information on competitors' compensation policies and benefits packages.

Employees must recognize that they are primarily responsible for their own satisfaction. While company policies can strengthen or weaken employee attachment, the company relies on employee feedback to set and adjust policies.

Length of Employment and Employee Behavior

This study showed that non-engineers with greater length of service (tenure) at the company were more likely to enact constructive behaviors and less likely to act destructively. While this is generally good news for employers, managers should be wary of dysfunctional adaptations that may underlie long employee service. As stated earlier, subsidiaries of Japanese companies commonly develop a "core of veteran local employees who make their peace with a traditional Japanese management regime and resign themselves to relatively unchallenging roles within it" (Lincoln, Kerbo & Wittenhagen, 1995, p. 431). While this core of local employees may be satisfactory performers, there is a high possibility that the company is carrying some individuals who have learned to work the system for their benefit. These employees can have a strong negative effect on their coworkers who perceive a gap between their efforts and rewards. As one employee in this study commented, "At times it is difficult putting in 150% when others do not." Thus, companies should focus on increasing the *quality* of retention, rather than just reducing employee turnover statistics.

In contrast, engineers with greater tenure were more likely to search for a job outside the company. This may be another attribute of subsidiaries of Japanese companies, where perceptions of the company can become increasingly negative in employees with longer tenure at the subsidiary (Watanabe & Yamaguchi, 1995). Executives must understand the dynamics of this trend at their company and develop programs to change it. A study of how engineers' attitudes change over time and the signals sent during these changes would help managers to identify at-risk employees and request assistance to reverse a negative situation.

Quality of Alternatives (Hypothesis 2)

Although the *quality of alternatives* factor is not organizationally controllable, it was included in this study to help differentiate the five employee behaviors. The study supported the importance of the quality of alternative jobs in increasing active behaviors and decreasing passive ones. While job market dynamics are beyond the control of any one company, organizations can influence the market's affect on their employees in several ways.

First, employers can aggressively seek information on competitor hiring practices from a variety of sources. Many companies make the mistake of relying exclusively on established information sources or internal experts for information about their environment (Slater & Narver, 1995). The most successful companies leverage the knowledge of both internal and external sources to obtain objective information about the company and state of its environment. Systems theorists call this approach *double-loop learning* and view it as part of a four-stage process (Morgan, 1986). First, companies must have the capacity to sense, monitor, and scan significant aspects of their environment. Second, they must be able to relate this information to the operating norms that guide their behavior. Third, companies must be able to detect significant deviations from the norms. Finally, they must be able to initiate corrective action when discrepancies are detected. All of these steps are important for Human Resources managers competing in a volatile employment market.

Second, companies can reduce barriers to employee transfer between departments. Inter-departmental rivalry is a common occurrence and managers are motivated to block employees from transferring to other departments. In the absence of an overt rivalry, the loss of a productive employee is a burden that most managers are unwilling to accept due to the time required to find, attract, and train a new employee. The company examined in this study faces such a challenge, as described by comments such as the following: "I went to my manager to discuss my career path,

what I need to do and where I could go within my SBU [sub-business unit] or within [the company]. I was told . . . I was indispensable in my current position and could not be replaced, therefore I had no career path and no future but what I had. I had to decide to either expect what I was doing or quit."

While the situation described by this employee was clearly frustrating, an employee should not view it as immutable. The strong market provides ample opportunity for growth regardless of the opinions of any one manager. Of course, an individual's propensity to acknowledge this opportunity is a function of their positive or negative affect. George and Jones (1996) explained that people with positive affect have higher self-efficacy, are more optimistic, and are more action oriented than those with negative moods.

Inter-departmental transfers are an excellent way to increase employee skills and provide a new challenge to an employee with significant experience in their present position. Despite a temporary drop in productivity, companies should recognize the significant mid-term benefits of such employee transfers, including opportunity to develop higher level managers from existing employees, retention of historical knowledge held by employees, and development of stronger inter-departmental relationships.

As in the development and maintenance of their investments, employees have a role in managing their career alternatives. Employees should not be deterred from seeking a position in another department if an employer does not formally support such transfers. Again, employees have an especially powerful position in a strong job market, as they can threaten to quit if not transferred. First and second-level managers can also initiate transfers between their department and similar ones in other divisions. It is common for employees to mistakenly expect executives to manage interdepartmental relationships. Senge (1990) calls this the "myth of the management team," where workers justify their reluctance to act beyond the strict boundaries of their position

by assuming that executives will integrate different functional areas. In many cases, executives spend more time in political battles, laying blame, and protecting their power than breaking down barriers to collaboration.

Moreover, employees should evaluate their job options objectively. High-tech companies are especially prone to promote top-performing engineers to management positions (Biddle & Roberts, 1993). However, few engineers are prepared for such a job change (Cordero & Farris, 1992) and may find themselves severely challenged to perform managerial tasks for which they were never trained and of which they may be only peripherally aware (Badaway, 1996). While the temptation to accept a promotion to maintain equity with peers is strong, individuals should establish goals and measure job alternatives based on personal criteria rather than seeking a promotion or title because their peers have received it.

Job Satisfaction and Employee Behavior (Hypotheses 3, 4, and 5)

The wealth of information provided by this study can guide executive decisions about where to invest resources for the greatest effect. However, before policy changes are initiated, the company studied should initiate an intensive organizational development assessment to draw out the details of the data. This process is important to any company contemplating organizational change, and is often neglected overlooked (Dipboye, 1997).

Interviews with employees would be helpful in understanding causality between behaviors and the job satisfaction factors that emerged most strongly in this study. Such a study would also clarify temporal effects between behaviors, which could further illuminate investment priorities. The high variance explained in this study relative to other research should give companies a sense of comfort that many major issues of concern to employees are contained within the study. These issues can serve as a starting point for more intensive analysis of the company.

The overall low level of satisfaction evident among employees in this study should be an immediate concern for the company. Human resources managers may want to work with an independent investigator to initiate similar studies in competitors to determine if this level of satisfaction is unique to the company studied or common in the industry.

The discussion of job satisfiers and dissatisfiers and their effect on employee behavior will be handled in the following three sections: Reducing Destructive Behaviors, Increasing Constructive Behaviors, and Increasing Active Behaviors. The recommendations made in these sections are addressed to both employers and employees.

Reducing Destructive Behaviors

Attention to employee expectations and workload are important to reduce search and neglect behavior among all employees. Reducing role ambiguity and organizational instability will further reduce destructive behaviors among engineers; while improved promotion opportunities will have a similar effect on non-engineers.

Met expectations and workload. This study showed that low levels of met expectations significantly increased search and neglect behavior in both engineers and non-engineers, while work overload strongly increased search in all employees and increased neglect in non-engineers. Companies can improve the accuracy of employees' expectations by providing a realistic description of job responsibilities and the working environment. This information may be contained in a *realistic job preview* provided during the interview process (Hom & Griffeth, 1995) to help ensure that individuals who accept positions with the company encounter fewer surprises and maintain a higher level of satisfaction after entry. Some exposure of both positive and negative realities is important. This study provides guidance on critical work factors to include in such a job preview document. These are the factors most likely to increase search and neglect behavior: workload, job variety, role ambiguity, and the organizational climate.

Prospective employees can improve their understanding of a prospective position and employer by asking detailed questions about issues most important to their personal satisfaction. This requires an individual to understand their internal motivations and be assertive in seeking relevant information. Current employees can improve their level of met expectations by initiating and driving an effort to define their personal job responsibilities and their manager's expectations. Participation in defining expectations is likely to increase satisfaction in a similar fashion to the increased acceptance of unfavorable performance reviews that occurs when employees participate in the review process (Magner, Welker, & Johnson, 1996).

As described earlier, the association between employee behaviors and workload in this study appeared to be nonlinear. It appeared that up to a certain point, increasing workload increased constructive behaviors, but after that point, it increased destructive behaviors. Workload was especially strongly associated with search behavior in both engineers and non-engineers. Workload management is a joint responsibility of managers and employees. Employees must learn to accurately assess the time and effort needed for different projects. This information must be communicated to management in a timely fashion. It is important that managers respect this information, after verifying it, and help employees to maintain a challenging but manageable level of work.

Destructive behaviors and engineers. Beyond workload and met expectations, engineers' destructive behavior increased as organizational instability and role ambiguity increased. Managers can address these problems by providing clear task descriptions and work processes to engineers. In the absence of this information, engineers must request clarity when they are unsure about their supervisor's expectations, work responsibilities, or their role relative to other departments.

Companies can improve this situation for all engineers by ensuring that engineering managers are properly selected, trained, and evaluated. Formal programs are important to identify

potential managers and help develop and practice their skills before they become responsible for the company's most precious resources: employees (Merriam & Caffarella, 1991). The need for such programs is underscored in the following survey comments: "When department promote people, they should carefully judge the individual's capability and ensure that individual is ready for the new demands and challenge" and "I think there should be a formal anonymous review by the employee of their manager with a higher manager." These programs are especially important for engineering managers who receive little managerial training in their formal education and may be unaware of the importance of human skills in the management process (Badaway, 1995; Biddle & Roberts, 1993; Cordero & Farris, 1992).

Destructive behaviors and non-engineers. Beyond unmet expectations and excessive workload, this study showed destructive behaviors to strongly increase among non-engineers as promotion opportunities and job variety decreased. To address these problems, the company examined in this study should assess the opportunities made available to non-engineers, especially with respect to the amount of variety in their daily work and long-term promotion opportunities.

Because the external market for non-engineers is very strong in the high-tech sector (Carnoy et al, 1997), low opportunities for non-engineers may be unique to the company examined in this study. While engineers play an active role in the subsidiary due to their direct responsibility for technical aspects of customer projects, non-engineers are more commonly involved in support activities that may be duplicated in the highly centralized organizational structure found in many overseas subsidiaries of Japanese multinational corporation (Dirks, 1994). Any decentralization to provide enhanced opportunity for non-engineers is likely to be very difficult for Japanese companies because it would cause a fundamental change in the organizational structure. As Lincoln, Kerbo, and Wittenhagen (1995) explain, the "tight controls that Tokyo or Osaka offices

impose on foreign subsidiaries is less...a function of some culturally grounded Japanese distrust of *gaijin* managers than of the seamless hierarchical unity of a typical Japanese firm" (p. 428).

Despite the difficult nature of this problem, Japanese companies interested in developing into fully global organizations must decentralize many support activities. Competent non-engineers will be needed to accomplish the decentralized tasks. To retain these individuals and ensure that the investment made in them pays off, companies must provide greater opportunities and more authority in their area of responsibility. One way to initiate such a change is to decentralize on a limited basis. Such a trial effort will minimize the risk to the organization and provide a model from which to expand the effort.

Increasing Constructive Behaviors

This study showed that maintaining high job variety is key to increasing constructive behaviors (voice, active loyalty, and passive loyalty) in both engineers and other non-engineers. Constructive behaviors are further increased among engineers when role ambiguity is reduced and satisfaction with the corporate climate increases, while improved growth opportunities and executive leadership will have a similar effect on non-engineers.

Job variety. As discussed earlier, job variety was the most common correlate to employee behaviors in this study (9 out of 59 significant correlations). In each case, increases in job variety were associated with increases in constructive responses (active loyalty, passive loyalty, voice) and decreases in destructive responses (neglect and search).

Manager's actions to increase job variety may be guided by the concept of job enrichment. Herzberg (1966) recommended several techniques that managers could use to enrich jobs: find ways to remove some controls while increasing individual accountability for the work, give a person a complete natural unit of work, increase downward information flow, and increase the challenge of the workers' jobs. These activities will also increase the value of employees' skills,

simultaneously addressing this investment issue discussed earlier. As in previous discussion, employees can initiate job enrichment programs both by letting management know when they are dissatisfied and by suggesting specific projects they feel comfortable leading or contributing to.

Constructive behaviors and engineers. As described in the earlier, engineers need clarity in their work responsibilities. Such clarity increases the amount of order and stability in the engineer's environment, a critical factor for satisfaction among members of the engineering profession (Gibson, 1996; Malik & Wilson, 1995). The importance of a stable environment was further supported by the finding that engineers with the highest active loyalty expressed high satisfaction with the organizational climate. Managers can influence organizational stability by carefully planning organizational change, involving engineers in planning changes that will affect them, and informing engineers as each change stage is implemented. Engineers can increase the order in their environment by requesting clarification and information when they need it, offering suggestions for improving changes, informing management when changes do not work as expected, and initiating changes where they see a need.

As with recommendations made in previous sections, change requires joint actior by both company management and employees. Unfortunately, leaders sometimes abdicate their authority and blame followers for the failure of the enterprise, while followers abdicate their responsibility to a leader and then blame the leader for making a poor choice (Hirschhorn, 1997). An example of this problem is given the following excerpt from the 1996 book, Only the Paranoid Survive by Andrew Grove, chairman of Intel Corporation:

> If you are in senior management, don't feel you're being a wimp for taking the time to solicit the views, convictions and passions of the experts. No statues will be carved for corporate leaders who charge off on the wrong side of a complex decision. Take your time until the news you hear starts to repeat what you've already heard, and until a conviction builds up in your own gut.

> If you are in middle management, don't be a wimp. Don't sit on the sidelines waiting for the senior people to make a decision so that later on you can criticize them over a beer. . . . Your time for participating is now. . . .
>
> It is important to realize what the purpose of these debates is and what it isn't. Don't think for a moment that at the end of such debates all participants will arrive at a unanimous point of view. That's naïve. However, through the process of presenting their own opinions, the participants will refine their own arguments and facts so that they are in much clearer focus. Gradually all parties can cut through the murkiness that surrounds their arguments, clearly understand the issues and *each other's* point of view. Debates are like the process through which a photographer sharpens the contrast when developing a print. The clearer images that result permit management to make a more informed—and more likely correct—call. (p. 115)

Constructive behaviors and non-engineers. In addition to job variety, non-engineers' constructive behaviors were associated with growth opportunities and executive support. Recommendations for improving growth opportunities among non-engineers are similar to those given earlier in the discussion of destructive behavior and promotion opportunities. In that discussion, lack of opportunity was described as resulting from the centrally controlled Japanese subsidiary. The root cause of non-engineers' perception of low executive support may similarly result from this unique corporate climate. Comments written on the surveys used in this study made it clear that non-engineers felt undervalued, pointing to the hiring freeze for new non-engineering employees as evidence that engineers were more highly valued by executives. Differences in managerial expectations appeared to contribute further to this problem, as described in another survey comment: "Some Japanese managers do not understand or make an effort to show appreciation for employees' efforts or try to motivate. Basically they have high expectations and don't tell you how they feel about your performance or efforts."

The job of the Japanese expatriate managers is a complex one. More experienced in the Japanese organizational culture, it is sometimes difficult to understand and address the needs of Western employees. Moreover, the management style used with success at the Japanese home office does not always work as expected in the U.S. environment. The poor transferability of one

management style into a different culture and the unexpected results of its use are not unique in subsidiaries of Japanese companies.

