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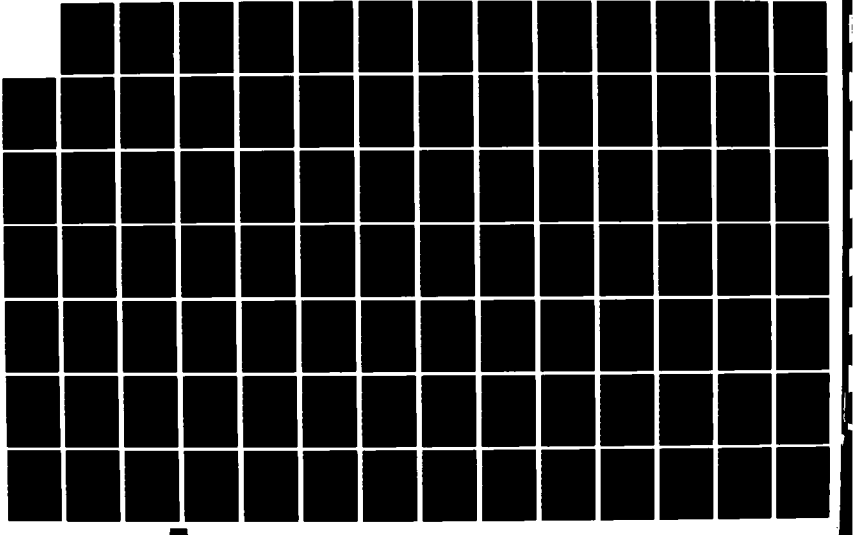

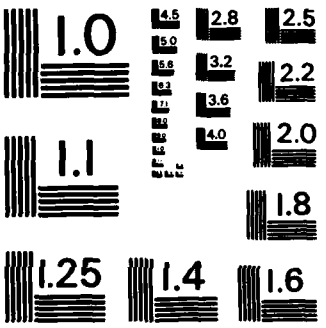

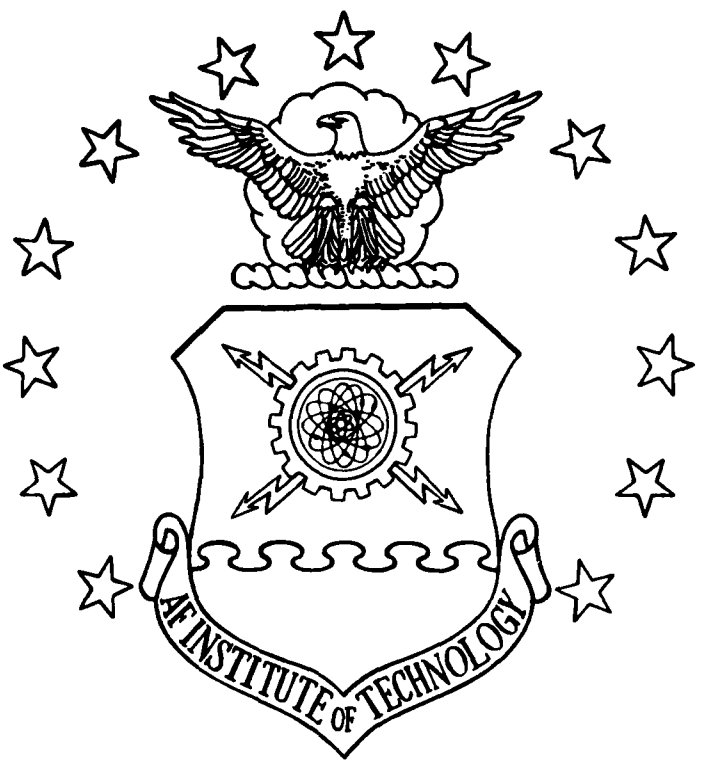

A CROSS-SECTIONAL STUDY OF THE EFFECT OF QUALITY CIRCLES ON TWELVE ATTITUDINAL VARIABLES

THESIS

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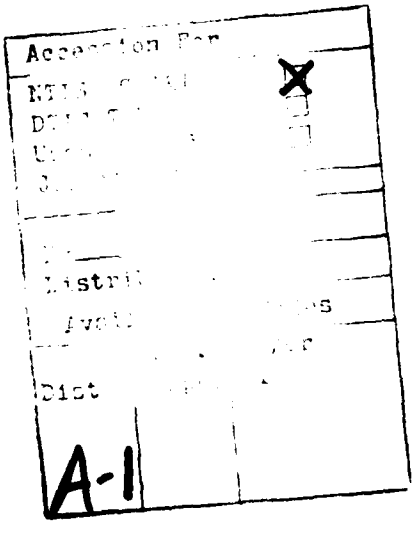

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THESIS

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Systems Management

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Abstract

This study analyzed differences in 12 attitudinal variables between employees associated with QCs and employees not associated with QCs at a DOD supply center. Variables measured were job satisfaction, job involvement, organizational commitment, communication climate, group cohesiveness, participative decision making, relationship-oriented and task-oriented supervision, feedback, interpersonal trust, and self-appraised job performance. 729 employees (29% of the population) responded in the survey. Members of non-QC work groups had significantly higher scores on six variables, when compared with members of QC work groups. Employees who were not QC members had significantly higher scores on three variables, when compared with QC members.

In a supplemental analysis, the number of improvements recommended and the number adopted was collected for all QCs. Based on median splits for these two productivity measures, significant differences were found between members of productive and less-productive QCs. Employees associated with QCs were also asked additional questions regarding the QC process. Based on their responses, and the results of the attitudinal measures, recommendations for future research are offered.

A CROSS-SECTIONAL STUDY OF THE EFFECT OF QUALITY CIRCLES ON TWELVE ATTITUDINAL VARIABLES

I. Introduction

Overview

This chapter begins with a brief background on quality circles including information on their start in Japan, the U.S., and the Department of Defense. Next, the purpose of the study and the research objectives are presented. The chapter closes with a limitation of the research.

Background

The U.S. exists in a highly competitive industrial world. Japan in particular has been making steady progress in product quality and productivity, and is continually threatening to capture more U.S. markets. Due to this competitive pressure, U.S. management continually searches for ways to increase its product quality, productivity, and quality of work life. One technique that has gained widespread attention and use since 1977 is the quality circle (QC).

A quality circle is a small group of employees with similar work interests, who voluntarily form a problem-solving team. The team meets regularly to identify work related problems and develop recommended solutions. The QC process is based on the premise that employees want to be involved in decision making and problem solving, and that they have much to offer in these areas.

Quality circles originated in Japan in the early 1960's and are

considered by many to be one of the main reasons behind the dramatic turnaround in the quality of Japanese products in recent years. By the late 1960's, U.S. management consultants began taking note of this new concept, but it was the mid 1970's before the first QC was started in the U.S. In the ten years since then, the QC phenomenon has grown rapidly in both public and private business communities.

QCs first appeared in the Department of Defense (DOD) at the Norfolk Naval Shipyard in 1975, and by 1983, their number was estimated at 1500 (Calhoun, 1983). In 1982 the Defense Logistics Agency (DLA), a segment of the DOD, contracted for formal quality circle training for management personnel at each of its 25 Primary Level Field Activities. As a result of that training, approximately 260 quality circles were formed involving over 2100 members (Barclay, 1983).

Purpose of Study

Much has been written about the benefits of QCs. The three benefits most often cited are increased productivity, improved product quality, and enhancement of the work lives of not only QC members but also other employees affected by circle activities. For example, Lloyd and Rehg (1983) cite people building and total quality control as the two elements of the philosophy of the QC concept and consider participative decision making, goal setting, and team building the three organizational development strategies upon which the QC process is based. Participative management and bottoms-up consultive management are two other terms commonly used to describe the QC process (Patchin, 1980; Steel & Shane, 1985). Finally, Dewar (1980) states that QCs are "a way of capturing the creative and innovative power that lies within the work

force . . . to effect improvements in quality, productivity, and motivation" (p. 2). However, there is also evidence that many QC programs fail to fulfill their promise. One study reports more than a 70 percent failure rate of quality circles (Leonard, 1983). This suggests that each orga nization continually monitor its QC process to ensure early detection and correction of problems.

One popular way of measuring QC effectiveness is through an attitude survey. The Air Force Institute of Technology (AFIT), which is responsible for overseeing education, consultation, and research on QCs within the DOD, developed the AFIT Survey of Work Attitudes especially for QC evaluation research. The purpose of this study was to use the AFIT survey to analyze the effect of quality circles on the attitudes of employees at a DOD supply center. Key personnel from this supply center received formal training in 1982 and, by March 1983, 12 circles had been formed. Initially a parttime facilitator, responsible for coordinating all aspects of the QC process, was employed but in September 1983, a full time facilitator was hired. Since that time the number of QCs has varied from 15 to 24.

Research Objectives

The research objectives of this study were as follows:

1. Determine if there is any significant difference in attitudes between employees from work groups with quality circles and employees from work groups without quality circles.
2. Determine if there is any significant difference in attitudes between employees who are QC members and employees who are not QC members.

The following attitudinal variables were examined in this study: job satisfaction, job involvement, organizational commitment, organizational communication climate, group cohesiveness, participation in decision making, relationship-oriented supervision, task-oriented supervision, job feedback, interpersonal trust, and self-appraised job performance. Each of these terms is defined in section 2 of Chapter II. The method of measurement for each is described in Chapter III.

Limitations

1. The only measures of QC effectiveness used in this study were attitudinal. Productivity and product quality data were not collected.

II. Literature Review

Overview

This chapter contains two main sections. The first section provides a more complete background on QCs than was provided in Chapter I. It begins with a history of the concept followed by a discussion of a typical QC organization and operation. Factors commonly cited as prerequisites for successful quality circles are then presented, along with some advantages and disadvantages of QCs. The section closes with a review of several empirical studies on the effectiveness of QCs.

The second section contains information on the attitudinal variables of interest to this study. For each variable, a definition is provided along with relevant background information.

Section One: Quality Circles

History of Quality Circles

Quality Circles in Japan. The quality circle concept originated in Japan in 1961 but much of the groundwork that enabled its success was done years earlier. After W.W. II, Japan was faced with the task of rebuilding its industrial capabilities which had been largely destroyed during the war. Japanese leaders had a goal of making their country an industrial power and realized that to achieve that goal they had to greatly improve the quality of their products. As part of this effort, the government declared quality a national priority. In 1948, the Japanese Union of Scientists and Engineers (JUSE) invited Dr. Edward Deming, a prominent U.S. statistician, to Japan to train their management in the principles of statistical quality control. In 1954, they

invited Dr. Joseph Juran, another U.S. consultant, to Japan to teach the management of quality control including his concept of Total Quality Control. The Japanese were very receptive to the teachings of both Drs. Deming and Juran and applied the principles in their companies. Gradually, the quality of their products began to improve.

Initially the formal training was directed to upper management, however, in the early '60s, the idea that shop foremen and workers could also benefit from the training became popular. The Japanese decided to form small groups of workers led by a foreman or supervisor, and teach them the techniques of quality control. This was the beginning of QCs.