DiBella's (1993) research into cross-cultural implications of managerial techniques showed that conflict occurred when an action that appeared rational within one cultural framework is seen as irrational in another. Managers must understand that their management development methods are based on a set of assumptions including beliefs about why the method is effective, how it works, what outcomes will occur, and the nature of the environment in which the practice will be used. DiBella's study concluded that if a practice is not purposefully adapted to the new cultural framework, its actual impact will be different from expectations, and the practice may be rejected, the programs terminated, or the participants may withdraw.

An in-depth assessment of the current cross-cultural management situation would greatly help the company used in this study to understand the dynamics at play between expatriate managers and their employees. Although not reflected in the broad ethnic groups described in this study, both the company studied and other high-tech companies employ individuals from a broad spectrum of ethnic backgrounds, especially of Asian and Middle-Eastern origin. The impact of culture on interactions between managers and employees from this diverse group of employees are not well understood and may be ignored by companies who fear that such an investigation would be offensive or misunderstood by employees.

Companies can begin to address this complex situation by helping managers and employees define their personal management style and their expectations of managers. Such a dialog would help to reset expectations and clarify areas where intervention may be necessary. With respect to the Japanese-Western dynamic, increased education of both expatriate and local employees in the organizational norms of the other culture could be a first step toward improving mutual understanding.

Increasing Active Behaviors

This study found that the job satisfaction factors associated with constructive, active behaviors appeared to function as two aspects of the work environment: stimulus factors and support factors. For example, workload appeared to function as a catalyst of active loyalty behavior, while job variety appeared to function as a precondition for active loyalty. As discussed earlier, some factors emerged as a positive correlate to both constructive and destructive behaviors. Thus, to increase active behaviors, support factors should be increased, while stimulus factors should be closely managed.

Active behaviors and engineers. This study found that among engineers, voice and active loyalty increased as satisfaction with reorganization efficiency, executive leadership and supervisor support decreased. Leadership failures appeared to stimulate engineers' sense of professional responsibility by providing a challenging opportunity for problem solving. However, as some of these factors are also associated with passive or destructive behaviors, it was concluded that to a certain point, the factors provide interesting work, but past that point case excessive work stress.

To manage these stimulus factors, managers should recognize the importance of engineers' professional identity. This trait should be respected and leveraged, but not misused. Managers should help engineers to pick the most solvable problems when they desire to fix problems caused by executive leadership or reorganization failure. Engineers can become quickly frustrated if their extraordinary efforts fall short due to obstacles beyond their control, such as inefficient systems, politics, conflicting instructions, lack of cooperation, "competition with co-workers and the negative atmosphere generated by office politics" (Hodson, 1994, p. 270).

Company-wide policies may be most helpful to avoid the development of work stress from these stimulus factors. While engineers may be willing to attack system-level problems, managers and executives must reduce inefficient or obstructive policies and departments. Managerial quality

may also be addressed through a company-wide program for evaluating and improving management skills. One such program, called a 360-degree evaluation, measures a manager's skills from the view of the manager, his or her supervisor, employees, and peers. This broad set of inputs helps a manager to identify problem areas and define improvement plans.

As with other job stresses, engineers can influence the stimulus factors by managing up. That is, they should ensure that their supervisors are aware of problems, proactively offer solutions, develop clear and thorough proposals for change, keep management informed of their progress, and ask for help when they need it.

This study also showed that engineers' active behaviors increased as job variety, role clarity, and promotion chances increased. These support factors appear to provide an environment where the engineer feels valued by the company, is clear on his or her responsibilities, understands management's expectations, and has access to a variety of opportunities for creative intervention.

To increase these support factors, managers can discuss career goals with engineers, provide career path options and requirements for achieving higher positions, and provide opportunities for engineers to develop necessary skills. It is more important to set accurate expectations and gradually develop new skills in an engineer than to offer a premature promotion to an eager individual.

To encourage continued active loyalty, managers can take engineers' attempts to solve problems and offer solutions seriously by listening carefully and allowing the engineer to implement promising ideas. Small successes are likely to encourage larger ones, and each discussion session can be an opportunity to help the engineer discover aspects of the problem that may not be encompassed in their plan.

Active behaviors and non-engineers. Among non-engineers, workload and role conflict appeared to stimulate active behaviors. The non-engineers in this study seemed to exert extra effort

mainly in an attempt to manage an excessive workload caused in part by a concurrent work increase and hiring freeze. Extra effort also appeared to be used to manage confusion over work responsibilities. These stimulus factors can easily become work stresses and cause destructive behaviors. As discussed before, non-engineers' excessive workload is likely to result from the unique corporate culture at the subsidiary in this study. The ideas presented in the earlier section entitled Constructive Behaviors and Non-Engineers are all appropriate ways to manage these stimulus factors. Non-engineers' active loyalty increased when they felt supported and valued by executives. In addition to the ideas presented in the Constructive Behaviors and Non-Engineers section, ensuring that employees understand how their jobs contribute to organizational goals can strengthen this relationship. Specifically, managers must help employees understand their role in the company, how their actions make a difference, and how their specific work relates to overarching organizational objectives.

If managers do not help employees define their job in these ways, employees should request the information and guidance. Especially in cases where the manager and employee are from different cultures, employee expectations need to be clearly stated to guide the manager's efforts. Employee input is a vital starting point in improving communication.

Summary of Findings and Conclusions

The key findings of this study are summarized in Tables 60 through 68 along with interpretations of the findings and the implications of these results for managers, employees, and researchers. Page references are provided, indicating where in the paper each point is discussed.

Table 60

Summary of Conclusions: Hypothesis 1 – Job Investments

Findings[a]	Conclusions	Recommendations[b]	Pages
• (+) Coworker support: increases active loyalty in all employees, reduces search in engineers. • (*) Importance of social network to engineers	• Reciprocity: employees are willing to support coworkers if they are supported themselves. • Most of engineers' social activity for involves coworkers.	• MR: Create opportunities for employee socialization, project teams, reduce competition between individuals and departments • ER: Support coworkers, initiate group activities to make more pleasant and stable work environment • RR: Investigate importance of social network in job satisfaction, even for engineers (unexpected)	• 163 • 198 • 228
• (?) Firm specific skills: increase search, but decrease neglect and active loyalty	• Firm specific skills may be beneficial, not limiting due to competitive information • May be overshadowed by strong job market	• MR: Give employees chances to gain skills. Understand employees' need to increase their personal value in the employment market • ER: Choose projects that will benefit company *and* increase your marketable skills. Manage your career and your self-investments. • RR: Inconclusive measure. Need to refine this one-item scale.	• 164 • 199 • 225
• (+) Fairness of pay: increases constructive, decreases destructive behaviors	• Employees who feel fairly paid stay at the company. • Pay equity and chance for financial gain especially important in high-tech.	• MR: Basic issue. Executives must understand the details of the competitive employee market and may need to expand the idea of fair pay to other benefits, creative benefits and bonus packages. • RR: Interesting to examine the impact of creative pay schemes and benefits, such as stock, on-site dry cleaning, child care, and others.	• 164 • 200
• (+) Tenure: All results support hypothesis except search in engineers	• Old-timers are happier or have adapted to the company. Unhappy employees are already gone. • Engineers with longer tenure may search due to broader skill set or desire for a new challenge.	• MR: Check for dysfunctional adaptation to company. Examine how attitudes change over time, how to recognize developing problems. Develop career paths, encourage interdepartmental transfers. • ER: Look for challenges inside company before going outside. Don't stop at company-defined norms. Create your own opportunities. • RR: Inconsistent results for engineers & non-engineers. Need to understand temporal aspects and operationalize change signals.	• 165 • 201-202

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 61

Summary of Conclusions: Hypothesis 2 – Quality of Alternatives and Overall Hypothesis 3

Findings[a]	Conclusions	Recommendations[b]	Pages
Hypothesis 2			
• (+) High alternatives increase active, decrease passive behaviors	• Outside alternatives increase active behaviors by reducing risk	• MR: Understand competition and be sure that the company has programs and policies in same areas as competitors, especially in career development paths. Break down barriers to transfers between departments to avoid forcing employees out of company. • ER: Evaluate job options realistically. Avoid changing jobs just to match peer achievements. Understand your own definition of success and make changes consistent with internal compass. • RR: This item appears valid for high-tech employees.	• 165 • 203-205
• (-) Passive loyalty increased as high alternatives and high education utility increased	• Passive loyalty may be higher risk than expected due to financial benefits lost if stay. • High demand for high-tech employees may skew results	• RR: The hypothesis was not supported, but results were significant. Other studies showed insignificant results for passive loyalty. May need continued improvement of passive and active loyalty constructs.	• 166 • 225
Hypothesis 3			
• (+) Overall, at least one job satisfaction variable supported model • (*) Relatively low overall satisfaction	• Satisfied employees are motivated to sustain happiness and are optimistic that their efforts will result in positive change.	• RR: Model and previous research supported. • RR: Job satisfaction variables proved to be useful for high-tech employees • RR: Explained variance was higher than that reported in other research • RR: Investigate other high-tech firms to see if low satisfaction in this study is company-specific or typical of industry	• 167 • 205-206

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 62

Summary of Conclusions: Hypothesis 3 – Job Variety

Findings[a]	Conclusions	Recommendations[b]	Pages
• (+) Job variety increases constructive, decreases destructive behaviors • (+) Strongest for active loyalty in engrs; passive loyalty in non-engineers	• Job variety fulfills employees' need for challenging, interesting work. Especially important for professionals who will be loyal first to profession, second to company.	• MA & ER: As the most frequent significant correlate, managers must attend to variety in work content. This is similar to ensuring that employees are gaining marketable skills through their work. • RR: Supports H3 and previous findings. Supports view of engineers as a group with a strong professional identity.	• 168 • 209
• (+) Strongest job variety correlations among non-engineers	• Engineers are more satisfied due to nature of their work and the high value to high-tech companies.	• MA & ER: It is especially important to give non-engineering employees more variety. Don't need to focus as much on this issue for engineers. • RR: Difference between engineers & non-engineers.	• 169 • 208
• (-) Strong negative correlation between job variety and neglect, but no strong relationship with search	• If job market were weak, expect a stronger relationship with search. But strong job market for high-tech masks this effect. • Evidence of a temporal effect?	• RR: Need to understand temporal aspects of EVLN behaviors. • MR: Examine temporal aspects of EVLN behaviors. Neglectful employee may close to quitting. Analyze and develop interventions for each step in break down of employee/employer relationship • ER: Need to ask for work and variety, initiate projects. Initiate fixes to perceived problems.	• 169 • 208 • 226
• (+) Strong positive relationship between job variety and voice	• Employees may feel that voice is part of their job. Those with high job variety may also have a higher expectation that change will result from their suggestions.	• MR: Give employees chances to make changes. Reward the use of voice by supporting the ideas they put forward and acting on them. • RR: Need further analysis to verify the interpretation of this result.	• 169 • 210

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 63

Summary of Conclusions: Hypothesis 3 – Organizational Change / Instability

Findings[a]	Conclusions	Recommendations[b]	Pages
• (+) Change / Instability decrease constructive, increase destructive behavior • (+) Strong correlation between reorg efficiency and passive loyalty in engineers • (*) Change inefficiency upset engineers, change frequency non-engineers	• Impacts confidence in leaders, predictability of environment • Increases trust in company, validates past success, gives employees reason to trust • Higher expectation need for order due to engineer personality	• RR: Supports use of instability variable, but need to improve validity and reliability. Third strongest correlation in the study. Difference between engineers and non-engineers. • MR: Need to understand wider consequences of organizational change, inform and involve employees, and learn how to minimize disruption. Plan changes to support professional groups. Engineers don't mind change if it's orderly. Non-engineers don't want too frequent change • ER: Need to speak up when see impending change that will be disruptive and offer suggestions before change takes place.	• 170 • 210
• (-) Too much change relationships may actually reflect not enough change	• Employees may see organizations as static or inflexible	• RR: Refine this item, especially for Japanese subsidiary environment. • MR: Examine impact of lack of flexibility on employees & customers. • ER: Initiate change where see a need.	• 172 • 208 • 225
• (-) Reorganization efficiency increases search in non-engineers	• Reorgs validate employee skills & attractiveness to other co's. • Congruence between personal values and company goals.	• MR: Be aware that the "best and brightest" of the non-engineers will exit if not attended to • RR: High performers may be found by looking at those who perceive organizational changes to be efficient and beneficial	• 172 • 228
• (-) Change failure increased voice among engineers	• Engineers feel a call to action when see failures in environment	• RR: Supports engineer's sense of professional identity and purpose. • MR: Allow engineers to initiate or join projects to solve problems. Help develop systems to avoid chronic inefficiency in work processes.	• 173 • 210

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 64

Summary of Conclusions: Hypothesis 3 – Work Stress and Met Expectations

Findings[a]	Conclusions	Recommendations[b]	Pages
Work Stress			
• (+) Work stress increases destructive behavior • (+) Strong link between workload and search.	• Work stress increases confusion and frustration • Gap between Japanese manager style and worker expectations increases ambiguity	• RR: Role ambiguity key for engineers, work overload for non-engrs. • MR: Need to manage workload to ensure that employees are not burning out. Reward and recognize extra effort. • ER: Manage workload. Tell boss accurate time needed for each job. Speak up if problems occurring, or if some schedules slipping.	• 173 • 206
• (-) Work stress increases constructive behavior • (-) Strong link of role conflict and act. loyalty in engrs, workload and act. loyalty in non-engrs	• Work stress may have a nonlinear relationship for engineers. • Voice used as a control valve for overworked employees.	• RR: Inconsistent results with respect to previous research. Indicates that high-tech is different than other populations. Engineers are also different in this issue than non-engineers. • MR: Supports need for high job variety among engineers. But watch for overload. Especially track workload in non-engineers and understand how work processes influence this problem. • ER: Speak up when overloaded. Don't assume the boss can tell.	• 175 • 207
• (+) Strong link of role ambiguity, neglect, and voice in engineers	• Role confusion causes withdrawal, reduces engineers' ability to identify problems and willingness to speak up.	• MR: Provide clear work expectations and processes to employee. • ER: Ask for clarification if unsure about work responsibilities. • RR: Voice/role ambiguity is strongest correlation in the study.	• 175 • 207
Met Expectations			
• (+) Unmet expectations increase destructive behaviors, especially strong relationship with search in all employees	• General measure of job dissatisfaction • Subsidiary climate may miss expectations of workers	• RR: Could develop a general measure of job dissatisfaction and a general measure of job satisfaction for the EVLN model. • MR: Realistic job previews would help align expectations and reality. • ER: Investigate new jobs thoroughly before accepting.	• 185 • 206-207