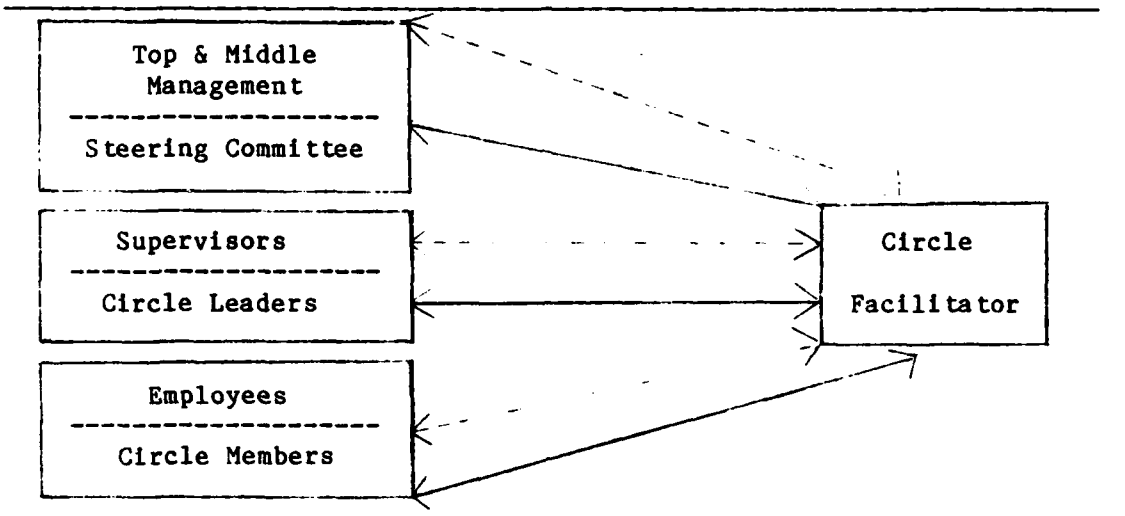
JUSE became the organization responsible for registering QCs in Japan. The first three quality circles were registered in May of 1962 and the concept quickly gained popularity (Dewar, 1980; Ingle, 1982).

Quality Circles in the U.S. By the late '60s and early '70s, the rest of the world began taking note of this new idea. In 1967, Dr. Juran's article, "The QC Circle Phenomenon" appeared and told the Western World about Japan's success with QCs. In 1973, Donald L. Dewar and five other Lockheed employees visited Japan to study QCs. In the following year they successfully started QCs at Lockheed. The concept was slow to catch on in the U.S. and it was not until 1977 that QCs gained national attention. Since that time, they have spread rapidly in the U.S. as well as in many other industrialized nations. In 1985, the International Association of Quality Circles (IAQC), an organization which provides guidance to groups initiating QC activites, boasted a U.S. membership of nearly 10,000 members in 100 chapters.

Quality Circles in the DOD. After the DOD experimented with several QC programs, it too encouraged their use and developed its own training courses to teach the principles of QCs. In 1980, the Air Force Institute of Technology began teaching courses on quality circles. In the following year, the U.S. Army Management Engineering Training Activity began teaching a QC facilitator course. Claims have been made that QC programs in the DOD have produced tangible returns on investment of $4 to $28 for each $1 invested. They are generally credited with improvements in productivity and employee morale (Calhoun, 1983).

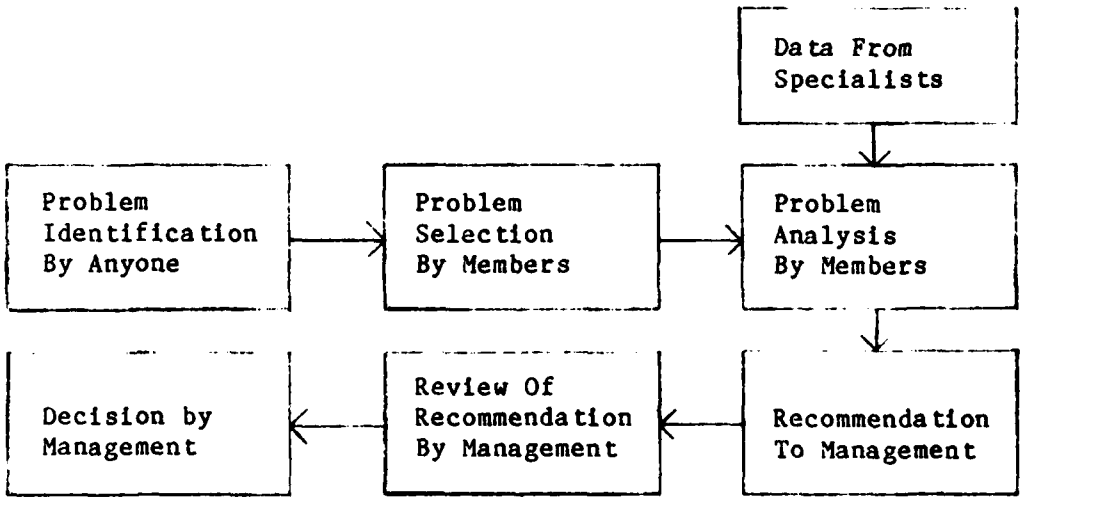
QC Organization and Operation. Figures 1 and 2 show a typical QC organization and operation, respectively. The steering committee in Figure 1 usually consists of top and middle managers from each major function in an organization. These managers set goals and objectives for the program. They also select the facilitator who is responsible for training QC members, providing support when necessary, and acting as a liaison between the circles and other organizations. The circle leader or supervisor conducts the circle meetings, giving the discussion direction, while ensuring the free and open exchange of ideas. Finally, the team members make up the basic elements of the program, selecting and analyzing problems, and making recommendations to management.

As shown in Figure 2, anyone in a circle can identify a problem to the group but the group decides which problems to address, and in what order. Once a problem is selected, the group analyzes it, collects pertinent information from specialists, and formulates a recommended solution. The proposal is then presented to management which has the responsibility for reviewing it and deciding on its merit.



Source: Dewar, Donald L. The Quality Circle Guide To Participation Management. Englewood Cliffs NJ: Prentice-Hall, 1980.

Figure 1. Typical QC Organization



Source: Dewar, Donald L. The Quality Circle Guide To Participation Management. Englewood Cliffs NJ: Prentice-Hall, 1980.

Figure 2. Typical QC Operation

Factors Necessary for Success of Quality Circles. QC authors mention many factors that are necessary for the success of quality circles. Genuine management support is the most often cited factor.

Dewar (1980, p. 191) lists the following "foundation blocks" as the essential elements of a QC program:

* Management is supportive.
* Participation is voluntary.
* There is a people-building attitude.
* Training is provided.
* Teamwork is encouraged.
* Recognition is provided.
* Members select problems in their area of expertise.
* Circles solve problems, not just identify them.

He also stresses that positive results are the key to continued employee participation and management support of the quality circle process. Lloyd and Rehg (1983) list five prerequisites for success that are the responsibility of management and five prerequisites that are the responsibility of quality circles members. Management must provide patience, support, training, the freedom for employees to voluntarily join or decline to join a QC, and union representation in the planning and implementing phase of the QC process. On the other hand, quality circle members must also provide patience, along with behavior in compliance with QC norms, accountability, discipline, and adherence to their charter of keeping QC activities in the area of work-related problems.

Steel and Shane (1985) discuss factors necessary for successful QCs using a contingency approach. They cite employees' willingness to change, a cooperative intra-group climate, a broad base of tangible and intangible management support, and continued management support as the elements necessary in an organization hoping to use quality circles successfully. They point out that due to variations in these elements

from one organization to another, quality circles are not for everyone.

Ingle (1982, p. 35-37) writes that the secret of success in quality circles is well defined objectives. He adds the following list of important aspects that help ensure success in the QC process:

1. Establish a suitable atmosphere.
2. Obtain commitment from top management.
3. Select the right people and the right area for starting QCs.
4. Select clear and realistic objectives.
5. Expose people to the program so everyone understands their purpose.
6. Inform and communicate continually.
7. Keep the program voluntary.
8. Emphasize appropriate training.
9. Start slowly and grow slowly.
10. Be open and positive in dealing with co-workers and management.
11. Monitor progress and changes so that corrective measures can be taken immediately.

Advantages and Disadvantages of Quality Circles. Many advantages and disadvantages of QCs are discussed in the literature. Fitzgerald and Murphy (1982) provide a comprehensive list of both.

Advantages. They point out that the increased training and development of employees is beneficial to everyone and that the increased level of quality consciousness displayed by QC members extends to non-members. Productivity is usually improved, costs are reduced, and members experience greater motivation and job satisfaction. A collaborative spirit of problem-solving results and everyone benefits from the participative management process. The organization's planning system is improved and the sometimes stymied assets of brainpower and creative thinking of employees are unleashed. Lastly, the recognition given to QC members for positive results works as a motivational tool.

Disadvantages. There is also a negative side to the QC process. Initially, QCs usually cause a decrease in productivity since

members take time from work for QC training and organizing requirements. Also, the initial investment in the QC program for training, the facilitator's salary, and training materials may range from $40,000 to $70,000. Mistakes during the organizing period are inevitable, therefore, the QC program may receive criticism from opponents. Employees with great expectations for the QC program may become discouraged because positive results are not always quick in materializing. Some management personnel may feel threatened by the quality circle process and attempt to sabotage its efforts resulting in negative productivity. Since a certain amount of mistrust exists between management and workers in many organizations, it may take time to overcome this adversarial relationship. Some people may view QCs as programs with a beginning and end rather than as an ongoing process, and therefore, they will not fully comprehend the purpose of QCs. QCs are a new type of program for most organizations and a certain amount of confusion usually occurs after QCs are started. Lastly, QCs may require changes in the organization's existing system of controls since quality circles may need additional data collected and monitored to achieve their goals.

Evaluation Research on QCs. Many U.S. companies as well as the Department of Defense have jumped on the QC bandwagon hoping to capture the magic of participative management that is often credited with making the Japanese world leaders in quality. But there are costs associated with QCs, the most obvious of which are the training of the facilitator and other key personnel, the facilitator's salary, and the members' time away from their jobs for weekly meetings. Thus, it is suprising to find that there have been few serious evaluation research studies on the

effectiveness of QCs. Many of the success stories written are anecdotal and do not provide hard evidence of QCs' success. Of the few empirical studies conducted, some were inconclusive, some exhibited less than ideal research designs, and others were plagued by problems effecting the value of the results. Some research efforts have reported negative findings regarding the effectiveness of QCs while others conclude that they are indeed effective. In a recent review of available QC evaluation research studies, Steel and Shane (1985) reported on eleven studies and concluded that "no clear trend in support of nor against the effectiveness of Quality Circles could be discerned from the findings of these studies" (p. 7). Three of those studies are discussed here.