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 65

Summary of Conclusions: Hypothesis 3 – Organizational Climate / Leadership

Findings[a]	Conclusions	Recommendations[b]	Pages
• (+) Satisfaction with climate / leadership supported model • (+) Strong link of active loyalty and climate satisfaction in engineers • (+) Strong link of leadership and passive loyalty in non-engineers	• Congruency between employee and company values important to increase order of and stability.	• RR: Satisfaction with organizational climate emerges as an important factor for high-tech workers and engineers. Opportunity to apply systems theory in organizations, especially holographic concept. • MR: Align goals of adjacent groups. Minimize conflict between groups. Understand what employees perceive to be supportive actions and attitudes from executives. • ER: Speak up and let manager know when need support, when support not there. Tell leaders what you need.	• 177 • 212 • 213
• (*) Dissatisfaction with executive leadership increases constructive behavior in engineers, destructive behavior in non-engineers	• Engineers act based on a professional code despite poor performance of management • Non-engineers are less satisfied with executives, maybe because they receive less support and are less valued than engineers.	• RR: Difference between engineers and non-engineers. If executives don't meet engineers' expectations, they take action. If executives don't meet non-engineers' expectations, they exit or neglect. • MR: Low priority for engineers, high for non-engineers. Support engineers' perceptions of professional and career development. • ER: Choose battles and ask for help in areas beyond your expertise.	• 179-182 • 213
• (-) Strong negative relationship between voice and supervisor support in engineers	• Engineers more understanding of managerial inefficiencies, share more of a background and common experience. • Non-engineers less satisfied with managers and less forgiving of manager weaknesses.	• RR: Expected stronger correlations between supervisor support and EVLN behaviors. Engineers again appear to act out of professional code by using active behavior despite weak support. • ER: Clarify what you expect from your boss. You may need to take a more active role in *managing* your boss or getting other support from peers. • MR: Improve managerial skills to keep non-engineers. Improve communication with employees to clarify expectations.	• 182 • 208 • 211

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 66

Summary of Conclusions: Hypothesis 3 – Autonomy and Growth Opportunity

Findings[a]	Conclusions	Recommendations[b]	Pages
Autonomy			
• (-) Negative link of autonomy and passive loyalty • (-) Positive link of autonomy and neglect	• More autonomous employees choose active response • May signal under management or inept management	• RR: Autonomy scale might not work well for this population. Alpha was 0.639 in this study compared to 0.84 (Mueller et al., 1994). May need to refine into a participation construct. • MR: Actively manage; give staff adequate direction and interaction. • ER: Initiate meetings with boss, schedule project reviews. Manage up.	• 186 • 212 • 225
Growth/Promotion			
• Engineers more satisfied with opportunities.	• Engineers get opportunities, due to higher value to company and lower supply of engineers.	• RR: Difference between engineers and non-engineers in high-tech. Similar results may be seen in other high-tech firms or the company studied may be overly skewed toward valuing engineers.	• 187 • 227
• (+) Strong link of promotion and passive loyalty for engineers. • (+) Strong positive link of growth and voice in engineers	• If engineer is advancing, figure co has their head on straight. • If growth avail, engineer feels validated when they see an opportunity for their input	• MR: Can make an impact on constructive behavior in engineers if define clear career path and promotion opportunities. Average satisfaction for engineers in these areas still fairly low. • ER: Make opportunities. Take charge of your career path.	• 188 • 214
• (-) Negative link of growth and active loyalty in non-engineers • (+) Negative link of promotions and search in non-engineers	• Growth may measure more employee marketability than satisfaction. • Low growth opportunity may also indicate low performer.	• RR: Refine these variables for non-engineers. Scale may not be working because opportunity is too low, these employees are plateaued, or they have given up. Loyalty for non-engineers looks like entrapment. Difference here between engineers and non-engineers. • MR: Ensure key non-engineers are getting growth opportunities to keep them.	• 188 • 208 • 225

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 67

Summary of Conclusions: Hypothesis 4 –Job Satisfaction Factors across Behaviors

Findings[a]	Conclusions	Recommendations[b]	Pages
• Search and neglect are associated with dissatisfaction for both engineers and non-engineers • Passive loyalty is mainly associated with satisfaction • Active loyalty is associated with satisfiers and dissatisfiers • Voice is associated with satisfiers and dissatisfiers	• Destructive or passive behaviors explained well by Herzberg • Active loyalty appears associated with both stimulus and support factors • Voice is a reaction to *dissatisfactory circumstances*, and encouraged by certain satisfying aspects of the company climate	• RR: H4 supported. Results give managers general guidelines for influencing employee behavior. Need more research to look at temporal effects between EVLN. • RR: Refine job satisfaction factors to be closer to Herzberg's definition of content/context. • RR: All scales should be either positively or negatively worded to avoid analysis complexities • MR: To encourage active behaviors and reduce passive behaviors, give employees challenges, attention, and the chance to perform. To encourage constructive behaviors, give employees job variety and support at the organizational level. To reduce destructive behaviors, help employees manage their workload, clarify their job expectations, and provide growth opportunities. Need in-depth organizational behavior analysis to understand the "why's" behind these relationships. • ER: If you see yourself slipping into passive behaviors, ask for help, manage up, and take the initiative to change your situation. If you move toward destructive behaviors, negotiate for a manageable workload, clarify your boss' expectations, and search for growth opportunities.	• 189 • 205-215

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Table 68

Summary of Conclusions: Hypothesis 5 – Differences between Engineers and Non-Engineers

Findings[a]	Conclusions	Recommendations[b]	Pages
• Differences greatest in constructive behaviors; lower in destructive behaviors. • Engineers and non-engineers shared four common factors for both destructive behaviors; but shared only two to three common factors for constructive behaviors. • Non-engineers: Older, long tenure, change frequency, work overload, job variety & destructive, quit if not support. Loyal non-engineers appear plateaued • Engineers: Change efficiency, Job variety & constructive. Act without support, Loyal engineers look like rising stars.	• Herzberg says job dissatisfaction (per destructive behaviors) caused by job context factors which are relatively the same for all employees. Job content factors determine job sat & constructive behaviors & understandably vary depending on type of work / profession.	• RR: Supports conclusion that separate satisfiers and dissatisfiers should be evaluated in the modified EVLN model: maybe a general job sat and a general job dissatisfaction. Can be simpler than all these variables, but still get at Herzberg's content and context concepts. • MR: Generally, can act to reduce destructive behaviors without attention to profession, but must attend to employee profession when acting to increase constructive behaviors. • MR: To decrease search and neglect in all employees, help employees manage their workload, clarify their job expectations. Non-engineers also need greater growth opportunities. • MR: To increase engineer's constructive behaviors, increase job variety, reduce role ambiguity, help engineers see the alignment between their actions and corporate direction, keep an orderly environment. • MR: To increase non-engineers constructive behaviors, provide more growth opportunities, more supportive environment, and more job variety. Show them that executives understand and care about their work.	• 192-197 • 205-215

[a]Explanation of symbols: (+) = Supports model, (-) = Contradicts model, (?) = Mixed support, (*) = New finding
[b]Explanation of symbols: MR = Recommendation to managers, ER = recommendation to employees, RR = recommendation to researchers

Recommendations for Future Research

The findings of this study contribute a great deal to the body of employee attachment research. Through the use of a high-tech population, this study has helped clarify the generality of two major models used by contemporary researchers. Several categories of recommendations flow from the findings. These recommendations are organized under the following five topics: improve scale reliability and validity, study causality and temporal effects, expand study to other companies, surprising results, and future research topics.

Improve Scales for High-Tech Population

While many significant and strong results emerged in this study, improved scale validity will improve the confidence in future findings. While the survey instrument used in this study was a compilation of previously used questions, numerous changes were made in the wording of existing questions, and several new questions were added. Thus, it is likely that this study is the first application of these scales to a high-tech population. Because of the limited pool of results, it is vital that the scales developed in this study be further applied and evaluated to increase their reliability and validity.

The first variables that may be attended to are those which had low internal consistency (as measured by Cronbach's alpha) in this study: job variety, active loyalty, voice, autonomy, coworker support, and neglect. While the new variables introduced in this study emerged as important correlates to the employee behaviors, additional work will allow researchers to confirm or deny their utility in high-tech settings.

Another set of scales that may need attention are those which correlated in inconsistent or unpredictable ways: firm-specific skills, passive loyalty, autonomy, and growth opportunities. High-tech workers may react more predictably to a participation-oriented scale, rather than the

type of autonomy scale used in this study. The instability measure, *too much change*, also produced inconclusive results in this study. This construct may be better analyzed if crafted to specifically measure the presence of either *too much change* or *too little change*.

Additional work is also needed on the workload and role conflict scales that appeared to function both as work stresses and aspects of job variety in this study. As discussed earlier, these scales appeared to be nonlinearly correlated to engineer's constructive and destructive behaviors.

Finally, the variables in this study were worded both positively and negatively, and some items of the scales were reversed. The combination of these meaning reversals and the use of a 7-point Likert scale unnecessarily complicated the analysis and did not appear to improve the validity of the scales. Future research may more reliably measure the constructs used in this study if all variables are worded either positively or negatively.

Causality and Temporal Effects

While this study found significant and consistent correlations between various job satisfaction factors and employee behaviors, certain trends emerged that suggest some level of sequentially in the employee behaviors. A pattern may exist among the behaviors such that as dissatisfaction worsens, employees move from constructive toward destructive behaviors. Employees may cycle through active and passive stages depending on the responses they receive when they take action. The employee's perception of the possibility of change is also a factor in their choice of action versus inaction (Withey & Cooper, 1992).

In addition, some sequential effects may be at play between the employee behaviors and some of the independent variables. In particular, the behavior of role conflict for engineers indicates that low levels of role conflict appear as job variety to engineers, increasing voice and active loyalty. However, at a higher level, destructive behaviors of neglect and search result.

Kowalski et al.'s (1996) theory of voice antecedents and consequences includes a similar threshold level as well as personality attributes in explaining they emergence and purpose of complaints in the workplace. Finally, as shown by Lee and Mitchell (1994, 1996), the temporal and sequential aspects of employee behavioral response to job satisfaction and dissatisfaction is a rich area for future research. This study supports further exploration of this field.

While the comments written on the survey questionnaires provided some fleshier understanding of the dynamics at work in the relationship between employee behaviors and job satisfaction factors, a detailed organizational assessment is important to better guide future actions of the company used in the study. In depth interviews would help the company better understand the reasons behind the many significant correlations reported in this study. Employee comments would also be helpful for assessing causality as well as temporal effects between the behaviors.

Expand Beyond Single Company, Effect of Company Culture.

The employees used in this study expressed a low level of satisfaction on all independent variables. It is not clear if this level of satisfaction is representative of only the company studied, all high tech companies, all companies in the geographic area studied, or due to a personal predisposition toward positive or negative affect among these employees. Moreover, it is not clear if the results of this study more representative of U.S. subsidiaries of Japanese multinationals or high-tech industry.

Future work is needed with other high-tech populations to confirm the findings presented in this study. While the results of this study commonly corroborated the findings of other studies involving engineers, future research may extend the use of these particular variables and scales in high tech and engineering populations.

Surprising Results that Warrant Additional Study

Several surprising results emerged in this study, which warrant future research, including engineers' social network, community at work, engineers' professional identity, passive loyalty in the high-tech industry, and types of correlates to active loyalty.

The emergence of coworker support as a strong correlate to constructive behaviors underscored the importance of social network development among engineers. This somewhat surprising result warrants further research to investigate the image of engineers as antisocial "nerds" and to better understand the needs of this professional group. A wider research approach could involve an examination of the importance of community in the workplace and how to build a sense of community.

Another recurring theme in the results of this study was the impact of engineers' professional identity on their behavior. While some research has tacked this issue (Badaway, 1995: Biddle & Roberts, 1993; Cordero & Farris, 1992), additional work in more contemporary organizations will enable a clearer understanding of the association between professional loyalty and organizational loyalty.

As in other research, the image of the passively loyal employee remained unclear in this study. While this study found significant correlates for passive loyalty, improving on the not significant results of previous research (Withey & Cooper, 1992), a consistent perspective of this employee behavior did not emerge. Passive loyalists exhibited traits previously attributed to both withdrawal behavior and low-conflict loyalty behavior. Moreover, passive loyalty in the high-tech industry, or any industry with a strong employment market, was discussed as a possible high-risk behavior due to the forgone financial rewards of transferring to a new employer.

Finally, this study found that the job satisfaction factors associated with constructive, active behaviors appeared to function as two aspects of the work environment: stimulus factors and

support factors. Additional work is needed to better understand the dynamics of active loyalty as both a reaction to stress and a response to a supportive work environment or congruency between individual and institution.

Future Research Topics

While this study addressed several complaints regarding current turnover and EVLN models, more research is needed to fully examine the relationship between specific job satisfaction factors and employee behaviors. Several avenues for future research not included in this study, but important to other employee attachment research are discussed below.

Two moderating factors not included in this study are performance and personal affect. Some of the results of this study, especially the unexpected negative association between growth opportunities and constructive behavior in non-engineers, may indicate the presence of a moderating performance factor. This study also did not examine the role of another pair of moderating factors discussed in other studies, positive affect and negative affect (Kim, et al, 1996). Kim et al.'s work showed that these personal attributes significantly affected the relationship between turnover and job satisfaction. Both of these, and other, moderating factors are important for future research to remove their potential confounding effects.

Finally, future research is needed to assess the appropriateness and effectiveness of the many recommendations offered to companies, managers, and employees in this study. Clarification of how to arrange the joint responsibility shared by managers and employees for many of these actions would provide a foundation of understanding for future interventions.

Significance

This study presented a new model to evaluate the determinants of constructive and destructive responses to job dissatisfaction. The model was derived from Farrell and Rusbult's (1992) EVLN typology, and enhanced with Price-Mueller (1981) job satisfaction independent variables, Withey and Cooper's (1989) concept of active and passive loyalty, and several new variables based on issues of importance to high-tech workers.

The model was tested and corroborated through a survey study of 118 engineers and 148 non-engineering professionals in the U.S. subsidiary of a Japanese electronics company. In addition to supporting the new model, the study showed that different job satisfaction factors were associated with different behaviors, and with different behaviors among engineers and non-engineering professionals. Several contradictory results helped to illuminate underlying issues in differences between these professional groups. Surprising results emerged in areas such as the importance of engineers' social network, community at work, engineers' professional identity, passive loyalty in the high-tech industry, and types of correlates to active loyalty.

Numerous recommendations for companies, managers, employees, and researchers were presented to guide interventions designed to increase constructive, active behaviors while reducing destructive, passive ones. Managers were counseled to implement an in-depth organizational assessment to gain richer detail for the results, examine causality, and learn of temporal associations between behaviors. Several results supported an increase in systems thinking in setting and fixing company policies. Employees were advised to determine their internal motivations and goals and be proactive in communicating their needs and expectations to management.

Key areas for future research included further development of the scales used in this study, study of causality and temporal effects, expansion of the study to other companies, and consideration of moderating factors such as performance and positive affect.