A study by Donovan and Van Horn (1980) used a pre-post research design in a study of five groups of assembly line workers involved with QCs at Honeywell. They reported up to a 46% reduction in unit assembly costs over two years, a 6% faster learning curve for QC groups versus non-QC groups, and a 9% greater machine utilization rate for QC members versus nonmembers. In all five groups studied, results were reported favoring the QC groups. However, as Steel and Shane point out, the research can be criticized in that two of the five groups did not have a control group, a third had a small sample size (30), and a fourth had no statistical analysis performed to establish the significance of the reported favorable results. Also, the pre-post research design does not guard against the possible occurrence of the Hawthorne effect.

In another case, Hunt (1981) conducted a study of production personnel using multiple research designs. Effectiveness criteria used were the percent of employees submitting suggestions, attrition, atti-

tudes, attendance, grievances, assessment of circles by managers, and several performance measures. The results of this study also favored QCs. An increase in QC member suggestions, job involvement, and problem-solving capabilities, along with a reduction in attrition and errors, are presented as evidence that quality circles are an effective way of improving productivity. This study can also be criticized, however, because statistical significance testing was only performed on one criterion - percent of employees submitting suggestions.

Steel and Shane (1985, p. 6) cite a 1983 study by Sander and Atwater for the U.S. Navy as the "most elaborate and well-controlled Quality Circle" evaluation research study of those reviewed. This study used a nonequivalent control group design with several control groups. Results were mixed. The research failed to show that QCs had any positive effect on attitudes, sick leave usage, suggestions, number of promotions, awards, suggestions, or accidents. On the other hand, interviews conducted with QC participants showed that many members thought the QC process had positive effects on communication and cooperation. Also, 13 out of 15 QCs successfully implemented solutions to problems they identified in the one-year study period (Sander & Atwater, 1983).

In a study not discussed in the Steel and Shane review, Griffin and Wayne (1984) studied 457 QC members in manufacturing plants of a midwestern company. For all the circles, they collected the number of improvements suggested and the number adopted for a 12 month period. At the midpoint of the same time interval, QC members took an attitude survey which measured their perceptions of group cohesion (within the

QC), performance norms (how dedicated and effective members felt their individual QC was), satisfaction with supervisor, job satisfaction, intrinsic and extrinsic satisfaction, satisfaction with co-workers, self-esteem, and the organization's commitment to the QC process.

In analyzing their results, Griffin and Wayne split QC members into two groups - those belonging to QCs with more than the median number of improvements suggested and those belonging to circles with less than the median number of improvements suggested. A statistical test (t-test) was then performed to check for significant differences between the groups' attitudes. In a second part of their analysis, a similar t-test was done with members split on the median number of improvements adopted.

Results were the same for both analyses. Significant differences were found between the groups for cohesion, performance norms, job satisfaction, intrinsic satisfaction, satisfaction with co-workers, self-esteem, and the organization's commitment to the QC process. The differences all favored the groups having higher than the median number of improvements suggested and adopted. In both analyses, the more productive groups had higher scores on each of the attitudinal variables.

In another research effort, Steel, Mento, Dilla, Ovalle, and Lloyd (1985) conducted a QC study in two DOD organizations using a nonequivalent control group design. One sample consisted of military maintenance personnel, the other of hospital employees. The researchers collected two waves of attitudinal survey data from each organization using the same instrument used in the current study. The first survey was given to both groups in the same month, before the QCs had started. The timing of the second survey was left to the individual QC facilitators.

For the hospital group, the second survey was slightly over six months later - for the maintenance group, slightly over a year after the initial administration.

Using a one-way analysis of covariance statistical test, significant improvements (over control group members) were found among QC members for the measures of goal difficulty, job satisfaction, group cohesiveness, participation in decision making, supervisory subtlety, work group support, and egalitarianism. However, for hospital personnel, no variables showed significant improvements. On the contrary, significant decreases in several attitudinal variables were noted among hospital QC members suggesting the QC intervention had a negative affect on attitudes. The researchers suggest that differences in training and management support were responsible for the dramatically inconsistent results. They report that clearly higher levels of QC training were provided to key personnel in the maintenance group. Also, measures of QC members' perceptions of management support were much lower among hospital personnel. The decrease in attitudes among hospital employees suggests that improper implementation of QCs can do more harm than good.

Section Two: Attitudinal Variables

Job Satisfaction. Job satisfaction is defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p. 1300). It has been the topic of considerable study since the 1920's. Its popularity as a research topic stems, in part, from a belief that job satisfaction and job performance are related. It is thought that if more is known about job satisfaction, more will be known about what makes people perform as they do.

Locke (1976) goes on to explain the difference between job satisfaction and morale. He borrows Viteles definition of morale - "an attitude of satisfaction with, desire to continue in, and willingness to strive for the goals of a particular group or organization" (1953, p. 284). The distinction Locke makes between job satisfaction and morale is that "morale is more future oriented, while satisfaction is more present and past oriented" (p. 1300). For example, if morale is high, it generally means that expectations about the future are favorable. Also, the term job satisfaction is usually used in reference to an individual whereas the term morale usually refers to a group.

Job satisfaction is also different from job involvement. To be involved with one's job means one is preoccupied or fully absorbed in it. One could be involved in a job and still be dissatisfied with it. For example, a worker could be totally involved in getting a job done because his paycheck depended on it. The same worker, however, could be dissatisfied with the job because of poor working conditions (Locke, 1976).

Many factors are thought to influence overall job satisfaction. Steers (1984) groups the primary factors into four categories.

1. Organization wide factors. Organizational factors that may effect job satisfaction include pay system, promotion opportunities, company policy and procedures, and organizational structures (span of control, levels of management, the way work is divided, etc.).

2. Immediate work environment factors. Supervisory style, participation in decision making, work group size, co-worker relations, and working conditions are examples of immediate work environment factors

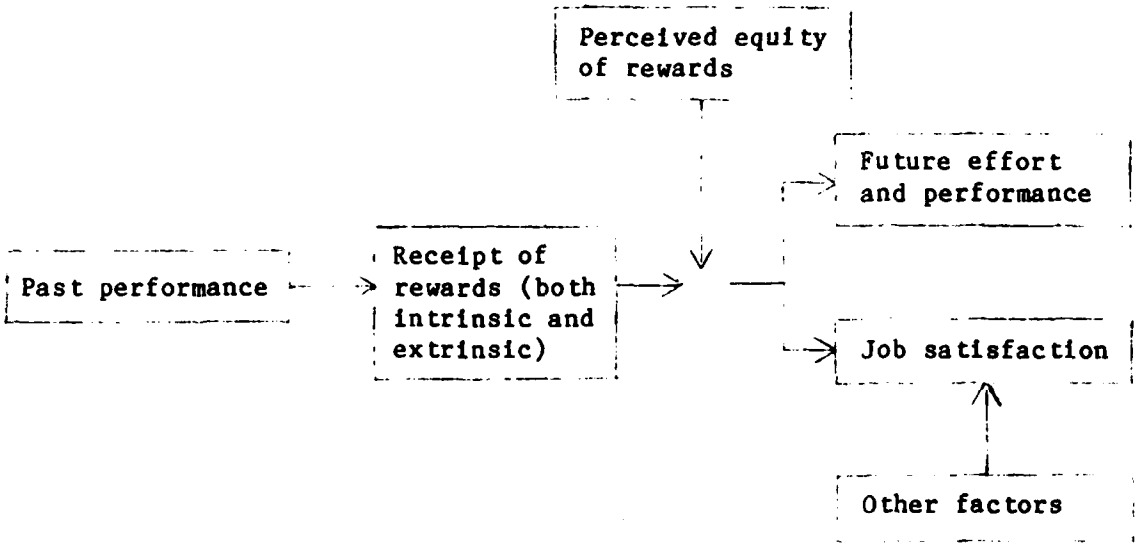
thought to influence satisfaction with one's job.

3. Job content factors. Job scope, role clarity, and conflict are the main job content factors cited as having possible effects on job satisfaction.

4. Personal factors. Age, tenure, and personality are examples of personal factors that could influence how satisfied one is with a job.

There are four major viewpoints on the relationship between satisfaction and performance. The first viewpoint is that there is no relationship between the two. This view is not widely accepted because it has not been supported by research. The second perspective is that satisfaction causes performance; i.e., a happy worker is a productive worker. This hypothesis also has not been well substantiated by research findings. The third point-of-view holds that performance causes satisfaction. In other words, workers will be satisfied if they perform well. Again, this approach has not been wholly supported by research. A fourth view is that the satisfaction-performance relationship is moderated by other variables. Porter and Lawler's model, shown in Figure 3, illustrates this standpoint on the issue. In the model, job satisfaction is affected by the perceived equity or fairness of rewards received for past performance. This view has been supported by several research studies (Schwab & Cummings, 1970; Greene, 1972).

A recent meta-analysis (a statistical method of averaging the quantitative results of different studies dealing with the same relationships) on research studies relating job satisfaction and performance found a moderate relationship of $r = .14$ between the two (Petty, McGee, & Kavender, 1984). An even higher correlation of $r = .31$ was found for



Source: Steers, Richard M. Introduction To Organizational Behavior (Second Edition). Glenview IL: Scott, Foresman and Co., 1984.

Figure 3. Relationship of Job Performance to Job Satisfaction

studies done after 1969. The results of this meta-analysis do not support any one of the views in particular, but indicates that there is some relationship between satisfaction and performance, which clearly disagrees with the view that there is no relationship between them.

Job Involvement. Job involvement has been defined by researchers in a variety of ways. One study by Fraunce (1959) described job involvement as a reflection of the extent to which success and failure in the job role affects a workers' self-image. Lodahl and Kejner (1965, p. 24) defined job involvement as "the degree to which a person is identified psychologically with his work, or the importance of work in his total self-image." In the same study Lodahl and Kejner also defined job involvement in a distinctly different manner; as a psychological state implanted from early individual socialization. This state or "protestant work ethic" is internalized to the extent that it is probably resistant to changes in the person due to {just} the nature of a particualr job" (p. 25). Also, Dubin (1956) saw the job-involved person as one who perceived his work as a "central life interest." These definitions depict the job-involved individual as deeply affected by the job. This individual would feel that work is a very key aspect of life. In contrast, the non-job-involved person is not particularly affected by the job. This individual would believe that life's interests lie outside the realm of the job. His self-image would be independent of the type of work and performance level he attained (Lodahl & Kejner, 1965; Rabinowitz & Hall, 1977).

Rabinowitz and Hall (1977) identified three broad categories of research and theory concerning job involvement. Job involvement can be

thought of as an individual difference variable, a situationally determined variable and/or a person-situation interaction. Since early formulations of job involvement to those of the present, the complexity of the construct itself has caused confusion and ambiguity at the theoretical level and at the empirical level as well. Batlis (1978) states that "job involvement is a construct which has eluded adequate explication since Lodahl and Kejner's (1965) original presentation" (p. 275).

Research viewing job involvement as an individual difference variable includes those works which regard job involvement as a personal characteristic resistant to change (Dubin, 1956; Lawler, Hackman, & Kaufman, 1973). Generally, the emphasis of this viewpoint is on a set of internal values producing job involvement which can be traced to the socialization process beginning during the worker's childhood. In contrast, Vroom (1962) and Blauner (1964) view job involvement as a function of the situation and suggest that the degree of job involvement is determined by the individual's experiences with characteristics of the work environment. Situational variables that have been linked to job involvement include social factors, job level, leader behavior, and participation in decision making. In one study of 2,628 manufacturing employees, job involvement and participative decision making were found to be highly correlated ($r = .51$, $p < .01$) (Siegel & Ruh, 1973).

According to the individual-situation approach, job involvement is an outcome of the interaction between individual and situational variables (Rabinowitz & Hall, 1977). Lodahl and Kejner (1965) studied job involvement as an interaction between the social conditions within an organization and the socialized value system of an individual. In

addition, Lawler and Hall (1970) and Brief and Aldag (1975) have emphasized the interactive aspects of job involvement. Moreover, the latter two studies conclude that psychological demands of jobs must be matched to the personal needs of employees if job satisfaction and involvement will be maximized.

To summarize the highlights of the review by Rabinowitz and Hall (1977) concerning the various theories on job involvement, they concluded that:

1. Job involvement is related to three variables: situational characteristics, personal chracteristics, and work outcomes.
2. Even major organizational stresses and job redesign do not affect the degree of job involvement.
3. Major aspects of job involvement are unexplained by any empirical studies.
4. Research data favors job involvement conceptualized as the employee's perception of the importance of his work more than as the employee's performance affecting his self-esteem.
5. Job involvement is both a cause and an effect of job behavior.
6. "Personal and situational variables have independent effects on involvement" (p. 285).
7. The attitudes of low job-involved persons are more effected by situational variables than are those of highly job-involved workers.

As the definition of job-involvement broadens, confusion and ambiguity increases. Along these lines, Saleh and Hosek (1977) define the construct as:

> the degree to which the person identifies with the job, actively participates in it, and considers his performance important to his self-worth. It is, therefore, a complex concept based on cognition, action, and feeling (p. 223).

Due to the disagreement over a specific definition of job involvement, two different measures of the construct are currently in use. The Central Life Interest Scale (Dubin, 1956) measures the degree of the employee's job involvement in relation to his associated work activities that may affect job involvement. Second, the Job Involvement Scale (Lodahl and Kejner, 1965) assesses the extent of worker involvement in the job without reference to other activities. Ben-Porat (1980) used both measures in a study of blue collar employee groups from eight industrial organizations in Israel. He found moderate correlations with job satisfaction (.42 for the Job Involvement Scale and .23 for the Central Life Interest Scale), while the Job Involvement Scale was a better predictor of job behavior in his study.

Steel, Kohntopp, and Horst (1983) employed a third job involvement measure, the Job Involvement Index, which is an abbreviated version of the Saleh and Hosek (1977) measure. From two predominantly female samples of nursing and hospital employees, three distinct job involvement factors were identified within the questionnaire. Consistent with the findings of Saleh and Hosek (1977), these factors corresponded to the Central Life Interest, Work Participation, and Self-concept dimensions of job involvement. Steel et al. (1983) concluded that job involvement was a "unitary psychological process" comprised of three job involvement factors. However, Kanungo (1982) would probably argue that the three factors of job involvement imply three distinct constructs. Only more research effort and empirical study will resolve this debate.

Organizational Commitment. Organizational commitment is defined as "the relative strength of an individual's indentification with and involvement in an organization" (Steers, 1984, p. 464). It may be characterized as containing three component factors:

> 1) a strong belief in, and acceptance of the organization's goals and values; 2) a willingness to exert considerable effort on behalf of the organization; and 3) a strong desire to maintain membership in the organization (Steers, 1984. p. 464).

There are many things (antecedents) that may affect the level of organizational commitment of an individual, and the degree of organizational commitment an individual possesses may influence certain types of behavior (outcomes). Steers' (1984) model, shown in Figure 4, depicts relationships between hypothetical antecedents and outcomes of organizational commitment. It contains four categories of antecedents - personal factors, role-related characteristics, structural characteristics, and work experiences, - and five outcomes - attendance, intent to remain, job involvement, job effort, and retention.

Research studies suggest the following relationships between organizational commitment and antecedent variables:

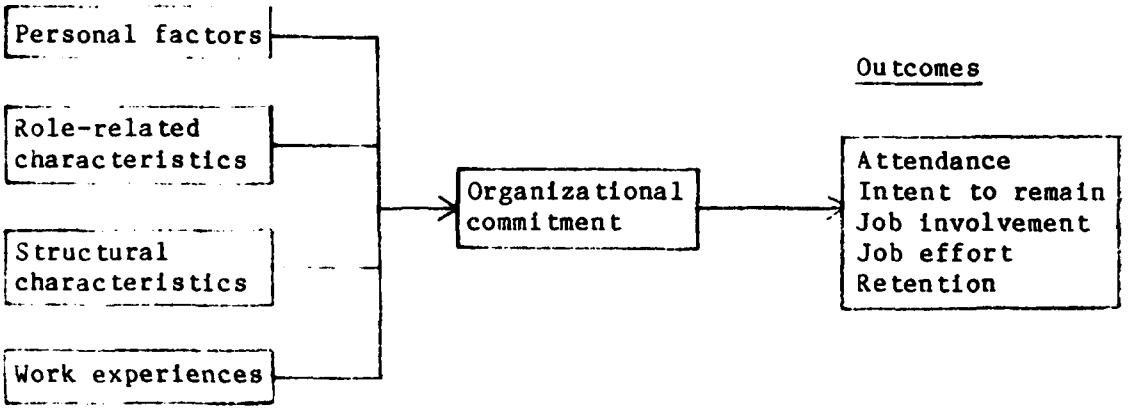
1. Personal factors. Older employees and those with more tenure tend to be more committed, women express higher levels of commitment than men, and less educated employees demonstrate greater commitment than more highly educated ones.

2. Role-related characteristics. Employees who perceive they have enriched jobs (jobs in which they are given freedom to do a task the way they feel it should be done, are held accountable for their work, receive a feeling of accomplishment, and experience personal growth) are more committed than those without enriched jobs. Employees who perceive

a low level of conflict in their workplace are more committed than those who perceive a higher level of conflict.

3. Structural characteristics. Employees in organizations where power and authority are decentralized tend to be more committed than those in organizations with a more centralized structure.

4. Work experiences. Employees with more pleasant work experiences show higher commitment than those with less pleasant experiences.



Source: Steers, Richard M. Introduction To Organizational Behavior (Second Edition). Glenview IL: Scott, Foresman and Co., 1984.

Figure 4. Antecedents and Consequences of Organizational Commitment

Research has also yielded the following relationships between organizational commitment and the outcomes contained in the model:

1. Attendance. Committed employees demonstrate higher attendance and greater participation in organizational activities (March & Simon, 1958).

2. Intent to remain. Employees with more commitment show a higher intent to remain with their organization than those with less commitment (Mowday, Steers, & Porter, 1979).

3. Job involvement. More committed employees tend to be more involved with their jobs than those less committed.

4. Job effort. More committed employees exhibit higher degrees of job effort than those with less commitment (Mowday et al., 1979).

5. Retention. Organizational commitment is also related to retention of employees, or conversely, turnover. A 1984 meta-analysis of studies relating commitment and turnover found a mean r = .38 between the two (Steel & Ovalle, 1984b).

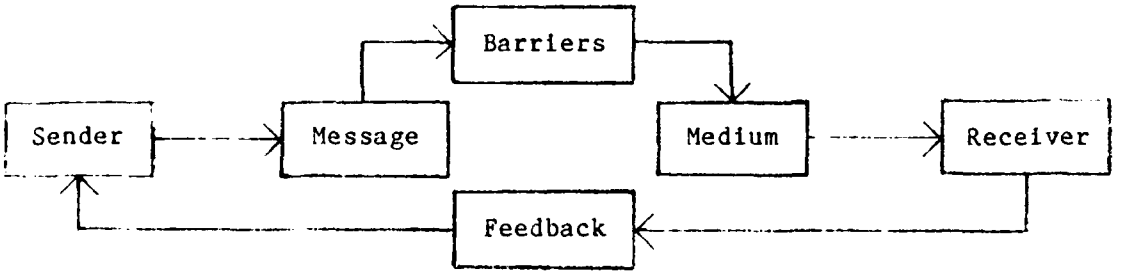
Communication Climate. Communication climate refers to the extent to which an organization permits and/or encourages communication. One of the simpler definitions of communication calls it the "process by which information is exchanged between individuals" (Chung & Megginson, 1981, p. 192). Figure 5 (Lindauer, 1979) shows a basic model of communication, in which a transmitter sends a message to a receiver along some type of channel. This simple model ignores two important elements of the human communication process - barriers and feedback. Barriers are things which restrict information flow, and feedback refers to information flow from the receiver back to the sender. Figure 6 (Samaras, 1980) shows another communication model which incorporates

(Message sent)
Channel

Transmitter----------Receiver
encodes a message

Source: Lindauer, J. S. Communicating in Business. Philadelphia: W. W. Saunders Co., 1979.

Figure 5. Basic Model of Communication



Source: Samaras, J. T. "Two-Way Communication Practices For Managers," Personnel Journal, 59(8): 645-648 (1980).

Figure 6. Model of the Human Communication Process

these two elements. This model suggests that a message may not be received or that it may be distorted if barriers exist. It also shows that a feedback loop can exist in the communication process.

Barriers in the communication process can come from three sources - the organization, groups, and individuals. The organization can create barriers through restrictive policies. An example would be the refusal to allow the publication of a company newsletter. Groups can be the source of barriers when peer pressure becomes strong enough to intimidate its members from expressing themselves freely. Finally, individuals can inhibit information flow by their attitudes and motives. An example of this type of barrier is an individual refusing to talk to another because of religious or racial prejudices.

Five barriers to effective communication in an organization cited by Steers (1984) are distortion, omission, overload, timeliness, and acceptance. Distortion refers to the altering of a message from the time it is sent to the time it is received. Two causes of distortion are the incorrect interpretation of the message and different frames of reference between sender and receiver. Omission occurs when important parts of a message are not sent. The omission can be intentional or unintentional. Overload refers to the situation where the receiver gets more information than he/she can handle. For example, if an individual is given too much detail in a report, it might be impossible for the individual to understand the main intent of the message. The barrier of timeliness occurs when a message is not received at the proper time. If information is received too late or too early, its value to the receiver can be decreased. Finally, acceptance of the message by the receiver

can be a barrier to effective communication. A person can receive all the right information at the right time but if the information is not accepted as valid and/or correct, the communication process has failed. One reason for nonacceptance of a message is lack of faith in the sender. The old proverb about the boy crying wolf is an example.

There are many strategies and techniques for improving the communication climate in an organization. Grievance procedures, open-door policy, counseling, attitude questionnaires, participative decision making techniques, exit interviews, and ombudspersons are some of the techniques suggested by Luthans (1981). Clarifying job tasks, appropriate feedback, by-passing formal communication channels when possible, and fostering interpersonal trust between work groups are more communication improvement techniques offered by Steers (1984). He also suggests two strategies for enhancing communication between groups. One alternative is to hold meetings between members of different groups. This can give group members more insight into the problems and operation of other groups. The second strategy is to reward supervisors who strive to support the efforts of other groups when practical. Inclusion of a rating of supervisors' efforts in this area on their performance evaluations is a way of implementing this strategy. Rotation of workers to other work areas is another commmon way of improving the communication in an organization.