Theoretical Contributions

The new model developed in this study was shown effective in identifying correlates to search, loyalty, neglect, and voice behaviors among high-tech professionals. The variance explained by the new model was substantially greater than that achieved in other EVLN studies where job satisfaction was measured in a more global fashion (Rusbult et al., 1988; Withey & Cooper, 1989; Withey & Cooper, 1992). The success of the new model responds to and validates several arguments made about models in the employee attachment field:

- Leck and Saunder's (1992) contention that job satisfaction in the EVLN model should be measured using a variety of factors.
- Withey and Cooper's (1992) proposal of two distinct types of loyalty.
- The application of Price and Mueller's (Kim et al., 1996) job satisfaction variables to behaviors other than search.
- The utility of new job satisfaction variables developed for high-tech workers (climate satisfaction, executive leadership, and instability factors).
- Hom and Griffith's (1995) call to apply the Price-Mueller model to non-hospital populations.
- Rusbult et al.'s (1988) conclusion that "future investigators will need to assess the validity of the present [EVLN] model across varied employment settings" (p. 617).

Thus, this study has made significant contributions to theoretical development in the employee attachment field. It has introduced several new job satisfaction factors, helped to extend

existing theoretical frameworks, and validated these frameworks in a population different from that used to develop the models. These results can help other researchers of other workplaces and professions to understand which areas of the models are likely to be applicable across different populations and which are factors should be carefully crafted for the population of interest. The study has shown that the basic framework of the EVLN model applies to the high-tech population used in this study, but some job satisfaction factors were unreliable and caused inconsistent results. The study is also notable for its use of a high-tech population, focusing specifically engineers' attitudes and how they differ from those of non-engineers.

Understanding and Managing Employee Retention

The results presented in this study can provide valuable guidance to high-tech companies seeking to increase retention and productivity of key employee groups, such as engineers. As Cramer (1993) cautions, "Before implementing potentially expensive intervention programs in an attempt to reduce turnover, employers must first identify the specific factors that are likely to be associated with it" (p. 795). Beyond identifying specific factors associated with certain behaviors, companies would be wise to implement a full assessment program to better understand how the factors interact dynamically with the behaviors. Most organizations neglect this step when planning interventions (Dipboye, 1997).

Proactive development and implementation of interventions is important to reduce the costs associated with destructive employee behaviors and to stabilize the work environment. The consequences of ignoring organizational problems that underlie destructive employee behaviors, may be economic, psychological, and organizational. Organizations may experience negative effects such as separation costs (lost revenues, overtime pay, administrative costs), replacement costs (advertisement, recruiting, selection), training costs, lost productivity, lower service/product

quality, and increased probability of turnover among stayers (Price, 1989). Turnover can cause a decrease in the job satisfaction of stayers especially if they compare themselves strongly with the leaver (Brockner & Kim, 1993). Observation of neglectful employees can also cause decreased satisfaction and productivity in more committed workers, as evidenced by the following survey comment: "At times it is difficult putting in 150% when others do not."

Table 69

Estimated Costs Associated with the Loss and Replacement of an Entry-level Engineer

Item	Estimated Costs
HR time to coordinate interviews, screen 40 candidates	$5,000
Recruiting consultant fee	$25,000
Interviewing time (4 interviewers) x (5 interviewees) x (2.5 hr/interview)	$3,000
Lost productivity of interviewers due to recruiting activities	$13,000
Hire-on bonus + Difference between old and new salary for one year	$30,000
Lost productivity while engineer's position is not filled (5 months)	$217,000
Lost productivity due to training and start-up time (6 months)	$260,000
Lost productivity of other workers due to missing engineer	$24,000
Total cost of replacing one engineer	$577,000

Thus, managers must measure the costs of intervention programs against the true costs of excessive employee turnover and low productivity. As shown in Table 69, significant measurable costs may be associated with the loss and replacement of an engineer. The case shown in Table 69 was calculated for the company used in this study, assuming that the departing engineer had a salary of $80,000 and generated $500,000 in revenue each year. These values are based on conservative amounts of actual revenues and salaries at the company used in this study.

As can be seen in Table 69, companies can spend *half a million dollars* in actual costs and lost revenue to replace one departed engineer. These figures can be especially damaging to high-tech firms that exist on narrow profit margins.

Thus, the first step for companies seeking to affect employee behaviors is to understand the *true costs* of replacing employees. Next, they must fully understand the specific factors associated with destructive employee behaviors. This study has illuminated the most critical factors to high-tech workers, and therefore provides guidance to decision-makers planning further organizational assessments and interventions. Moreover, the study identified differences in how employers should approach behavioral change in engineers compared to non-engineering professionals. The key recommendations of importance to high-tech managers are as follows:

- Create opportunities for employees to build social ties to increase constructive behaviors, improve communication, and stabilize the work environment.
- Help engineers build marketable skills. Loyalty weakens when engineers perceive that skills they are learning are of low value to the market.
- Continuously monitor and match competitors' compensation level and type.
- Be wary of dysfunctional adaptations that may underlie long employee service. Focus on increasing the *quality* of retention, rather than just reducing turnover statistics.
- Learn why engineers' satisfaction diminishes over time, uncover signals from at-risk employees, and provide programs to reverse negative situations.
- Reduce barriers to employee transfer between departments.
- Improve the accuracy of employees' expectations through realistic job previews.
- Provide clear task descriptions and work processes to engineers.

- Ensure that engineering managers are properly selected, trained, and evaluated. Help them develop and practice skills before they become responsible for employees.
- Japanese companies interested in developing into fully global organizations must decentralize many support activities.
- Enrich jobs by removing some controls while increasing individual accountability, giving employees a complete natural unit of work, and increase information flow.
- Carefully plan organizational change, involve engineers in planning changes that will affect them, and inform engineers at each change stage.
- Perform an in-depth assessment of the current cross-cultural management situation to understand the dynamics between expatriate managers and their employees.
- Help managers define their personal management style and help employees define their expectations of managers.
- Recognize the importance of engineers' professional identity. Help engineers pick and attack solvable problems to build confidence and skills.
- Reduce inefficient or obstructive policies and departments.
- Improve managerial quality through company-wide assessment to evaluate and skills improvement programs.
- Discuss career goals with engineers, provide career path options and requirements for achieving higher positions, and provide opportunities for engineers to develop necessary skills.

The results of this study are also of great value to human resources (HR) managers. While these professionals may not have full control over the intervention budgets, and rarely have any control over managers, they are responsible to ensure that effective policies are developed and

maintained. The results of this study can provide HR managers with a framework of reasons that underlie problems brought to them when they are called on to provide in-house consulting to line managers. The results can also help HR managers to prioritize their activities and help line managers solve problems through appropriate use of HR-developed interventions.

Role of Employees in Retention

While the results of this study are mainly of use to managers and organizations, employees can also benefit from the findings. Change requires joint action by both company management and employees. Moreover, some individuals may be dissatisfied, but uncertain of the source of this unhappiness or what to do about it. Young workers, such as the engineers in this study, may lack introspection skills or sufficient work experience to clearly understand their work, management, and motivational preferences. The findings of this study present many ideas for employees to consider when examining their feelings about their work life.

Because the dissatisfaction of employees is a key aspect of this study, it is crucial that individuals understand their internal motivations and goals and be proactive in communicating their needs and expectations to management. A dissatisfied employee who withholds this information from the supervisor may leave a company in frustration, but never find a satisfying work environment until he or she expresses what they need from a job.

Managers can do their best to uncover problem areas, guess the causes, and attempt changes, but doing so in the absence of feedback from the employee can be a futile effort. Without a basis of communication, it is common for participants to withdraw into a standoff where leaders abdicate their authority and blame followers for the failure of the enterprise while followers abdicate their responsibility to a leader and then blame the leader for making a poor choice (Hirschhorn, 1997).

Additionally, an employee capable of communicating their preferences is not bereft of choices in the absence of good management. As many of the recommendations described earlier stress, individuals should not wait for their managers should act when they begin to be dissatisfied or when they see a problem. Rather, employees should explain what they need to their manager, requesting task clarification, seeking information, and developing additional support mechanisms. Within this general attitude, the main recommendations made to all employees based on the findings of this study follow:

- Employees, especially engineers, may not be aware of the impact of peer relationships on their overall job satisfaction. Initiate social activities with peers.
- Initiate projects that interest them and provide opportunities for marketable skill development. Proactively seek interesting work.
- Employees must recognize that they are primarily responsible for their satisfaction.
- Employees mistakenly expect executives to manage interdepartmental relationships.
- Employees should evaluate job options objectively, establish goals, and measure job alternatives based on personal criteria rather than to maintain equity with peers.
- Request clarity when they are unsure about their supervisor's expectations, work responsibilities, or their role relative to other departments.
- Initiate job enrichment activities by letting management know when they are dissatisfied and suggesting projects they feel comfortable leading or contributing to.
- Manage up. That is, ensure that supervisors are aware of problems, proactively offer solutions, develop clear and thorough proposals for change, keep management informed of their progress, and ask for help when it is needed.

Social Impact

This study provided quantifiable evidence of many issues reportedly arising in contemporary organizations (Drucker, 1995). The dynamics at play as roles and responsibilities of both employees and organizations are changing are especially evident in this study. The results showed that traditional issues of work challenge, growth opportunity, and work stress remain important but are augmented and sometimes overshadowed by the significance of community in the workplace, organizational climate, instability, and professional identity. It is critical that organizations and individuals recognize these changes and develop skills to thrive as the industry evolves. The four issues of social significance most evident in this study are the emergence of a new employer/employee relationship, difficulties resulting from multicultural workforces, challenges due to environmental complexity, and the importance of community in the workplace.

A New Employer-Employee Relationship

The relationship between employer and employee is becoming more complex as industry moves far away from the lifetime employment contract of the post-war era to a more fluid and evenly balanced relationship. Employees are gaining more power, especially in high-tech companies where the "means of production" reside in the brains of individuals, rather than in capital equipment and organizationally controlled reserves. However, with this power comes additional responsibility for oneself, for coworkers, and for the organization.

The exceptionally strong and frequent emergence of job variety as a correlate of all employee behaviors indicates that the level of interesting and challenging work offered by a company heavily determines whether an employee will act constructively with loyalty and voice or destructively with neglect and exit. Drucker (1995) called the types of professionals involved in this study *knowledge workers*. This study fully supports his contention that "loyalty can no longer be obtained by the paycheck. The organization must earn loyalty by proving to its knowledge

employees that it offers them exceptional opportunities for putting their knowledge to work" (p. 89). Beyond challenging work, the high-tech employee is also concerned about the quality of executive leadership, change effectiveness, efficiency of reorganizations, and organizational climate. They judge and measure the actions of their company leaders, and may react destructively if they find them lacking.

This study also showed that a key aspect of employee power and responsibility stems from their professional identity. Especially among engineers, the desire to maintain professional competence and competitiveness outweighs their desire to remain loyal to any one organization. Rather than constraining corporate choices, this employee attribute provides a forum for a reciprocal relationship between parties. By supporting engineers' professional aspirations and values, companies reap the benefits of their service, expertise, and loyalty. Moreover, engineers' professional activities in associations and industry committees can provide a unique channel for information about competitors, customers, and market direction.

Despite the fact that many of the new knowledge-based industries emphasize worker participation and increasingly require workers to innovate, cooperate, and take responsibility for the direction of their work; companies achieve varying levels of success in these goals. Like other centrally organized companies, the company examined in this study struggled to satisfy its knowledge workers in a climate that was not much different from the traditional command-and-control organization of the past. This study indicated that other companies facing such a conflict as they struggle to change their corporate culture must take the needs of their knowledge workers seriously and understand that while poor conditions may be tolerated for a period of time, this tolerance is limited. In industries with high external opportunities, knowledge worker patience may be very limited indeed.

Multicultural Issues

Another area of social significance illuminated by this study was the problems faced in extensively multicultural environments. Of special interest to the field of multicultural management is the fact that this study was performed with professional employees. Many industries are facing increasing diversification of their workforce (Albert, 1994) and working to globalize their businesses. This study identified some of the specific problems that can arise in such situations.

Of particular importance is the effect of culture in setting expectations of managers and employees. DiBella's (1993) research into the cross-cultural implications of managerial techniques showed that conflict occurs when an action that appeared rational within one cultural framework is seen as irrational in another. Managers must understand that their management style is based in part on a set of assumptions including beliefs about why the method is effective, how it works, what outcomes will occur, and the nature of the environment in which the practice will be used. If a practice is not purposefully adapted to the new cultural framework, its actual impact may be unpredictable, the practice may be rejected as participants withdraw.

This study's recommendation for an in-depth assessment of the existing cross-cultural management situation is appropriate for any multicultural work environment. This effort can help participants to better understand the dynamics at work between managers and their employees. Companies can begin to manage this complex situation by helping managers and employees define their personal management style and their expectations of managers. Such a dialog would help to reset expectations and clarify areas where intervention may be necessary. It may be easier for companies to ignore these differences due to fears that such investigations would be offensive or misunderstood by employees. However, building understanding of differences and expectations can have ramifications far beyond what may be expected. Such analysis builds bonds at the individual

level, unearths unspoken stereotypes, overturns possible myths, and can generally renew the emotional climate of the workplace.

Earley and Erez (1997) address this problem through a simple framework for examining cultural differences. Their model is built upon two dimensions: how people relate to one another and how acceptable it is to have power and status. The researchers emphasize the importance of using such a framework in the following:

> Managers and their employees who work abroad, or even in a different part of their country than the one they are used to, must develop an awareness of cultural differences in managerial practices and principles of behavior. Furthermore, they need to understand why culture makes a difference. This knowledge will enable them more effectively to manage employee actions in response to managerial practices that they might try to implement. We also need to consider cultural characteristics when we think about transferring our managerial practices and motivational practices across international boundaries. Management practices must be congruent with cultural and personal values in order to be embraced, and to have a positive impact in the workplace. When these methods do not confirm to people's values, they need to be modified to relate to the unique characteristics of targeted employees. Becoming a successful manager abroad, or a successful manager of diverse employees at home, requires a knowledge and understanding of people, their cultural backgrounds, and their unique needs. (p. 176)

Environmental Complexity

While this study identified many key issues that managers and employees must tackle, it also illuminated the incredible complexity of the high-tech environment. The intricacy and instability of this industry requires employees to work consciously and collectively toward their goals. The study showed that high-tech workers were capable of withstanding a great deal of instability, as long as it was not in every area of their work life. Most importantly, employees needed clarity in their work roles and responsibilities. Fortunately, this is an area that is fully within the company's control. This finding is especially heartening considering the unpredictable nature of the high-tech environment.

In addition to role clarity, employees need the support of company infrastructure and information about their environment. To address both of these needs, companies must adopt a more

systems-related view. Executives must understand the interrelatedness of departments, the far reaching effect that their personal actions have on every worker, the importance of congruency between policy and practice, and the vital role that employees can play in defining and implementing organizational goals.