Group Cohesiveness. Group cohesiveness refers to "the degree to which its (the group's) members are attracted to the group, are motivated to remain in the group, and mutually influence one another" (Organ & Hamner, 1982, p. 325). Shaw (1976) provides the following description

of members of a cohesive group:

> members of highly cohesive groups are more energetic in group activities, they are less likely to be absent from group meetings, they are happy when the group succeeds and sad when it fails, etc., whereas members of less cohesive groups are less concerned about the group's activities (p. 197).

Cartwright and Zander (1968) developed the model shown in Figure 7 which includes the following four factors as determinants of group cohesion:

1. Motive base for attraction. This refers to individual needs such as affiliation, recognition, and security that can be satisfied by the group.

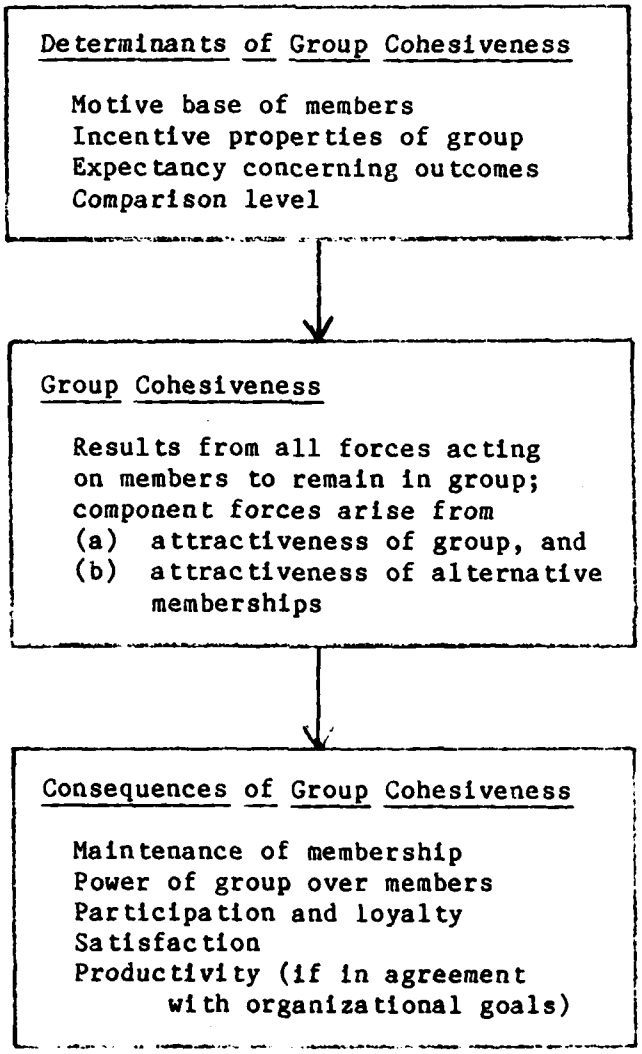
2. Incentive properties of the group. This refers to characteristics of a group which may be attractive to its members. Several examples are the group's prestige, goals, and style of operation.

3. Expectancy about outcomes. This refers to members' perceptions that belonging to the group will help them achieve personal goals.

4. Comparison level. This refers to individuals comparing their chances of achieving personal goals through membership in one group, with their chances of achieving those goals through membership in some other group or by disassociating themselves with any group.

The following is a summary of the effect of group cohesiveness on the consequences shown in the model.

1. Maintenance of membership. If the group is more attractive to its members than any other groups they could join, the members will strive to continue as members.



Source: Steers, Richard M. Introduction To Organizational Behavior (Second Edition). Glenview Il: Scott, Foresman and Co., 1984.

Figure 7. Determinants and Consequences of Group Cohesiveness

2. Power of group over members. If members perceive that belonging to a group will help them achieve personal goals, they will work to remain accepted members of the group. As a result, the group can hold a certain power over its members. An individual member might give in to the desires of the group in order to stay in favor with other group members.

3. Participation and loyalty. Increased levels of cohesiveness are associated with more frequent communication among members, greater participation in group activities, and lower absenteeism. More cooperation and friendliness are also seen in more cohesive groups.

4. Satisfaction. Higher levels of satisfaction are reported in more cohesive groups.

5. Productivity. In a highly cohesive group, productivity can be expected to be higher if the group's goals are in agreement with the goals of the organization. On the other hand, if the goals of a highly cohesive group are in conflict with organizational goals, productivity will probably decrease. If both group cohesion and the group acceptance of organizational goals are low, productivity can also be expected to be low (Steers, 1984).

The importance of group cohesion was illustrated in a study of British coal miners. After World War II, a new technique of mining coal called the conventional long-wall method was introduced because it was expected to increase efficiency. This new method required miners to work independently instead of in groups, as in the past. The result was that efficiency went down and miners became discontented with their jobs. Only after the new technique was modified to allow miners to once again

work in groups, did efficiency and morale increase (Trist & Bamforth 1951).

Participative Decision Making. Participative decision making (PDM) is a process in which decision making is shared to some degree between workers and management. It has been popular among management theorists because of the belief that it increases job satisfaction and productive efficiency. However, results of studies on the topic have not consistently found this to be true. In their extensive literature review, Locke and Schweiger report that past research shows that "PDM usually leads to higher satisfaction but not to higher productivity than more authoritative management styles" (1979, p. 266). However, Steel and Mento (1985), disagree with Locke and Schweiger's findings. Steel and Mento report study results showing that PDM can result in an increase in both job satisfaction and performance. A study by Dennison (1984) agreed with Steel and Mento's results. Steel and Mento call for more research on the subject before any conclusions may be made regarding the PDM/performance relationship.

PDM is used to some degree in the QC process in that QC members develop recommendations within their group and forward them to management for consideration. Management usually makes the final decision on whether or not to implement the recommendation, but when a recommendation is implemented, workers presumably perceive that they have been involved in decisions affecting their work.

PDM is currently being used in many organizations both in the U.S. and in foreign countries. In Yugoslavia, workers in plants elect Worker Councils which can hire and fire management (with some restrictions).

Rank and file workers must approve important decisions before they are implemented. In Germany, PDM is called codetermination and is a major political issue. Steel and coal companies have an equal number of worker and management representatives on boards of directors. In Britian, PDM is called "industrial democracy" and has also been a political issue. Collective bargaining is the main form of PDM used there. In the U.S., as in Britian, collective bargaining is the main form of formal PDM. The Scanlon Plan, which includes a group incentive bonus, is another form of PDM. Finally, QCs are yet another method of PDM used in the U.S. and many foreign countries (Strauss, 1982).

Despite the evidence of PDM's benefits, its use in organizations or subunits of organizations should be contingent on several factors. Locke and Schweiger (1979) cite the following factors which they believe condition the effectiveness of PDM:

1. Relevant knowledge held by those participating in the decision. PDM will work best in situations where participants have relevant knowledge to contribute. The more workers know about their job and organization, the more likely they will contribute to decisions affecting their work. On the other hand, if the supervisor of a group is much more knowledgeable than subordinates regarding the work to be done, PDM may be ineffective since the leader's methods, no matter how good they are, may be voted down by less knowledgeable workers.

2. Motivation or expectations of subordinates. PDM will be more effective with workers who want to be involved in the decision making process. Workers who would rather not be involved in decisions affecting their work will not function well in a PDM environment.

3. Task Attributes. PDM is more effective when tasks are complex and unstructured because the workers are learning how to do a job as they go. In this case, management relies on the decisions of workers in determining what method will best get the job done. On the other hand, PDM is less effective in tasks that are simple and routine since the best methods probably have already been established and little improvement is possible.

4. Group characteristics. One danger of using PDM is that there may be personality differences which prevent participants from communicating in a positive manner. Also, resentment may arise from the rejection of a participant's idea. Another danger of PDM is that group conformity or groupthink (Janis, 1972) may occur making the group nonreceptive to new ideas.

5. Leader attributes. PDM is most effective when supported by all levels of management. Nonsupportive leaders who feel threatened by the PDM process may try to sabotage the efforts of participants and attempt to move toward a more directive style of decision making. Another required leader attribute is skill in the use of PDM techniques. For example, a leader who supports the use of PDM may not work well in the process if he/she lacks the communication skills necessary to interface with workers.

6. Time to reach a decision. Since it takes more time to reach a decision using PDM than when the directive approach is used, an organization must be in a position where it can afford to wait the extra time. It follows that PDM would not work well in situations where speed in decision making is critical to the success of the organization.

Relationship-oriented and Task-oriented Supervision. The terms relationship-oriented and task-oriented supervision describe different styles of behavior exhibited by leaders. Relationship-oriented behavior refers to showing respect, trust, friendliness, and concern for the welfare of employees. Task-oriented behavior, on the other hand, is characterized by concentrating on defining and organizing tasks, assigning work to employees, and supervising the workers with the goal of getting a job done. Although they are distinctly different types of behavior, both are usually exhibited by all leaders in varying degrees at some time or another. Contemporary leadership theory suggests that leaders should consider certain aspects of a situation to determine the most effective style.

Several views on leadership have been developed over the years. The oldest view is the "great man" theory. This idea held that leadership qualities were based on heredity. If people were not born with leadership qualities, they would never have them. Great leaders were born - not made.

The "great man" theory gave way to trait theories in the first part of the twentieth century. Trait theorists believed that effective leaders had certain personal characteristics in common and people who possessed these characteristics made good leaders. In 1948, a review of 124 studies that dealt with leader attributes found that successful leaders generally were taller, more intelligent, and had more initiative than the average person. The review also found that in some cases, the characteristics of successful leaders varied. In some situations, an effective leader was not always taller or more intelligent than others

(Stogdill, 1948). This led Stogdill and others to begin studying the behaviorial styles, rather than personal traits, of effective leaders to learn more about what makes them effective.

In the 1950's, two major independent studies of leader behavior were conducted, one at Ohio State and the other at the University of Michigan. Both reached similar conclusions in that two relatively distinct behavior patterns were displayed by effective leaders. These behavioral styles are the relationship-oriented and the task-oriented styles. These studies, as well as others like them in subsequent years, found that the success of either behavioral style depended on certain aspects of the situation. In a review of behavioral leadership studies, House and Baetz (1979, p. 359) concluded the following:

> 1. Task-oriented leadership is necessary for effective performance in all working groups.
>
> 2. Acceptance of task-oriented leadership requires that the task-oriented leader allows others to respond by giving feedback, making objections, and questioning the task-oriented leader.
>
> 3. Socio-emotionally oriented leadership is required in addition to task-oriented leadership when groups are not engaged in satisfying or ego-involving tasks.
>
> 4. Groups requiring both kinds of leadership behavior will be more effective when these leader behaviors are performed by one person rather than divided among two or more persons.
>
> 5. When the leadership roles are differentiated, groups will be most effective if those assuming the roles are mutually supportive and least effective when they are in conflict with each other.
>
> 6. When formally appointed leaders fail to perform the leader behaviors for group success, an informal leader will emerge and will perform the necessary leader behaviors, provided success is desired by the group members.

In summary the studies show that both relationship-oriented and task-oriented leadership styles are necessary for a group to be effective. The situation will determine when each style is best.

Contemporary leadership theories are referred to as contingency or situational theories. They are more complex and sophisticated than earlier ones, but most recognize and incorporate to some degree the findings of the House and Baetz review. Fiedler's (1967) contingency theory, for example, holds that the effectiveness of a leader depends on the leadership style (relationship-oriented or task-oriented) and the favorableness of the situation. The three main situational factors that Fiedler's theory considers are how well the leader is accepted by members, the clarity of the task goals and job assignments, and the amount of power the manager has over the group.

Feedback. Feedback, as explained earlier, is part of the communication process and refers to information flow from the receiver to the sender. It is the response of the receiver to the message that lets the sender know if the message has been received or interpreted correctly. Research has shown that two-way communication, which feedback allows, is more accurate than one-way communication, because it allows the sender and receiver to check that messages are being received and interpreted correctly (Haney, 1964).

Another feature of feedback is that it allows us to know how others view us and increases our self-awareness of how our behavior effects others. If our behavior is irritating or displeasing, feedback from others will let us know. We may choose to ignore the feedback, but at least we have been informed.

Feedback can be written, verbal, or nonverbal. An inspection report on the quality of our work is an example of the written type. Verbal feedback occurs through conversations, and nonverbal feedback consists of body movements and facial expressions. The lack of feedback from others, when it is expected, has negative connotations and discourages communication. It also implies that the receiver is not interested in the message.

In the context of organizations, feedback is defined as "the degree to which employees receive information as they are working which reveals how well they are performing on the job" (Sims, Szilagyi, & Keller, 1976, p. 197). There are three main sources of feedback for workers in organizations - supervisors, co-workers, and the job itself. Supervisory feedback consists of the informal feedback received in the course of daily conversations with employees and the formal feedback received through performance appraisals. A study by Meyer, Kay, and French (1965) found that critical feedback from supervisors in a performance appraisal tended to put employees on the defensive rather than motivate them to improved performance.

Feedback from co-workers can also be informal or formal. Informal feedback is received through day-to-day conversations with fellow employees. A comment from a co-worker on the quality or quantity of a fellow employee's work is an example. Informal feedback from peers may also come through the grapevine. Formal feedback from co-workers may come from a recognition system in which workers are nominated for awards by their peers.

Written procedures and standards of performance are examples of

feedback from the work itself. For example, a worker may have written instructions that tell how to do a job and how to check if it is done correctly. The worker can check the work against the written procedures and know immediately if it is right. A study by Greller and Howard (1979) found that job induced feedback was more meaningful than feedback from external sources such as supervisory performance appraisals.

Hackman and Oldham (1976), in their job characteristics model of work motivation, include feedback as one of the core job dimensions that affect how an individual performs. They theorize that jobs can be designed to include feedback mechanisms in which employees are able to check their own work. In this way workers are continually reminded of their performance without the potential problems associated with supervisory provided feedback. One of these potential problems they refer to is misunderstanding of the feedback messages from the supervisor to the employee.

Interpersonal Trust. Rotter (1967) defined trust as "expectatio held by an individual or group that the word of another individual can be relied on" (p. 651). In an organizational context, it has two aspects: trust between the organization and its employees, and trust between employees themselves, which includes trust between supervisors and subordinates and employee to employee trust. When employees and organizations enter a working relationship, each develops certain expectations of the other. Chung and Megginson (1981, p. 172) call this set of mutual expectations a "psychological contract" which governs the day-to-day working relationship between the two. They state that "although the contract is neither formally stated or legally binding, it serves as

the basis for evaluating the quality of the relationship. Unless the participants continuously honor this contract, the relationship will falter and eventually fail" (1981, p. 172).

The relationship between employers and employees, and among employees themselves, cannot develop or be effective unless the participants are willing to honor their psychological contract. Each participant trusts the other to adhere to the set of expectations which may include performance, competence, trust and interpersonal influence.

"Trust," continues Chung and Megginson, "is the key to maintaining a meaningful relationship. Trust is having faith that another person is capable of honoring the psychological contract " (p. 173). When the contract is met, the result is an increase in trust and influence. An increase in influence leads a person to become more effective in performing a task. "Trusting," comments Sullivan (1983), "will ensure the smooth functioning of work groups, and work groups in turn will legitimize and develop involvement and intimacy which will foster more trust" (p. 135). Ultimately, increased trust may lead to more effective groups.

When the minimum acceptance level of the psychological contract is not met, Chung and Megginson (1981) state, "the affected member will send out signals of dissatisfaction in the form of joking, complaining, or showing anger. If the signals are received and honored by the other person, the relationship can be restored or the contract renegotiated. Otherwise, the association will suffer chronic discontent, strife, alienation, and eventual termination" (p. 173). This process may have dysfunctional effects on productivity.

As a testament to the value of trust, Ouchi (1981) recognizes trust as an integral part of his "Theory Z" management model. Theory Z organizations are modeled after the highly productive Japanese management style, in which the firm and workers form an "industrial clan," each dedicated to satisfying the needs and goals of the other. The company pledges long-term working relationships, concern for the workers well-being, good working conditions and so forth. The workers respond in kind with loyalty and commitment to the firm's goals which lead ultimately to higher productivity.

"The first lesson of Theory Z," says Ouchi, "is trust. Productivity and trust go hand in hand...involved workers are the key to productivity" (1981, p. 4-5).

Self-appraised Job Performance. One type of job performance appraisal technique used by industry today is the self-report inventory. In this technique workers respond to a series of standard questions using either a true-false or a Likert-type scale. Due to problems inherent in the technique, its usefullness as a management tool has been questioned. When workers' self-appraisals are compared with appraisals prepared by their supervisors, peers and subordinates, a large percentage of individuals generally overrate their performance (Thornton, 1980).

Meyer (1980) reports a study in which 92 General Electric engineers were asked to rate their job performance on a scale from 0 to 100, with 100 meaning the engineer rated himself better than any other engineer doing similar work in that department. At the other end of the spectrum, 0 indicated that he felt his performance was poorer than anyone

else's in the department. If he felt his performance was average, he rated himself at 50. Using this scale, one would expect an even distribution of scores above and below 50, if respondents use all portions of the rating scale. The result, however, showed that on the average each participant rated himself in the 78th percentile, or in the top 25%. Only two participants placed themselves below the 50th percentile, and both of those placed themselves in the 45th percentile. Meyer found similar results in several additional studies. He also found that the "inflated self-appraisals" were common to all types of participants from blue collar workers to high level executives. In one study, he reports that over 80% of a group of high level managerial employees placed themselves in the "top 10%" category.

Following the self-appraisal in Meyer's studies, each individual participated in an appraisal discussion with his supervisor during which the participant was rated by the supervisor using the same scale. Meyer's findings indicated that the resultant discrepencies in appraisals, when the supervisor's rating was lower, lead to unconstructive, defensive behavior including shifting the blame for cited shortcomings, minimizing the importance of the appraisal and the job, and demeaning the supervisor.

Meyer (1980) concludes that, "forcing people to correct their unrealistically high opinions of their own performance by using forced distributions in rating programs would not be expected to have positive effects. Threatening an individual's self-esteem in this way will probably contribute only to defensive behaviors, loss of pride in work, and lower levels of job performance" (p. 295).

In an effort to overcome some negative effects of self-appraisal, research was conducted on Feedback Based Self Appraisal (FBSA), in which Steel and Ovalle (1984a) had participants rate their job performance based on feedback already received from their supervisors. Steel and Ovalle report results of two studies that "linked improvements in rater agreement obtained with FBSA rating instructions to the amount of feedback available to subordinate raters" (p. 681).

Steel and Ovalle's (1984a) findings suggest that inconsistencies between supervisor appraisals and self-appraisals may be related to the frame of reference used by each participant while rating. When this frame of reference is the same as in the case of FBSA, through the use of a set of instructions referencing supervisor ratings, differences between the supervisor and subordinate ratings were diminished.

III. Method

Overview

The purpose of this chapter is to describe the procedures used to collect, measure, and analyze the attitudinal and perceptual variables addressed in this study. The data collection procedures, sample, measurement instrument, and data analysis methods will be described.

Sample

A total of 729 government employees participated in the study. Approximately 40 percent of those surveyed were male, and the average age of the sample was between 31 and 40 years old. The sample included 4 USAF officers, 705 civil service employees, 12 wage grade employees and 8 non-specified government employees. The educational level of the participants ranged from non-high school graduates to doctoral degrees. Only 18 percent of the participants had no college experience. The respondents indicated that 49 percent had more than 3 years of tenure in their present organization and 12 percent had less than 6 months in their organization. In addition, 91 percent of the respondents did not directly supervise anyone.

Measures

The survey questionnaire included 141 items and measured a large number of demographic and attitudinal variables. Only a portion of the variables measured by the survey were used in this study; therefore, only those variables incorporated into the present analysis will be

discussed. The 12 attitudinal variables selected for this study are job satisfaction, organizational commitment, job involvement (Central Life Interest and Self-Concept factors) organizational communication climate, job feedback, interpersonal trust, group cohesiveness, participation in decision making, relationship-oriented supervision, task-oriented supervision, and self-appraised job performance.

Appendices A through N contain the survey items used in this study. Negatively stated items were reverse scored. Reverse scoring was used to minimize response bias. The symbol (R) follows reverse scored items in Appendices A through N.

Demographic Characteristics. Seven demographic variables were measured: age, education, sex, organizational tenure, number of workers supervised, government service classification, and pay grade. Gender was measured with a simple dichotomous item coded 0 for males and 1 for females. The government service classification item listed these responses: officer (1), enlisted (2), GS civilian (3), WG civilian (4), non-appropriated fund employee (5), and other (6). The remaining items were measured using ordinal scales with unequal intervals. The age item ranged from "less than 20" (1) to "more than 60" (7). The next item asked for the highest level of education achieved with responses ranging from non-high school graduate (1) to doctoral degree (8). Organizational tenure referred to "total months in this organization" with responses beginning with "less than a month" (1) and ending with "more than 36 months" (7) with unequal intervals for the remaining responses. Job position was addressed by the item asking, "How many people do you directly supervise?" The responses ranged between "none"

(1) to "21 or more" (7). Appendix A lists all the items, the responses, and the frequency of responses for each demographic variable.

Job Satisfaction. The AFIT Survey of Work Attitudes incorporates an instrument developed by Andrews and Withey (1976). The five items constituting this measure were arrayed on verbally anchored rating scales ranging from "delighted" (7) to "terrible" (1). These items were reverse scored.