The high-tech industry is not alone in facing growing complexity in the work environment and organizational structure (Beer & Eisenstat, 1996; Senge, 1990; Solomon, 1994). As shown in this study, instability and complexity can severely challenge organizations, supporting Senge's (1990) explanation that many "organizations break down, despite individual brilliance and innovative products, because they are unable to pull their diverse functions and talents into a productive whole" (p. 69).

To respond to these forces, this study advises companies in unstable environments to stabilize the areas over which they have control (e.g., role clarity and infrastructure) and improve information quality in areas where they can exert little influence (e.g., competitors' pay and benefits).

Community in the Workplace

One of the surprising findings of this study is the importance of developing a sense of community in the workplace. While this idea may appear "soft" to some executives, this study showed that employee loyalty to the organization actually increased as peer relationships improved. By attending to this issue, companies can create a more stable workforce along with a workplace that is more emotionally healthy and supportive of the whole individual.

Helgesen (1995) showed that managers concerned about developing community and helping employees to feel a part of the company realized productivity improvements, in part by eliminating corporate rituals which are "inefficient; ways of reinforcing status that have nothing at all to do with how the job gets done" (p. 240).

Developing community is also essential to help individuals admit their interdependence and become able to share ideas and feelings openly with each other. This skill is crucial to support the previous three social issues which must be addressed in contemporary workplace: the development of a new employer/employee relationship, uncovering conflicting culture-based expectations, and developing a holistic organizational capable of thriving in a complex environment.

Challenge and Opportunity

Managers who ignore the problems highlighted by this study are likely to be replaced by individuals who delve into them and forge a new relationship with employees. As well, employees who abdicate their personal responsibility to develop self knowledge and self management skills will find themselves in a backwash behind more conscious and self-reliant peers.

While this study showed that high-tech companies and employees face many difficult and complex problems, it also uncovered a great deal of hope for individuals in the industry. Employees were found to be capable of managing a great deal of complexity, uncertainty, and instability. Up to a certain point, these environmental attributes stimulated extraordinary effort among workers. Engineers were particularly able to provide competent and dedicated service despite, or perhaps because of, organizational, executive, and supervisor failure.

Considering the considerable savings realized from retaining engineers and other knowledge workers, managers should begin attacking the problems highlighted by this study. These results show that employees neither expect nor need perfection in their work environment. Rather, they need the opportunity to contribute and a climate that supports and encourages their involvement. Building such an environment involves developing a sense of community in the workplace, providing stability in the form of information and involvement, and supporting individuals' professional goals. Companies who ignore the many avenues for improvement will continue to suffer the profit-draining costs associated with high engineering turnover.

REFERENCE LIST

Aczel, A. D. (1996). Complete business statistics (3rd ed.). Chicago, IL: Irwin.

Agho, A. O., Mueller, C. W., & Price, J. L. (1993). Determinants of employee job satisfaction: An empirical test of a causal model. Human Relations, 46(8), 1007-1027.

Agho, A. O., Price, J. L, & Mueller, C. W. (1992). Discriminant validity of measures of job satisfaction, positive affectivity and negative affectivity. Journal of Occupational and Organizational Psychology, 65(3), 185-196.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211.

Albert, R. D. (1994). Cultural diversity and intercultural training in multinational organizations. In Wiseman, R. L. & Shuter, R. (Eds.), Communicating in Multinational Organizations (pp. 153-165). Thousand Oaks, Ca: SAGE.

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. Journal of Occupational Psychology, 63(1), 1-18.

Alnajjar, A. A. (1996). Relationship between job satisfaction and organizational commitment among employees in the United Arab Emirates. Psychological Reports, 79(1), 315-321.

Babakus, E., Cravens, D. W., Johnston, M., & Moncrief, W. C. (1996). Examining the role of organizational variables in the salesperson job satisfaction model. Journal of Personal Selling and Sales Management, 16(3), 33-46.

Badaway, M. K. (1996). Developing managerial skills in engineers and scientists: Succeeding as a technical manager (2nd ed). New York: Van Nostrand Reinhold.

Baugh, S. G., & Roberts, R. M. (1994). Professional and organizational commitment among engineers: conflicting or complementing? IEEE Transactions on Engineering Management, 41(2), 108-114.

Beer, M., & Eisenstat, R. A. (1996). Developing an organization capable of implementing strategy and learning. Human Relations, 49, 597-619.

Biddle, J., & Roberts, K. (1993). Private sector scientists and engineers and the transition to management. The Journal of Human Resources, 29(1), 82-107.

Blegen, M. A., Mueller, C. W., & Price, J. L. (1988). Measurement of kinship responsibility for organizational research. Journal of Applied Psychology, 73(3), 402-409.

Bluedorn, A. C. (1982). A unified model of turnover from organizations. Human Relations, 35(2), 135-153.

Bolton, R. N., & Bronkhorst, T. M. (1995). The relationship between customer complaints to the firm and subsequent exit behavior. Advances in Consumer Research, 22, 94-100.

Bourque, L. B., & Fielder, E. P. (1995). How to conduct self-administered and mail surveys. Thousand Oaks, CA: Sage Publications, Inc.

Bozionelos, N. (1996). Organizational promotion and career satisfaction. Psychological Reports, 79(2), 371-375.

Brockner, J., & Kim, D. H. (1993). Factors affecting stayers' job satisfaction in response to a coworker who departs for a better job. Journal of Applied Social Psychology, 23(20), 1659-1684.

Brooke, P. P. Jr., & Price, J. L. (1989). The determinants of employee absenteeism: An empirical test of a causal model. Journal of Occupational Psychology, 62(1), 1-19.

Brooke, P. P. Jr., Russell, D. W., & Price, J. L. (1988). Discriminant validation of measures of job satisfaction, job involvement, and organizational commitment. Journal of Applied Psychology, 73(2), 139-145.

Buchanan, B. (1974). Building organizational commitment: The socialization of managers in work organizations. Administrative Science Quarterly, 19(4), 533-546.

Burgess, S. F., & Beilstein, J. C. (1996). Women's voice and agency in rural Africa: Small-scale communal farmers in Zimbabwe. Women & Politics, 16(2), 19-43.

Burke, R. J. (1996). Sources of job motivation among employees of a professional services firm. Psychological Reports, 78(3), 1231-1234.

Carmines, E. G., & Zeller, R. A. (1979). Reliability and validity assessment. Sage University series on Quantitative Applications in the Social Sciences, series no. 07-017. Newbury Park, CA: Sage Publications, Inc.

Carnoy, M., Castells, M., & Benner, C. (1997). Labour markets and employment practices in the age of flexibility: A case study of Silicon Valley. International Labor Review, 136(1), 27-48.

Cooper, D. E., & Emory, C. W. (1995). Business research methods (5th ed.). Chicago, IL: Irwin.

Cordero, R., DiTomaso, N., & Farris, G. F. (1994). Career development opportunities and likelihood of turnover among R&D professionals. IEEE Transactions on Engineering Management, 41(3), 223-233.

Cordero, R., & Farris, G. F. (1992). Administrative activity and the managerial development of technical professionals. IEEE Transactions of Engineering Management, 39(3), 270-276.

Cramer, D. (1993). Tenure, commitment, and satisfaction of college graduates in an engineering firm. The Journal of Social Psychology, 133(6), 791-796.

Creswell, J. (1994). Research design: Qualitative and quantitative approaches. Thousand Oaks, CA: Sage Publications, Inc.

Cropanzano, R., Howes, J. C., Grandey, A. A., & Toth, P. (1997). The relationship of organizational politics and support to work behaviors, attitudes, and stress. Journal of Organizational Behavior, 18(2), 159-180.

Curry, J. P., Wakefield, D. S., Price, J. L., & Mueller, C. W., (1986). On the causal ordering of job satisfaction and organizational commitment. Academy of Management Journal, 29(4), 847-858.

Dalessio, A., Silverman, W. H., & Schuck, J. R. (1986). Paths to turnover: A re-analysis and review of existing data on the Mobley, Horner, and Hollingsworth Turnover model. Human Relations, 39(3), 245-263.

Dedoussis, V. (1994). The core workforce - peripheral workforce dichotomy and the transfer of Japanese management practices. In Campbell, N. & Burton, F. (Eds.), Japanese multinationals: Strategies and management in the global *kaisha* (pp. 186-217). London: Routledge.

Delbecq, A. L., & Weiss, J. (1988). The business culture of Silicon Valley: Is it a model for the future? in J. Hage (Ed.) Futures of organizations: Innovating to adapt strategy and human resources to rapid technological change (pp. 123-141). Lexington, Mass: Lexington Books.

DiBella, A. J. (1993). The role of assumptions in implementing management practices across cultural boundaries. The Journal of Applied Behavioral Science, 29(3), 311-327.

Dickter, D. N., Roznowski, M., & Harrison, D. A. (1996). Temporal tempering: An event history analysis of the process of voluntary turnovers. Journal of Applied Psychology, 81(6), 705-716.

Dipboye, R. L. (1997). Organizational barriers to implementing a rational model of training. In Quinones, M. A. and Ehrenstein, A. (Eds.), Training for a rapidly changing workforce: Applications of psychological research (pp. 31-60). Washington DC: American Psychological Association.

Dirks, D. (1994). Organizational development in Japanese overseas subsidiaries. In Campbell, N. & Burton, F. (Eds.), Japanese multinationals: Strategies and management in the global *kaisha* (pp. 251-273). London: Routledge.

Dowding, K., & John, P. (1996). Exiting behavior under tiebout conditions: Towards a predictive model. Public Choice, 88(3-4), 393-406.

Drigotas, S. M., Whitney, G. A., & Rusbult, C. E. (1995). On the peculiarities of loyalty: A diary study of responses to dissatisfaction in everyday life. Personality & Social Psychology Bulletin, 21(6), 596-609.

Drucker, P. F. (1995). Managing in a time of great change. New York: Truman Talley.

Earley, P. C., & Erez, M. (1997). The transplanted executive: Why you need to understand how workers in other countries see the world differently. New York: Oxford University Press.

Eubank, W. L., Gangopadahay, A., & Weinberg, L. B. (1996). Italian communism in crisis: A study in exit, voice, and loyalty. Party Politics, 2(1), 55-75.

Farr, J. V., Walesh, S. G., & Forsythe, G. B. (1997). Leadership development for engineering managers. Journal of Management in Engineering, 13(4), 38-41.

Farrell, D. (1983). Exit, voice, loyalty and neglect as responses to job dissatisfaction: A multidimensional scaling study. Academy of Management Journal, 26,(4), 596-607.

Farrell, D., & Rusbult, C. E. (1981). Exchange variables as predictors of job satisfaction, job commitment, and turnover: The impact of rewards, costs, alternatives, and investments. Organizational Behavior and Human Performance, 28(1), 78-95.

Farrell, D., & Rusbult, C. E. (1985). Understanding the retention function: A model of the causes of exit, voice, loyalty, and neglect behaviors. Personnel Administrator, 30(?), 129-140.

Farrell, D., & Rusbult, C. E. (1992). Exploring the exit, voice, loyalty, and neglect typology: The influence of job satisfaction, quality of alternatives, and investment size. Employee Responsibility and Rights Journal, 5(3), 201-218.

Farrell, D., & Stamm, C. L. (1988). Meta-analysis of the correlates of employee absence. Human Relations, 41(3), 211-227.

Fink, A. (1995). How to sample in surveys. Thousand Oaks, CA: Sage.

Flowers, V. S., & Hughes, C. L. (1973) Why employees stay. Harvard Business Review, July-August, 1973.

Fowler, F. J. (1993). Survey research methods. Newbury Park, CA: Sage Publications.

Fuller, J. B., Hester, K., Dickson, P., Allison, B. J., & Birdseye, M. (1996). A closer look at select cognitive precursors to organizational turnover: what has been missed and why. Psychological Reports, 78(3), 1331-1352.

Gaertner, K. N., & Nollen, S. D. (1989). Career experiences, perception of employment practices, and psychological commitment to the organization. Human Relations, 42(11), 975-991.

Gaertner, K. N., & Nollen, S. D. (1992) Turnover intentions and desire among executives. Human Relations, 45(5), 447-465.

Garden, A. M. (1992). Potential reasons for software employees in small companies to leave their present company. IEEE Transactions on Engineering Management, 39(3), 246-252.

George, J. M., & Jones, G. R. (1996). The experience of work and turnover intentions: interactive effects of value attainment, job satisfaction, and positive mood. Journal of Applied Psychology, 81(3), 318-326.

Gibson, N., & Whittaker, J. (1996). Rules of thumb (Guidelines for managing engineers). Journal of Management in Engineering, 12(6), 34-40.

Glazier, A. S. (1989). Stemming turnover in public relations firms. Public Relations Journal, 45(2), 22-27.

Graham, J. W., & Keeley, M. (1992). Hirschman's loyalty construct. Employee Responsibility and Rights Journal, 5(3), 191-200.

Grove, A. S. (1996). Only the paranoid survive: How to exploit the crisis points that challenge every company and career. New York: Doubleday.

Gunter, B., & Furnham, A. (1996). Biographical and climate predictors of job satisfaction and pride in organization. The Journal of Psychology, 130(4), 193-208.

Harris, S. G., & Mossholder, K. W. (1996). The affective implications of perceived congruence with culture dimensions during organizational transformation. Journal of Management, 22(4), 527-547.

Helgesen, S. (1995). The female advantage: Women's ways of leadership. New York: Doubleday.

Herzberg, F. (1966). Work and the Nature of Man. New York: World.

Hillard, M. (1991). The labor process of research and development engineers in electronics industries. Review of Radical Political Economics, 23(1&2), 80-86.

Hirschman, A. O. (1970). Exit, voice, and loyalty: Responses to decline in firms, organizations, and states. Cambridge, MA: Harvard University Press.

Hodson, R. (1994). Good jobs and bad management: How new problems evoke old solutions in high-tech settings. In Farkas, G. & England, P. (Eds.), Industries, firms, and jobs: Sociological and economic approaches (pp. 247-279). New York: Aldine de Gruyter.

Hodson, R., Creighton, S., Jamison, C. S., Rieble, S., & Welsh, S. (1994). Loyalty to whom? Workplace participation and the development of consent. Human Relations, 47(8), 895-909.

Hom, P. W., & Griffeth, R. (1991). Structural equations modeling test of a turnover theory: Cross-sectional and longitudinal analyses. Journal of Applied Psychology, 76(3), 350-366.

Hom, P. W., & Griffeth, R. W. (1995). Employee turnover. Cincinnati, OH: South-Western College Publishing.

Hom, P. W., Caranikas-Walker, F., Prussia, G. E., & Griffeth, R. W. (1992). A meta-analytical structural equations analysis of a model of employee turnover. Journal of Applied Psychology, 77(6), 890-919.

Hughes, C. L., & Flowers, V. S. (1987). Why employees stay is more critical than why they leave. Personnel Journal, 66(10), 19-23.

Hulin, C. L., Roznowski, M., & Hachiya, D. (1985). Alternative opportunities and withdrawal decisions: Empirical and theoretical discrepancies and an integration. Psychological Bulletin, 97(2), 233-250.

Igbaria, M., & Greenhaus, J. H. (1992). Determinants of MIS employees' turnover intentions: a structural equation model. Communications of the ACM, 35(2), 34-50.

Iverson, R. D., & Roy, P. (1994). A causal model of behavioral commitment: Evidence from a study of Australian blue-collar employees. Journal of Management, 20(1), 15-41.

Jones, E., Kantak, D. M., Futrell, C. M., & Johnston, M. W. (1996). Leader behavior, work-attitudes, and turnover of salespeople: An integrative study. Journal of Personal Selling and Sales Management, 16(2), 13-23.

Jones, O. (1996). Human resources, scientists, and internal reputation: the role of climate and job satisfaction. Human Relations, 49(3), 269-294.

Kalleberg, A. L., & Reve, T. (1993). Contracts and commitment: Economic and sociological perspectives on employment relations. Human Relations, 46(9), 1103-1132.

Keeley, M., & Graham, J. W. (1991). Exit, voice and ethics. Journal of Business Ethics, 10(5), 349-355.

Keller, R. T., Julian, S. D., Kedia, B. L. (1996) A multinational study of work climate, job satisfaction, and the productivity of R&D teams. IEEE Transactions on Engineering Management, 43(1), 48-55.

Kemery, E. R., Bedeian, A. G., & Zacur, S. R. (1996). Expectancy-based job cognitions and job affect as predictors of organizational citizenship behaviors. Journal of Applied Social Psychology, 26(7), 635-651.

Kim, J., & Mueller, C. W. (1978). Introduction to factor analysis. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-013. Newbury Park: Sage.

Kim, S., Price, J. L, Mueller, C. W., Watson, T. W. (1996). The determinants of career intent among physicians at a U.S. Air Force hospital. Human Relations, 49(7), 947-976.

Kirkpatrick, D. L. (1993). How to train and develop supervisors. New York: American Management Association.

Klecka, W. R. (1980). Discriminant analysis. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-019. Newbury Park: Sage.

Klenke-Hamel, K. E., & Mathieu, J. E. (1990). Role strains, tension, and job satisfaction influences on employees' propensity to leave: a multi-stage replication and extension. Human Relations, 43(8), 791-807.

Kline, T. J., & Boyd, J. E. (1991). Organizational structure, context, and climate: Their relationships to job satisfaction. The Journal of General Psychology, 118(4), 305-316.

Kowalski, R. M. (1996). Complaints and complaining: Functions, antecedents, and consequences. Psychological Bulletin, 119(2), 179-196.

Krathwohl, D. R. (1993). Methods of educational and social science research: An integrated approach. White Plains, NY: Longman.

Kuhn, T. S. (1970). The structure of scientific revolutions (2nd ed.). Chicago, IL: University of Chicago Press.

LaFarge, V. V. (1994). The ambivalence of departing employees: Reactions of involuntary and voluntary exiters. Journal of Applied Behavioral Science, 30(2), 175-197.

Leck, J. D., & Saunders, D. M. (1992). Hirschman's loyalty: Attitude or behavior? Employee Responsibility and Rights Journal, 5(3), 219-230.

Lee, J., & Jablin, F. M. (1992). A cross-cultural investigation of exit, voice, loyalty and neglect as responses to dissatisfying job conditions. Journal of Business Communication, 29(3), 203-228.

Lee, T. W., & Mitchell, T. R. (1994) An alternative approach: the unfolding model of voluntary employee turnover. Academy of Management Review, 19(1), 51-89.

Lee, T. W., & Mitchell, T. R. (1996). An unfolding model of employee turnover. Academy of Management Journal, 39(1), 5-36.

Lewin, D., & Mitchell, D. J. B. (1992). Systems of employee voice: Theoretical and empirical perspectives. California Management Review, 34(3), 95-111.

Lincoln, J. R., Kerbo, H. R., & Wittenhagen, E. (1995). Japanese companies in Germany: A case study in cross-cultural management. Industrial Relations, 34, 417-440.

Litwin, M. S. (1995). How to measure survey reliability and validity. Thousand Oaks, CA: Sage Publications, Inc.

Magner, N., Welker, R. B., & Johnson, G. G. (1996). The interactive effects of participation and outcome favourability on turnover intentions and evaluations of supervisors. Journal of Occupational and Organizational Psychlogy, 69(2), 135-144.

Malik, S. D., & Wilson, D. O. (1995). Factors influencing engineers' perceptions of organizational support for innovation. Journal of Engineering Technology management, 12, 201-218.

March, J. G., & Simon, H. A. (1958). Organizations. New York: John Wiley.

Mathieu, J. E. (1991). A cross-level nonrecursive model of the antecedents of organizational commitment and satisfaction. Journal of Applied Psychology, 76(5), 607-618.

Medcof, J. W., & Hausdorf, P. A. (1995). Instruments to measure opportunities to satisfy needs, and degree of satisfaction of needs, in the workplace. Journal of Occupational and Organizational Psychology, 58(3), 193-205.

Merriam, S. B., & Simpson, E. L. (1995). A guide to research for educators and trainers of adults (2nd ed.). Malabar, FL: Krieger Publishing.

Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. Journal of Applied Psychology, 78(4), 538-551.

Minton, J. W. (1992). The loyalty construct: Hirschman and beyond. Employee Responsibility and Rights Journal, 5(3), 273-281.

Mobley, W. H. (1977). Intermediate linkages in the relationship between job satisfaction and employee turnover. Journal of Applied Psychology, 62(2), 237-40.

Montgomery, J. D. (1996). Dynamics of the religious economy: Exit, voice and denominational secularization. Rationality and Society, 8(1), 81-110.

Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. Journal of Vocational Behavior, 14(2), p. 224-247.

Mueller, C. W., Boyer, E. M., Price, J. L., Iverson, R. D. (1994). Employee attachment and noncoercive conditions of work. Work and Occupations, 21(2), 179-212.

Mueller, C. W., & Price, J. L. (1990). Economic, psychological, and sociological determinants of voluntary turnover. The Journal of Behavioral Economics, 19(3), 321-335.

Mueller, C. W., & Price, J. L. (1989). Some consequences of turnover: A work unit analysis. Human Relations, 42(5), 389-402.

Mueller, C. W., Wallace, J. E., & Price, J. L. (1992). Employee commitment: Resolving some issues. Work and Occupations, 19(3), 211-236.

Myers, S. M. (1991). Conditions for manager motivation. Harvard Business Review, 69(6), 159.

Norusis, M. J. (1997). SPSS 7.5 Guide to Data Analysis. Upper Saddle River, New Jersey: Prentice Hall.

Olson-Buchanan, J. B. (1996). Voicing discontent: What happens to the grievance filer after the grievance? Journal of Applied Psychology, 81(1), 52-63.

Organ, D. W., & Lingl, A. (1995). Personality, satisfaction, and organizational citizenship behavior. The Journal of Social Psychology, 135(3), 339-350.

Parker, L. E. (1993). When to fix it and when to leave: Relationships among perceived control, self-efficacy, dissent, and exit. Journal of Applied Psychology, 78(6), 949-959.

Pearson, C. A. L. (1995). The turnover process in organizations: An exploration of the role of met-unmet expectations. Human Relations, 48(4), 405-420.

Pelletier, L. G., & Vallerand, R. J. (1996). Supervisors' beliefs and subordinates' intrinsic motivation: A behavioral confirmation analysis. Journal of Personality and Social Psychology, 71(2), 331-340.

Pollard, G. (1995). Job satisfaction among newsworkers: The influence of professionalism, perceptions of organizational structure and social attributes. Journalism & Mass Communication Quarterly, 72(3), 682-697.

Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. (1974). Organizational commitment, job satisfaction, and turnover among psychiatric technicians. Journal of Applied Psychology, 59(5), 603-609.

Porter, L. W., & Steers, R. M. (1973). Organization, work, and personal factors in employee turnover and absenteeism. Psychological Bulletin, 80(2), 151-176.

Price, J. L. (1977). The study of turnover. Ames, Iowa: Iowa State University Press.

Price, J. L. (1989). The impact of turnover on the organization. Work and Occupations, 16(4), 461-473.

Price, J. L., & Mueller, C. W. (1981). A causal model of turnover for nurses. Academy of Management Journal, 24(3), 543-565.

Price, J. L., & Mueller, C. W. (1986). Absenteeism and turnover of hospital employees. Greenwich, Conn.: JAI Press.

Pucik, V. (1994). The challenges of globalization: the strategic role of local managers in Japanese-owned U.S. subsidiaries. In Campbell, N. & Burton, F. (Eds.), Japanese multinationals: Strategies and management in the global *kaisha* (pp. 218-239). London: Routledge.

Pugh, D. S., & Hickson, D. J. (1997). Writers on organizations. Thousand Oaks, CA: Sage.

Radford, J., & Kove, S. (1991). Lessons from the Silicon Valley. Personnel Journal, 70(2), 38-43.

Rizzo, J. R., House, R. J., & Lirtzman S. I. (1970). Role conflict and ambiguity in complex organizations. Administrative Science Quarterly, 15(?), 150-163.

Rusbult, C. E., & Farrell, D. (1983). A longitudinal test of the investment model: The impact on job satisfaction, job commitment, and turnover of variations in rewards, costs, alternatives, and investments. Journal of Applied Psychology, 68(3), 429-438.

Rusbult, C. E., Farrell, D., Rogers, G., & Mainous A. G. (1988). Impact of exchange variables on exit, voice, loyalty, and neglect: an integrative model in response to declining job satisfaction. Academy of Management, 31(3), 599-627.

Rusbult, C. E., & Lowery, D. (1985). When bureaucrats get the blues: Responses to dissatisfaction among federal employees. Journal of Applied Social Psychology, 15(1), 80-103.

Rusbult, C. E., & Zembrodt, I. M. (1983). Responses to dissatisfaction in romantic involvements: A multidimensional scaling analysis. Journal of Experimental Social Psychology, 19(3), 274-293.

Rusbult, C. E., & Zembrodt, I. M., & Gunn, L. K. (1982). Exit, voice, loyalty, and neglect: Responses to dissatisfaction in romantic involvements. Journal of Personality and Social Psychology, 43,(6), 1230-1242.

Saunders, D. M. (1992). Introduction to research on Hirschman's exit, voice, and loyalty model. Employee Responsibility and Rights Journal, 5(3), 187-190.

Scheaffer, R. L., Mendenhall, W., & Ott, L. (1990). Elementary survey sampling. Belmont, CA: Duxbury Press.

Schellenberg, K. (1996). Taking it or leaving it: instability and turnover in a high-tech firm. Work and Occupations, 23(2), 190-213.

Schwarzwald, J., Shalit, B., & Koslowsky, M. (1992). A field study of employees' attitudes and behaviors after promotion decisions. Journal of Applied Psychology, 77(4), 511-513.

Senge, P. M. (1994). The fifth discipline fieldbook: Strategies and tools for building a learning organization. New York: Doubleday.

Sherman, J. D. (1986). The relationship between factors in the work environment and turnover propensities among engineering and technical support personnel. IEEE Transactions on Engineering Management, 33(2), 72-78.

Singleton, R. A. Jr., Straits, B. C., & Straits, M. M. (1993). Approaches to social research. New York: Oxford University Press.

Slater, S. F., & Narver, J. C. (1995). Market orientation and the learning organization. Journal of Marketing, 59, 63-73.

Solomon, C. M. (1994). HR facilitates the learning organization concept. Personnel Journal, 73, 56-66.

Steers, R. M. (1977). Antecedents and outcomes of organizational commitment. Administrative Science Quarterly, 22(1), 46-56.

Steers, R. M., & Mowday, R. T. (1981). Employee turnover and postdecision accommodation processes. In L. Cummings & B. Staw (Eds.), Research in Organizational Behavior, (pp. 235-281). Greenwich, Conn.: JAI Press.

Stroh, L. K., Brett, J. M., & Reilly, A. H. 1994). A decade of change : Managers' attachment to their organization and their jobs. Human Resource Management, 33(4), 531-548.

Sudman, S. (1976). Applied sampling. New York: Academic Press.

Suskie, L. A. (1996). Questionnaire survey research: What works? (2nd edition). Tallahassee, FL: Association for Institutional Research.

Taylor, J. C., & Bowers, D. G. Survey of organizations. Ann Arbor: Institute for Social Research.

Toffler, A. (1990). Powershift: knowledge, wealth, and violence at the edge of the 21st century. New York: Bantam Books.

Tubbs, M. E., & Ekeberg, S. E. (1991). The role of intentions in work motivation: Implications for goal-setting theory and research. Academy of Management Review, 16(1), 180-199.

Unden, A. L. (1996). Social support at work and its relationship to absenteeism. Work and Stress, 10(1), 46-61.

Virany, B., Tushman, M. L., & Romanelli, E. (1992). Executive succession and organization outcomes in turbulent environments: An organization learning approach. Organization Science, 3(1), 72-91.

Vroom, V. H. (1964). Work and motivation. New York: Wiley.

Wallace, J. E. (1995a). Corporatist control and organizational commitment among professionals. Social Forces, 73(3), 811-839.

Wallace, J. E. (1995b). Organizational and professional commitment in professional and nonprofessional organizations. Administrative Science Quarterly, 40(2), 228-255.

Watanabe, S., & Yamaguchi, R. (1995). Intercultural perceptions at the workplace: The case of the British subsidiaries of Japanese firms. Human Relations, 48(5), 581-607.

Wayne, S. J., Shore, L. M., & Linden, R. C. (1997). Perceived organizational support and leader-member exchange: A social exchange perspective. Academy of Management Journal, 40(1), 82-111.

Wholey, D. R. (1990). The effects of formal and informal training on tenure and mobility in manufacturing firms. The Sociological Quarterly, 31(1), 37-57.

Withey, M. J., & Cooper, W. H. (1989). Predicting exit, voice, loyalty, and neglect. Administrative Science Quarterly, 34(4), 521-539.

Withey, M. J., & Cooper, W.H. (1992). What's loyalty? Employee Responsibility and Rights Journal, 5(3), 231-240.

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. Journal of Marketing, 60(2), 31-46.

Zenger, T. R. (1992). Why do employers only reward extreme performance? Examining the relationships among performance, pay, and turnover. Administrative Science Quarterly, 37(2), 198-219.

Zikmund, W. G. (1988). Business research methods. Chicago, IL: Dryden Press.

APPENDIX A: QUESTIONNAIRE

The following eight pages contain a replicate of the survey questionnaire. The version reproduced here is slightly different from the original due different margin constraints. The font used in the original was 11-point Times New Roman. The font size was reduced to 10-point type to enable the survey questionnaire to fit on the allowed page size in this appendix. Also, the ellipses in the Likert scales are slightly less regular than those used in the original survey.