Steel, Mento, Dilla, Ovalle, and Lloyd (1985) estimated the internal consistency reliability for the job satisfaction scale used in this study based on Cronbach's coefficient alpha. Since two different samples of subjects were studied, they obtained reliabilities of .78 and .79.

Job Involvement. The fifteen statements which Steel, Kohntopp, and Horst (1983) extracted from the lengthier Job Involvement Index (Saleh & Hosek, 1977), attempted to assess the worker's perception of his job involvement. Derived from the factor analytic work of Saleh and Hosek (1977), Steel et al. (1983) selected five items with high average loadings from each of their three identified factors. Two of the three factors were used in this study. These factors (II and III), defined by Saleh and Hosek and labeled by Steel et al. (1983), are the Central Life Interest Factor (II)-"the degree to which the total job situation is a central life interest" and Self-Concept Factor (III)-"the degree to which the employee perceived that his job performance is central to his self-esteem" (p. 213-214). All job involvement items used seven-point agree-disagree response formats.

Steel et al. (1983) and Steel et al. (1985) estimated internal

consistency reliabilities for each job involvement scale. Based on these studies, a range of values between .87 and .91 were observed for the Central Life Interest scale and a range of .63 to .93 was observed for the Self-Concept Factor scale.

Organizational Commitment. This instrument measured organizational commitment with the 15-item questionaire developed by Mowday, Steers, and Porter (1979) known as the Organizational Commitment Questionaire. This instrument measured the degree to which subjects feel committed to their organization. The respondent's perceptions concerning loyalty toward the organization, acceptance of the organization's values, and willingness to exert a great deal of effort to achieve organizational goals were assessed within the questionnaire (Porter, Steers, Mowday, & Boulean, 1974). Responses ranged from "strongly disagree" (1) to "strongly agree" (7). Several of these items were reverse scored. Internal consistency reliabilities calculated by Porter et al. (1974) ranged from .82 to .93.

Communication Climate. Items measuring communication climate assess the degree to which the subject is given all the necessary information to do the job effectively, is aware of important events and situations, and perceives his supervisor as open to new ideas on task improvements. For example, one item stated, "My work group is usually aware of important events and situations." Another item stated, "The people I work with make my job easier by sharing their ideas and opinions with me." Responses to these four items range from "strongly disagree" (1) to "strongly agree" (7). Steel et al. (1985) found the reliability of the communication climate scale to be .70 and .73 in two

different samples.

Group Cohesiveness. A measure of group cohesiveness was composed of three items scaled on a seven-point agree-disagree rating scale. One item measuring cohesiveness stated, "There is a high spirit of teamwork among my co-workers." The internal consistency reliability of this measure was estimated to be .80 by Steel et al. (1985).

Participation in Decision Making. Five survey items were developed to measure group decision making. Again, a seven-point Likert scale from (1) "strongly disagree" to (7) "strongly agree" was utilized. As a representative question, respondents were asked to rate the degree to which an individual was "allowed to participate in decisions regarding" his job or was "allowed a significant degree of influence on decisions regarding" his job. Previous estimates of internal consistency reliability ranged from .74 to .84 (Steel et al., 1985).

Supervision. Relationship-oriented supervision was measured by combining two items stating: "My immediate supervisor makes an effort to help people in the work group with their personal problems" and "My immediate supervisor seeks the advice of our work group on important matters before going ahead." Further, a measure of task-oriented supervision was derived from ratings on statements such as: "My immediate supervisor pushes the people under him (or her) to insure they are working up to capacity." A seven-point Likert scale from "strongly disagree" to "strongly agree" was used. In previous research the internal consistency reliability, estimated by Cronbach's alpha statistic, was .66 to .68 for relationship-oriented supervision and .34 to .47 for task-oriented supervision (Steel et al., 1985).

Job Feedback. Job feedback is the degree by which carrying out the work activities assigned provides the individual with direct and clear information about the effectiveness of his performance. Five items with five-point scales were adopted from the Job Characteristics Inventory (Sims, Szilagyi, & Keller, 1976). This instrument, which has a "solid psychometric reputation" (Steel et al., 1985, p.104), uses a range of responses from "very little" (1) to "very much" (5). Steel et al. (1985) reported reliability coefficients of .86 and .91 for this instrument.

Interpersonal Trust. A measure constructed to assess interpersonal trust was adapted from Rosenberg (1957). The three items in this instrument were scaled on seven-point "agree-disagree" continua. The range of Cronbach's coefficient alpha for this measure was .66 to .67 in the studies on this instrument by Steel et al. (1985). The items used from the AFIT Survey of Work Attitudes were: (1) "Most people are not always straightforward and honest when their own interests are involved," (2) "In these competitive times one has to be alert or someone is likely to take advantage of you," and (3) "It is safe to believe that in spite of what people say, most people are primarily interested in their own welfare." Scoring was reversed for all three scales.

Self-appraised Job Performance. Employees self-appraised their performance across five performance dimensions (i.e., quantity, quality, efficiency, problem-solving capacity, and adaptability). These ratings were summed and the total score was used as a global indicator of overall self-rated job performance. Each item was rated on a seven-

point Likert scale ranging from "far worse" to "far better." Steel and Ovalle (1984) reported valid relationships between self-appraisals obtained with this instrument and independent performance criteria for a sample of finance company employees. Also, Steel et al. (1985) reported a reliability coefficient of .91 for two samples of government employees with this instrument.

A Posteriori Items. Seven items were appended to the survey. A manipulation check item provided yes/no responses to the questions; "Are you aware of the quality circle program?" and "Does your work group have quality circles?" A third item asked the respondent; "What is the extent of your involvement in the quality circles process in you work group?" Refer to Chapter IV for the response frequencies.

A necessary condition for QC success is support from middle and upper management (Cole, 1980). Two items solicited group member impressions on the degree of managerial support for the QC process. One of these asked, "Do managers and supervisors in your organization support the Quality Circles process?" Four response alternatives were given: (1)"Not at all", (2)"Are somewhat supportive", (3)"Are very supportive", and (4)"I don't know." Further indication of management commitment to Quality Circles is reflected in a willingness to implement Circle proposals. An item asked, "Have the suggestions for change developed by the Quality Circle been implemented?" Response choices were: (1)"never", (2)"some of the time", and (3)"most of the time."

The last two items directly sought QC members' evaluations of the accomplishments of the QC process. Group members rated the effectiveness of their circles in creating solutions to problems. The

response choices were: (1)"not at all effective", (2)"somewhat effective", and (3)"very effective." In addition, QC members were queried on their satisfaction level with the QC process using a five-point rating scale with extremes of (1)"very dissatisfied" to (5)"very satisfied." Refer to Appendix N for a complete listing of a posteriori items, responses, and frequency of responses.

Data Collection Procedures

The data used in this study were obtained as part of the initial research effort involving a longitudinal study on the implementation of a quality improvement program. The present study utilized data from a baseline survey of government personnel from a Department of Defense supply center for the procurement of spare parts. Participation in the study was voluntary and steps were taken to ensure the confidentiality of participant responses.

Data were collected on-site in several group meetings of between 5 and 50 employees over a two week period. In each session, respondents were thoroughly briefed regarding survey instructions, the confidentiality of their answers, and probable uses of the data. Each participant completed a 141 item questionnaire. The response rate for the initial survey was approximately 29 percent.

Data Analyses

A series of statistical procedures were conducted to address the specific objectives of this research. Specifically, internal consistency reliability estimation and Student's t-test were used to

evaluate the results.

Internal Consistency Reliability. Reliability is the accuracy or precision of a measuring instrument. Without this accuracy there can be no valid scientific results (Kerlinger, 1973). For a test item or study to be internally consistent, these items must be homogeneous. Simply, the test items must be written unambiguously in order that individuals will not interpret them differently. In addition, the use of standard and clear instructions and tests were administered under standard, similar, and well-controlled conditions. Moreover, the use of a large number of test items is strongly preferred because the probability of chance errors being neutralized is greater than with fewer test items (Kerlinger 1973).

To estimate the accuracy of the measuring instrument through some measurement of internal consistency, Cronbach's coefficient alpha was used. Cronbach's alpha was calculated for each attitudinal variable that was selected for this study to estimate the degree to which the scores obtained were free from measurement error (Cronbach, 1970).

Student's T-Test. To evaluate the differences between treatment groups, group means were compared by applying Student's t-test. The t-test was utilized to determine whether the difference between two sample means was significant. That is, whether a difference in sample means is indicative of a true difference between the two populations. Initial comparisons constructed were:

1. QC work groups and non-QC work groups.
2. QC members and non-QC members.

IV. Results

Overview

This chapter presents the results of analyses of data gathered in this study. The chapter begins by reporting internal consistency reliability coefficients for scales used to measure each attitudinal variable. The results of the mean difference tests on demographic characteristics and attitudinal variables between all respondents from QC work groups and non-QC work group respondents are presented next. A second group of mean difference tests were conducted on the same attitudinal variables between actual QC members and non-QC members. Additionally, a supplemental analysis utilizing several mean difference tests was conducted with various groupings, exploring different QC factors and relationships.

Internal Consistency Reliability

Estimates of internal consistency reliability (Cronbach's alpha) were tabulated for each of the 12 attitudinal variables studied. Table 1 presents these reliability coefficients.

Overall, the reliability coefficients ranged from a low of .51 for task-oriented supervision to a high of .92 for job feedback and self-appraised job performance. Those measures with lower reliabilities (e. g., organizational communication climate, interpersonal trust, group cohesiveness, relationship-oriented supervision, task-oriented supervision, and job involvement III) had only four or less items per instrument. It is a well-known psychometric principle that reliability is a function of an instrument's length.

Table 1

Internal Consistency Reliabilities (Cronbach's Alphas)

for Twelve Attitudinal Variables

Variable	No. of Questions	N	Cronbach's Alpha
Job satisfaction	5	629	.78
Job involvement (II)	5	658	.89
Job involvement (III)	3	658	.71
Organizational commitment	15	629	.90
Organizational communication climate	4	629	.72
Group cohesiveness	3	686	.74
Participation in decision making	5	686	.88
Relationship-oriented supervision	2	686	.73
Task-oriented supervision	2	658	.51
Job feedback	5	629	.92
Interpersonal trust	3	686	.70
Self-appraised job performance	5	658	.92

Demographic Characteristics

The results of mean difference tests between QC work group members and members of non-QC work groups on selected demographic characteristics are shown in Table 2. A significant difference ($p < .05$) between these groups was found in educational levels and a marginally significant difference ($p < .10$) was detected in pay grades. Non-QC work group members had significantly higher education levels and pay grades than QC work group members.

A chi-square analysis was also performed between these same groups on gender, resulting in a significant chi-square statistic ($X = 14.88$, $df = 1$, $p < .001$). The results of these tests indicate that the QC and control treatment groups differed on important group composition factors. Hence, the ensuing results must be tempered by the knowledge that the comparisons are between non-equivalent groups.

Tests of Quality Circles Effects

QC Work Groups Versus Non-QC Work Groups. In this analysis, respondents from work groups with QCs (regardless of actual QC membership) were compared to individuals from work centers without QCs (non-QCs).