Professionals in High Technology: Reactions to Changes in Job Satisfaction

Sponsored by Walden University. Supported by ABC Electronics.

Unless otherwise requested, **please circle the ONE best response** to each item. If you want to explain your answer further, use the space at the end of the questionnaire or attach another piece of paper. Please mail this questionnaire in the addressed postage-paid envelope provided to the address at the end of the form. **Your responses to this questionnaire are completely anonymous**. Please also mail the separate postcard so that we can verify who has completed the questionnaire. Thank you very much for your help!

1) Which term best describes your current profession? Circle only one item.

Accounting / Finance 1
Administration / Human Resources 2
Engineering 3
Engineering Management 4
Management 5
Marketing / Planning 6
Sales 7
Other (specify) _____

Please circle the ONE number that best matches how much you agree with each statement.

		Not at all			To some extent			To a great extent
2)	I have the opportunity to expand the scope of my job	1	2	3	4	5	6	7
3)	The skills and knowledge I have learned on the job at ABC would transfer easily to most other organizations ...	1	2	3	4	5	6	7
4)	My experiences at ABC have been better than I originally expected	1	2	3	4	5	6	7
5)	My department's management demonstrates their commitment to cooperating with other groups in ABC	1	2	3	4	5	6	7
6)	My job rarely allows me to take part in making decisions that affect me	1	2	3	4	5	6	7
7)	I feel comfortable talking with my manager about problems in our relationship	1	2	3	4	5	6	7
8)	I receive conflicting requests and/or priorities from different sources within ABC	1	2	3	4	5	6	7

		Not at all			To some extent			To a grea extent
9)	Senior management has a clearly defined vision for ABC	1	2	3	4	5	6	7
10)	I have clear planned goals and objectives for my job	1	2	3	4	5	6	7
11)	I have the systems, procedures, and/or tools I need to achieve my objectives	1	2	3	4	5	6	7
12)	There are plenty of promotion opportunities for me at ABC	1	2	3	4	5	6	7
13)	Managers at ABC support employees trying to keep a reasonable balance between work and personal or family responsibilities	1	2	3	4	5	6	7
14)	I have the appropriate amount of input into what happens on my job	1	2	3	4	5	6	7
15)	People at ABC know how to work together to achieve needed changes in the organization	1	2	3	4	5	6	7
16)	When problems arise between departments at ABC, people push more for their own interests than for the overall company benefit	1	2	3	4	5	6	7
17)	ABC's leaders inspire employees to give their best for the company	1	2	3	4	5	6	7
18)	Finding a job outside ABC would be difficult for me	1	2	3	4	5	6	7
19)	ABC's executive team provides the leadership ABC needs to clarify our corporate vision	1	2	3	4	5	6	7
20)	Organizational changes at ABC occur too frequently	1	2	3	4	5	6	7
21)	Generally, my work at ABC has not been what I thought it would be	1	2	3	4	5	6	7
22)	Working at ABC has prepared me well for future jobs	1	2	3	4	5.	6	7
23)	I have to spend effort to accommodate the styles and demands of the different groups I work with	1	2	3	4	5	6	7
24)	I know exactly what is expected of me	1	2	3	4	5	6	7
25)	I have the opportunity to advance at ABC	1	2	3	4	5	6	7

	Not at all			To some extent			To a gr exten
26) My manager treats me in a way that motivates me to give my best effort	1	2	3	4	5	6	7
27) ABC is careful to develop the systems and procedures needed to operate smoothly as an organization	1	2	3	4	5	6	7
28) My formal education would be useful at many companies besides ABC	1	2	3	4	5	6	7
29) The stress in my job is beginning to create problems for me at home	1	2	3	4	5	6	7
30) There are plenty of good jobs outside ABC that I could have	1	2	3	4	5	6	7
31) At ABC, we fail to make important changes because we do not foresee implementation problems	1	2	3	4	5	6	7
32) Different departments at ABC coordinate efforts and/or support each other to benefit the company overall	1	2	3	4	5	6	7
33) My manager has the technical knowledge needed to guide my activities	1	2	3	4	5	6	7
34) I have opportunities to improve my knowledge at ABC	1	2	3	4	5	6	7
35) ABC's executives show a good balance of concern for short-term profitability and long-term success	1	2	3	4	5	6	7
36) Reorganizations at ABC generally improve work efficiency and/or productivity	1	2	3	4	5	6	7
37) I am often asked to do things in my job that are against my better judgment	1	2	3	4	5	6	7
38) My manager clearly explains what is expected of me	1	2	3	4	5	6	7
39) My manager assists in developing the procedures and/or infrastructure needed to help me work efficiently	1	2	3	4	5	6	7
40) ABC's strategic direction is clearly communicated	1	2	3	4	5	6	7
41) I am sometimes uncertain exactly what I am responsible for in my job	1	2	3	4	5	6	7

	Not at all				To some extent		To a grea extent
42) I have a great deal of freedom over how I do my job	1	2	3	4	5	6	7
43) I have a good chance to get ahead at ABC	1	2	3	4	5	6	7
44) There is at least one good job outside of ABC that I could begin very quickly if I were to leave my job here	1	2	3	4	5	6	7
45) ABC has lived up to the expectations I had when I first entered	1	2	3	4	5	6	7
46) Major change efforts at ABC are driven by a clear understanding of customer and/or employee needs	1	2	3	4	5	6	7
47) ABC has provided me with adequate training for my job	1	2	3	4	5	6	7
48) My manager shows me how to improve my performance..	1	2	3	4	5	6	7
49) During the past three months, my workload has been entirely too much for me to handle	1	2	3	4	5	6	7
50) I am frustrated by the number times I have been assigned to a different manager since joining ABC	1	2	3	4	5	6	7
51) I am confident senior management can guide ABC successfully into the coming decade	1	2	3	4	5	6	7

Please circle the ONE number that best matches how much you agree with each statement.

52) How creative does your job require that you be?

No creativity required	1	2	3	4	5	6	7	Required to b very creative

53) To what extent are you fairly rewarded considering the responsibilities that you exercise?

Not rewarded fairly at all	1	2	3	4	5	6	7	Rewarded very fairly

54) To what extent do the people in your work group take an appropriate interest in your well-being?

Not interested at all	1	2	3	4	5	6	7	Very interested

55) To what extent does your job require that you do the same things over and over?

Always do the same thing 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Never do the same things

56) To what extent do you look forward to being with the people in your work group each day?

Not at all 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Very much

57) To what extent does your job require that you keep learning new things?

Never need to learn new things 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Must always learn new thir

58) To what extent are you fairly rewarded for the amount of effort that you put forth?

Not rewarded fairly at all 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Rewarded very fairly

59) To what extent are the people in your immediate group friendly?

Not friendly at all 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Very friendly

60) To what extent are you fairly rewarded taking into account the education and training you have had?

Not rewarded fairly at all 1 ..... 2 ..... 3 ..... 4 ..... 5 ..... 6 ..... 7 Rewarded very fairly

Please circle the ONE number that best matches how much you agree with each statement.

	Not at all	To some extent	To a great extent
61) When I think of an idea that will benefit ABC, I make a determined effort to implement it	1	2 3 4 5 6	7
62) In the past year I have seriously considered taking a position in another company	1	2 3 4 5 6	7
63) The people in charge of this company generally know what they're doing	1	2 3 4 5 6	7
64) I willingly join in efforts to improve working conditions at ABC			1
65) I find myself taking longer breaks or socializing with coworkers more than I should	1	2 3 4 5 6	7

	Not at all			To some extent			To a gr exten
66) I treat company information in the strictest confidence	1	2	3	4	5	6	7
67) I have recently spent some time looking for another job	1	2	3	4	5	6	7
68) I think that employees shouldn't criticize their company...	1	2	3	4	5	6	7
69) I usually give something extra when the organization needs it	1	2	3	4	5	6	7
70) Most days I just don't care much about my work	1	2	3	4	5	6	7
71) I sometimes discuss poor working conditions with my manager and/or with other upper managers at ABC	1	2	3	4	5	6	7
72) I actively support ABC in public	1	2	3	4	5	6	7
73) Even with careful planning, I understand that I sometimes have to work late to get the job done	1	2	3	4	5	6	7
74) I would enjoy wearing clothing (tee shirt, jacket, pin) that bears ABC's name or symbol	1	2	3	4	5	6	7
75) I often think about quitting	1	2	3	4	5	6	7
76) I care very little about what happens to ABC as long as I get a paycheck	1	2	3	4	5	6	7
77) When upper managers don't act on serious problems, I am willing to speak up and push for improvements	1	2	3	4	5	6	7
78) Most problems at work will go away with time	1	2	3	4	5	6	7
79) I do things above and beyond the call of duty without being asked	1	2	3	4	5	6	7
80) I generally say good things about ABC even when other people criticize it	1	2	3	4	5	6	7
81) When I have a really frustrating day, I think of quitting	1	2	3	4	5	6	7
82) Sometimes when I just don't feel like working I will call in sick	1	2	3	4	5	6	7

The following questions will help us make sure every segment of ABC is fairly represented.
NOTHING on this page will ever be used to identify an individual uniquely.
Only averaged data will be reported back to ABC.
If you feel uncomfortable answering all of these questions, please feel free to skip some.

For each statement below, please circle the ONE number that describes you best.

83) Which item best describes your ethnic group?

African-American	1
American Indian	2
Asian	3
Caucasian	4
Hispanic	5

Other (specify) _____

84) What is your age today?

Less than 24 years	1
Between 25 and 34 years	2
Between 35 and 44 years	3
Between 45 and 54 years	4
More than 55 years	5

85) What is your gender?

Female	1
Male	2

86) Please fill in the number of years you have worked at

ABC Electronics (i.e., 2.5 yrs): _____

STOP ! Please check that you marked a response to each question.

Additional comments.

Please use this space or an extra sheet of paper if you have additional comments or would like to further explain any of your answers.

Mailing Instructions:

Mail this questionnaire in the addressed postage-paid envelope. If this envelope is missing, please mail your completed questionnaire to: Christina Smith, PO Box 7476, Fremont, CA 94537-7476. Please also mail the separate postcard to remove your name from the follow-up mailings list.

Thank you very much for completing this questionnaire!

APPENDIX B: POSTCARDS AND COVER LETTER

This appendix contains six items: 1) The advance postcard sent a week before the survey was mailed to employees in the sample set; 2) A letter sent to second level managers informing them of the survey; 3) The cover letter for the first mailing; 4) The cover letter for the second mailing sent four weeks after the first mailing; 5) The response postcard included in the mailings; and 6) The follow-up postcard sent two weeks after the second mailing.

1) Advance postcard

August 8, 1997

Dear ABC Employee:

In the next few days you will receive a survey packet. This survey is being conducted as part of my doctoral program at Walden University and in cooperation with ABC. It concerns job satisfaction and employee behaviors among professionals in high-tech industry.

Your response will be completely anonymous. No names or individual information will be released to ABC or reported in the study. ABC will not own or have access to your individual survey.

Only a portion of professional employees at ABC have been selected to participate in this study, so your opinions are very important. **When you receive the questionnaire in the mail, please fill it out and return it as soon as possible.**

Your response is also needed to ensure that significant conclusions (in areas such as career development, managerial support, and organizational systems) may be drawn from the data. If you have any questions or concerns about the survey, please feel free to call me at XXX-XXX-XXXX or christina_smith@el.abc.com. Thanks in advance for your help with this study.

Sincerely,

Christina Smith

2) Letter to second level managers

Walden University LOGO

August 13, 1997

Dear ABC Executive:

During the next few weeks, some of your employees may be receiving a survey on the topic of job satisfaction among professionals in a high tech company. This survey project was approved by <president> and is hoped to provide important information to managers at ABC. The study is being conducted as part of my doctoral program in Applied Management and Decision Science at Walden University.

The survey results will be presented to ABC executives later this year (results for <manufacturing site> will be shown separately) and may be used to help guide company policies in areas such as career track development, training, and organizational systems development.

The survey will be sent to approximately 40% of our exempt, non-expatriate employees. Because of the focus on professionals, only exempt employees from levels 4 and 9 (some level 3's) were included. Employees were randomly selected from a list of job titles which require a 4-year degree.

Employees will be informed that their response will be completely anonymous, and that ABC will receive only aggregate results of the surveys. Individual information will not be released to ABC or reported in the study. ABC will also not own or have access to individual survey information. While the survey form itself is anonymous, a separate postcard will be used to remove respondents from a follow-up mailing list. The survey will be sent in four stages:

8/8	Advance postcard to inform employees that they will receive a survey in a few days
8/14	First survey mailing
9/4	Second survey mailing to all non-respondents
9/18	Follow-up postcard to all non-respondents.

If you would like to receive a copy of the survey packet, a copy of the finished report, or if you have any questions or concerns, please feel free to contact me at XXX-XXX-XXXX or christina_smith@el.abc.com. If you prefer to speak with someone else, <name>, VP of Human Resources (x1234), <name> (x5678), and <name> (x0912) are also informed about this study.

Please accept my sincere thanks in advance for your support of this study.

Sincerely,

Christina Smith
Doctoral Candidate, WU
Sr. Manager, ABC

3) Cover letter for the first mailing

Walden University LOGO

August 14, 1997

Dear ABC employee:

The enclosed study is being conducted as part of my doctoral program in Applied Management and Decision Science at Walden University. The study has been approved by ABC, and ABC will receive only aggregate results.

Your response will be completely anonymous. No names or individual information will be released to ABC or reported in the study. ABC will not own or have access to your individual survey.

Only a portion of professional employees at ABC have been selected to participate in this study, so your opinions are very important.

Instructions:

(1) The survey will take about 20 minutes of your time.

(2) Please complete the questionnaire and return it in the enclosed self-addressed stamped envelope.

(3) Separately mail the stamped postcard when you have completed and returned the survey. When I receive the postcard, your name will be removed from the follow-up mailings list. This postcard allows me to keep your questionnaire completely anonymous.

(4) It would be very helpful to have your completed questionnaire returned by **August 27, 1997**.

Because high-tech companies operate in a dynamic environment with extremely mobile workforces, it is vital that organizations understand job satisfaction and employee behaviors among high-tech professionals. A summary of employee responses can help to guide company policies in areas such as career track, managerial training, and organizational systems development.

If you would like to receive a copy of the finished report, or if you have any questions or concerns, please feel free to contact me at XXX-XXX-XXXX or christina_smith@el.abc.com. Please accept my sincere thanks in advance for your help in this study.

Sincerely,

Christina Smith
Doctoral Candidate, WU
Sr. Manager, ABC

Approved by:

<NAME>
VP Human Resources,
ABC Electronics

4) The cover letter for the second mailing

Walden University LOGO

September 4, 1997

Dear ABC employee:

About two weeks ago you were sent a questionnaire about job satisfaction and employee behaviors among high-tech professionals. As of today, your response has not been received. If you have already returned the survey, please accept my sincere thanks. If not, please do it today.

This study is being conducted as part of my doctoral program in Applied Management and Decision Science at Walden University. The study has been approved by ABC, and ABC will receive only aggregate results.

Your response will be completely anonymous. No names or individual information will be released to ABC or reported in the study. ABC will not own or have access to your individual survey.

Only a portion of professional employees at ABC have been selected to participate in this study, so your opinions are very important.

Instructions:

(1) The survey will take about 20 minutes of your time.

(2) Please complete the questionnaire and return it in the enclosed self-addressed stamped envelope.

(3) Separately mail the stamped postcard when you have completed and returned the survey. When I receive the postcard, your name will be removed from the follow-up mailings list. This postcard allows me to keep your questionnaire completely anonymous.

(4) It would be very helpful to have your completed questionnaire returned by **September 15, 1997**.

I recognize how busy you must be and greatly appreciate you taking the time to complete this questionnaire. If by chance you did not receive the first questionnaire or it got misplaced, I have enclosed a replacement. If you would like to receive a copy of the finished report, or if you have any questions or concerns, please feel free to contact me at XXX-XXX-XXXX or christina_smith@el.abc.com. Please accept my sincere thanks in advance for your help in this study.

Sincerely,

Christina Smith
Doctoral Candidate, WU
Sr. Manager, NECEL

Approved by:

<NAME>
VP Human Resources,
ABC Electronics

5) The response postcard included in the mailings

Dear Researcher:

I am sending this postcard at the same time that I am putting my completed questionnaire in the mail. Since my questionnaire is completely anonymous, this postcard will tell you that you need not send me a further reminder to participate in your study.

(back)

CHRISTINA SMITH
P.O. BOX 7476
FREMONT, CA
94537-7476

(front)

6) The follow-up postcard sent two weeks after the second mailing

Dear ABC Employee: September 18, 1997

About two weeks ago you were sent a questionnaire about job satisfaction and employee behaviors among high-tech professionals. As of today, your response has not been received. If you have already returned the survey, please accept my sincere thanks. If not, please do it today.

This study is being conducted as part of my doctoral program in Applied Management and Decision Science at Walden University and in cooperation with ABC.

Your response will be completely anonymous. No names or individual information will be released to ABC or reported in the study. ABC will not own or have access to your individual survey.

Only a portion of professional employees at ABC have been selected to participate in this study, so your opinions are very important.

I am writing to you again because of the importance **each** questionnaire has to the study. **I need your completed questionnaire.** It will require about 20 minutes of your time and your response will provide vital information.

If you did not receive the questionnaire, or it got misplaced, please call me at XXX-XXX-XXXX or christina_smith@el.abc.com and I will get another one in the mail to you immediately.

Sincerely, Christina Smith

APPENDIX C: COPYRIGHT AND PERMISSION LETTERS

Permission to use survey questions and figures was requested from all locatable authors. Replies are shown in this section. Figures or questions taken from articles of authors who were not locatable were used under authorization of UMI's copyright office that the published questions may be used as they reside in the public domain (phone conversation, July 25, 1997).

Permission to use Figure 2, The Price-Mueller turnover model (Kim et al., 1996):

Subject: Re: Request for Authorization (Figure and Survey Instrument)
Author: "J. Price" <jprice@blue.weeg.uiowa.edu> at INTERNET
Date: 7/28/97 7:07 AM

You have my authorization to reprint the table that you cite in your email. I will see if I can't find a copy of the questionnaire and send it to you.

James Price
Dept. Sociology
W145 Seashore Hall
University of Iowa
Iowa City, IA, 52242
(319)335-2497

Permission to use survey scales from Wallace (1995b):

Subject: Re: Request for Authorization to use Survey
Author: "Jean Elizabeth Wallace" <jwallace@acs.ucalgary.ca> at INTERNET
Date: 7/28/97 1:24 PM

Ms. Smith

As you may notice, most of the scales referred to in the Appendix of my (1995) Social Forces paper are adapted from already published scales (e.g., coworker support, promotional opportunity, job security, etc.). If you want to use these you simply need to cite these original sources since I am not the one to obtain copyright permission from for already published scales. For the few scales that there are no references for (e.g., firm-specific skills, autonomy, etc.) you may just cite this article as the source. I have not applied for any copyright status for the ones I constructed for my survey. I will send you additional survey information as you request. I hope you find it helpful.

Sincerely, Jean E. Wallace, Assistant Professor

Permission to use survey scales from Kim, Price, Mueller, and Watson (1996); Mueller, Boyer, Price, and Iverson (1994); Price and Mueller (1981).

Subject: Re: Request for written authorization to use survey items
Author: "C. Mueller" <cmueller@blue.weeg.uiowa.edu> at INTERNET
Date: 8/4/97 2:42 PM

Dear Ms. Smith,
You have permission to use any of the scales published in the three articles listed in your e-mail message of 8-4-97.

Charles W. Mueller
Professor of Sociology

ps I'll send the materials you requested earlier.

Permission to use survey scales from Allen and Meyer (1990).

Subject: Re: Request for Authorization to use Survey
Author: NATALIE ALLEN <ALLEN@SSCL.UWO.CA> at INTERNET
Date: 8/7/97 11:16 AM

Hello Christina,

I have been out of town for a few days and just now read your message -- my apologies for the delay.

Yes, certainly, you have my permission to use the items described in the 1990 paper. If you have any questions about them, please do not hesitate to contact me. Also, I would be very interested in learning more about your project as it progresses. Best wishes with it!

Cheers, Natalie Allen

****
Dr. Natalie J. Allen
Department of Psychology
The University of Western Ontario
London, Ontario N6A 5C2 CANADA
(519) 661-3013
allen@sscl.uwo.ca

Final permission obtained by phone from Dr. Caryl Rusbult (May 6, 1998) and by email from Dr. Daniel Farrell (May 6, 1998) to use modified survey scales and Figure 2 from Rusbult, Farrell, Rogers, and Mainous (1988).

Permission to use survey scales from Withey and Cooper (1992):

```
Subject: Re: Request to use published scales
Author:  <cooperw@qsilver.queensu.ca (cooperw)> at INTERNET
Date:    8/8/97 12:24 PM

SURE. GO AHEAD.  GOOD LUCK.  WE'D BE INTERESTED IN WHAT YOU FIND. >

cooperw@qsilver.queensu.ca

>     Dear Dr. Cooper:
>
>     My name is Christina Smith and I am a doctoral candidate in Applied
>     Management and Decision Science at Walden University. I am writing to
>     request your authorization to use some of the survey questions
>     published in the following paper:
>
>     Withey, M. J., & Cooper, W.H. (1992). What's loyalty? Employee
>     Responsibility and Rights Journal, 5(3), 231-240.
>
>     I am particularly interested in the items measuring active loyalty.
>     I've tried to contact Dr. Withey, but the operator at the Memorial
>     University of Newfoundland cannot find him in that campus directory.
>     If you agree, please send me a return email with your authorization.
>     Thank you in advance for your assistance with this request. Please do
>     not hesitate to contact me with any questions or concerns at the
>     following numbers:
>
>     Phone: 408-588-6621 (day)
>     510-793-3708 (eve)
>     christina_smith@el.nec.com (email)
>
>     Best regards,
>     Christina Smith
>     Fremont, California, USA
>     Doctoral Candidate,
>     Applied Management and Decision Science, Walden University
```

Permission to use survey scales from Gaertner & Nollen (1989):

```
Subject: Re: Request for Authorization -Reply -Reply
Author:  Stanley Nollen <NOLLENS@gunet.georgetown.edu> at INTERNET
Date:    8/4/97 5:14 PM

Dear Ms. Smith,

You have my permission to use the two scales in our article, "Career
Experiences, Perceptions of Employment Practices, ...." in Human Relations,
vol 42, no 11, 1989.

Now, I have to tell you exactly what the scales are!  Either I will located
them in my old files, or Karen will.  It may take several days.  In any case,
thank you for your interest.

Stanley Nollen
Georgetown University School of Business
```

CURRICULUM VITA

Christina Smith Melnarik

Career History

Senior Manager, Strategic Marketing, 7/95 to 11/97, NEC Electronics, Santa Clara, CA
ASIC Product Marketing Manager, 11/93 to 7/95, NEC Electronics, Santa Clara, CA
Staff Product Marketing Engineer, 9/92 to 11/93, NEC Electronics, Santa Clara, CA
Strategic Customer Marketing Manager, 2/90 to 9/92, VLSI Technology, San Jose, CA
Design Engineering Manager, 8/85 to 2/90, VLSI Technology, San Jose, CA

Education

Ph.D. Applied Management and Decision Sciences, Walden University, May 1998
M.S. Engineering Management/Electrical Engineering, Santa Clara University, June 1991
B.S. Chemical Engineering, University of California at Davis, June 1985

Publications

Smith, C. M. (1991). A revitalizing role for engineers and engineering managers in implementing a Deming-style organizational structure. Proceedings of the IEEE Seventh Careers Conference on Change and Competitiveness, USA, 173-186.

Smith, C. M. (1993). NEC gate array solution for high performance systems. In L. J. D'Luna, G. W. Brown, & P. P. K. Lee (Eds.), Proceedings of the Custom Integrated Circuits Conference (pp. 178-185). Piscataway, NJ: IEEE.

Smith, C. M. (1993). 5V to 3V evolution paths: Selecting a gate array product for the next generation. In D. Perkins & R. Saleh (Chair), Gate arrays and programmable devices. Symposium conducted at the IEEE 1993 ASIC Conference, San Diego, CA.

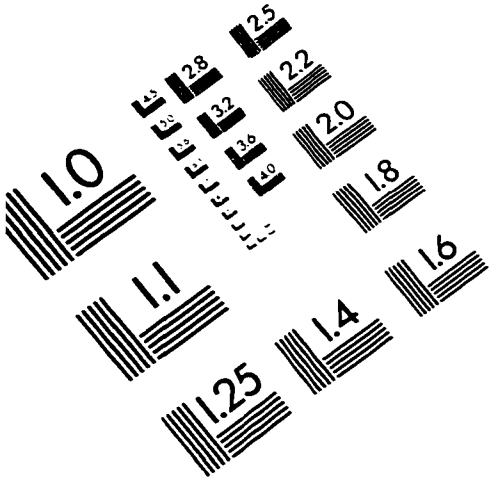
Smith, C. M. (1995). A two million gate 0.35 μm CMOS ASIC family. In Gate arrays and programmable devices. Symposium conducted at the IEEE 1995 ASIC Conference, San Diego, CA.

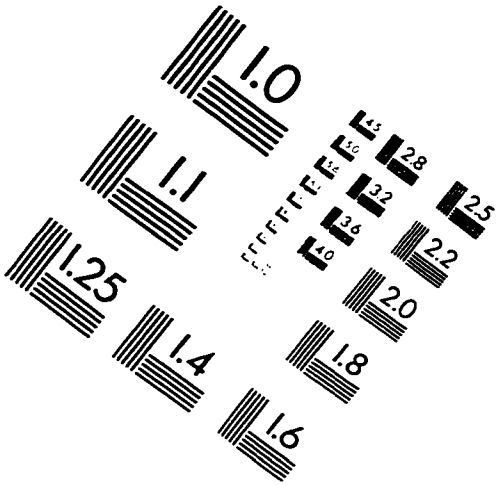
Smith, C. M., & Dailor, D. S. (1988). The Scribe Maker system: An automatic scribeline generator and scribe artifact placement system. Proceedings of the Eighth Annual Symposium on Microlithography (pp. 43-48). San Jose, CA: BACUS.

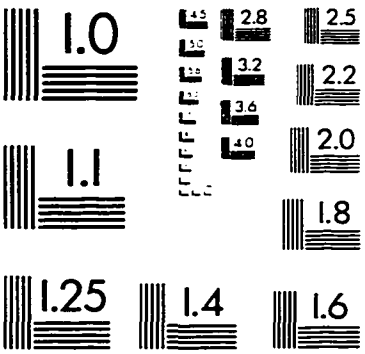
Awards

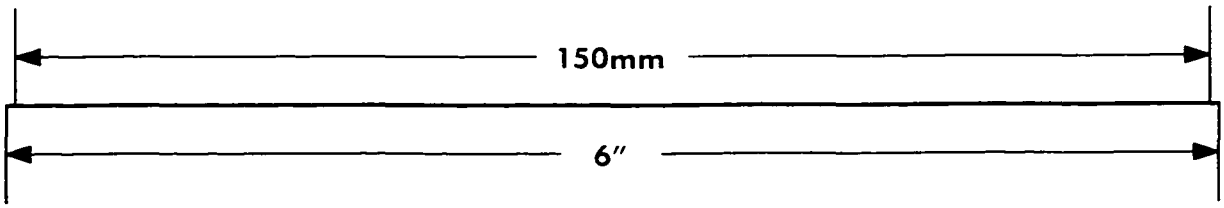
NEC 1994 President's LEAD Award, December 1994
NEC 1993 Most Significant SBU Contributor to Sales Recognition Award, May 1993
VLSI Outstanding Teamwork Awards: July 1992, June 1992, July 1990, March 1990, Feb 1990
VLSI Outstanding Performance Awards: July 1987, July 1986

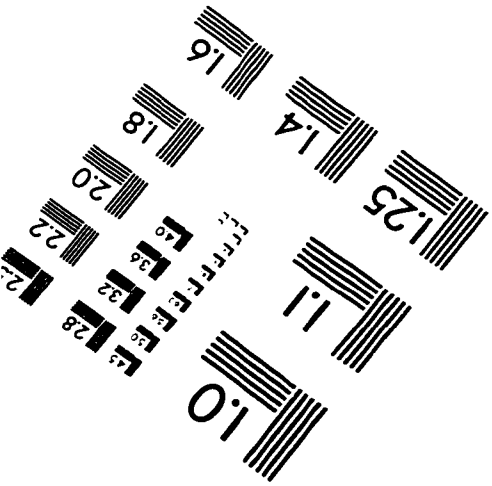
IMAGE EVALUATION
TEST TARGET (QA-3)

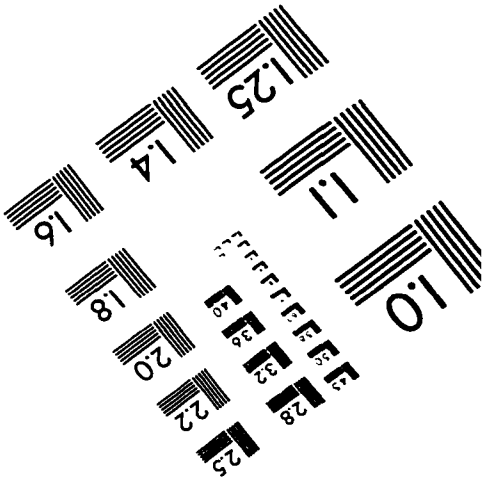












APPLIED IMAGE . Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989