Results of the t-tests between QC work group members and non-QC work group members on 12 attitudinal variables are shown in Table 3. Significant differences ($p < .05$) were found on job satisfaction, job involvement (III), group cohesiveness, participation in decision making, and interpersonal trust. A marginally significant difference ($p < .10$) was found on organizational commitment. Non-QC work group members had significantly higher means on all of these variables which did not

Table 2

Mean Difference Tests on the Demographic Characteristics

between Individuals in QC Work Centers and Non-QC Work Centers

Variable	QC Work Centers		Non-QC Work Centers		
	M	SD	M	SD	t
Age	3.40	1.32	3.29	1.38	1.10
School	2.39	1.21	2.66	1.39	2.79**
Organizational tenure	4.27	1.94	4.33	1.96	0.43
Number of people supervised	0.31	1.09	0.29	1.00	0.22
Pay grade	2.90	1.49	3.12	1.58	1.85*

Note: QC Work Groups range of n: 296-300.
Non-QC Work Groups range of n: 426-427.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

Legend: An Interpretation of the Data

Age: 3 represents ages 31 to 40
4 represents ages 41 to 50

School: 2 represents some college work
3 represents associate degree

Tenure: 4 represents more than 18 months, less than 24 months
5 represents more than 24 months, less than 36 months

Supervision: 0 represents none under my supervision
1 represents one to two under my supervision

Pay grade: 2 represents a grade level of 5-6
3 represents a grade level of 7-8
4 represents a grade level of 9-10

Table 3

Mean Difference Tests on 12 Attitudinal Variables

Between Individuals in QC Work Centers and Non-QC Work Centers

Variable	QC Work Centers		Non-QC Work Centers		
	M	SD	M	SD	t
Job satisfaction	24.14	4.27	24.90	4.23	2.37**
Job involvement (II)	13.06	6.80	13.30	7.01	0.46
Job involvement (III)	17.50	3.28	18.18	2.91	2.87**
Organizational commitment	68.44	18.32	70.95	17.77	1.80*
Communication climate	18.49	5.53	18.66	5.41	0.39
Group cohesiveness	12.97	4.87	14.11	4.47	3.25**
Participation in decision making	18.31	8.21	19.91	8.32	2.53**
Relationship-oriented supervision	8.14	3.51	8.53	3.52	1.45
Task-oriented supervision	8.29	3.07	8.17	3.02	0.52
Job feedback	14.97	5.35	15.34	5.34	0.91
Interpersonal trust	8.56	3.74	9.25	3.91	2.35**
Self-appraised job performance	24.77	4.80	25.40	5.04	1.64

Note: QC group range of n: 271-297; Non-QC group range of n: 403-424.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

support the hypotheses.

QC Members Versus Non-QC Members. For the second analysis, respondents were grouped depending on their response to the item that asked, "What is the extent of your involvement in the Quality Circles process in your work group?" Those selecting the response "I am a Quality Circle member " were grouped as QC members. Respondents selecting either of the other choices, "I was never a Quality Circle member" or "I was but am no longer a member of a Quality Circle," were grouped as non-QC members. Results of the mean difference tests (t-tests) between QC members and non-QC members on the 12 attitudinal variables in this study are shown in Table 4. Significant differences ($p < .05$) were found on job satisfaction, group cohesiveness, and interpersonal trust. Non-QC members had significantly higher means than QC members on these three variables which, again, did not support the hypotheses.

Supplemental Analyses

Three supplemental analyses were performed in an attempt to gain more insight into the nature of QC and non-QC member differences. Again, mean difference tests were used to check for significant differences on attitudinal measures between various groups. Following Griffin and Wayne (1984), more productive and less productive QC groups were compared in terms of number of improvements suggested and number of improvements adopted.

More/Less Productive QCs (Number of Improvements Suggested). In the first supplemental analysis, QC members were split into two groups - those individuals belonging to QCs that were more productive and those

Table 4

Mean Difference Tests Between Actual QC Members and Non-QC Members

Variable	QC Members		Non-QC Members		
	M	SD	M	SD	t
Job satisfaction	23.54	4.21	24.69	4.25	2.09**
Job involvement (II)	13.56	6.83	13.17	6.93	0.44
Job involvement (III)	18.29	2.51	17.87	3.13	1.24
Organizational commitment	68.38	16.00	70.07	18.22	0.70
Communication climate	17.96	5.97	18.64	5.41	0.89
Group cohesiveness	12.41	4.78	13.76	4.64	2.22**
Participation in decision making	19.08	8.50	19.28	8.29	0.18
Relationship-oriented supervision	7.72	3.73	8.43	3.50	1.50
Task-oriented supervision	8.68	3.25	8.18	3.02	1.23
Job feedback	14.53	6.51	15.25	5.23	0.83
Interpersonal trust	7.82	3.31	9.08	3.89	2.43**
Self-appraised job performance	25.41	5.49	25.11	4.90	0.45

Note: QC member range of n: 55-65; Non-QC member range of n: 619-655.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

belonging to QCs that were less productive. Productivity was defined as the number of improvements suggested to management. QCs with more than the median number of improvements suggested were labeled "more productive" and those with less than the median number suggested were labeled "less productive."

The results of this analysis are shown in Table 5. No significant differences were found between the groups.

More/Less Productive QCs (Number of Improvements Adopted). The second analysis defined QC productivity in terms of the number of improvements adopted by management. Members of QCs with more than the median number of improvements adopted by management were placed in a group labeled "more productive" and members of QCs with less than the median number of improvements adopted were placed in a second group labeled "less productive."

Table 6 shows the results of this analysis. A marginally significant difference ($p < .10$) was found on job satisfaction levels favoring the more productive QC group. Also, members of more productive QCs had significantly ($p < .05$) higher job involvement (III) scores and group cohesiveness scores. However, the less productive QC groups had marginally higher ($p < .10$) self-appraisals of job performance scores.

More Productive QCs (Number of Improvements Adopted) Versus Non-QC Members. A third supplemental analysis compared the attitudes of members of more productive QCs (members of QCs having more than the median number of improvements adopted) with those of all non-QC members from the original control group. As Table 7 shows, the only significant ($p < .05$) difference found was on the job involvement (III) variable

Table 5

Mean Difference Tests Between More and Less Productive QCs

Where Productivity was Defined as the Number of Improvements Suggested

Variable	More Produtive		Less Productive		
	M	SD	M	SD	t
Job satisfaction	23.89	4.54	22.84	3.90	0.95
Job involvement (II)	13.65	6.55	12.92	7.16	0.41
Job involvement (III)	18.72	1.99	17.96	2.80	1.23
Organizational commitment	69.51	16.47	67.61	16.19	0.43
Communication climate	17.47	6.22	18.84	5.81	0.79
Group cohesiveness	12.92	4.87	11.44	4.50	1.21
Participation in decision making	18.89	8.39	18.88	9.07	0.00
Relationship-oriented supervision	7.51	3.71	7.96	3.83	0.45
Task-oriented supervision	8.83	3.15	8.52	3.38	0.35
Job feedback	14.95	7.09	14.10	5.68	0.46
Interpersonal trust	7.46	2.69	8.65	4.01	1.26
Self-appraised job performance	25.42	5.36	26.68	4.43	0.95

Note: More Productive Group range of n: 33-37.
Less Productive Group range of n: 19-25.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

Table 6.

Mean Difference Tests Between More and Less Productive QCs

Where Productivity was Defined as the Number of Improvements Adopted

Variable	More Productive		Less Productive		
	M	SD	M	SD	t
Job satisfaction	24.95	4.62	22.76	3.99	1.92*
Job involvement (II)	13.50	6.61	12.81	6.83	0.92
Job involvement (III)	19.20	1.51	18.03	2.61	2.19**
Organizational commitment	73.63	16.60	66.39	15.73	1.62
Communication climate	19.30	6.23	17.15	5.90	1.26
Group cohesiveness	15.20	4.03	10.95	4.47	3.60**
Participation in decision making	18.00	9.04	19.30	8.46	0.54
Relationship-oriented supervision	8.05	3.27	7.52	3.98	0.52
Task-oriented supervision	8.15	3.33	9.00	3.16	0.96
Job feedback	16.40	6.50	13.70	6.53	1.49
Interpersonal trust	8.42	2.39	7.69	3.67	0.79
Self-appraised job performance	24.21	4.91	26.82	4.84	1.92*

Note: More Productive Group range of n: 19-20.
Less Productive Group range of n: 33-42.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

Table 7

Mean Difference Tests Between Individuals
in More Productive QCs and All Non-QC Members
Where More Productive was Defined as the Number of Improvements Adopted

Variable	More Productive		Non-QC Members		
	M	SD	M	SD	t
Job satisfaction	24.95	4.62	24.69	4.25	0.27
Job involvement (II)	14.50	6.61	13.17	6.93	0.85
Job involvement (III)	19.20	1.51	17.87	3.13	3.71**
Organizational commitment	73.63	16.60	70.07	18.22	0.84
Communication climate	19.30	6.23	18.64	5.41	0.53
Group cohesiveness	15.20	4.03	13.76	4.64	1.37
Participation in decision making	18.00	9.04	19.28	8.29	0.66
Relationship-oriented supervision	8.05	3.27	8.43	3.50	0.47
Task-oriented supervision	8.15	3.33	8.18	3.02	0.04
Job feedback	16.40	6.50	15.25	5.23	0.96
Interpersonal trust	8.42	2.39	9.08	3.89	1.15
Self-appraised job performance	24.21	4.91	25.11	4.90	0.79

Note: More Productive Member range of n: 19-20.
Non-QC Member range of n: 619-655.
All statistical tests were two-tailed tests.
*p<.10, **p<.05

with members of more productive QCs having higher scores on this variable.

Analysis of the a Posteriori Measures. The frequency of responses to the first three a posteriori items are as follows:

(1) Are you aware of the Quality Circle Program?
    1. YES = 602 respondents.
    2. NO = 113 respondents.
(2) Does your work group have quality circles?
    1. YES = 239 respondents.
    2. NO = 474 respondents.
(3) What is the extent of your involvement in the quality circles process in your work group?
    1. I WAS NEVER A QUALITY CIRCLE MEMBER = 171 respondents.
    2. I WAS BUT AM NO LONGER A MEMBER = 36 respondents.
    3. I AM A QUALITY CIRCLE MEMBER = 66 respondents.

The means of several a posteriori items used by Steel et al. (1985) to collect evaluative data on QC programs they studied are compared in Table 8 with similar ratings provided by QC participants from the DOD supply center. Steel et al. (1985) reported data on a comparatively successful QC program in a maintenance organization and a comparatively unsuccessful QC intervention in an Army hospital. They used a survey instrument similar to the one used in the present study. Comparing the results from all three QC programs, there was a wide difference on the item measuring management support of the QC program. QC group members from the maintenance organization provided higher ratings of managerial support ($M = 2.61$, $SD = .66$) than the members of the supply center ($M = 2.09$, $SD = .69$) or the hospital, which had the lowest level of perceived support ($M = 1.57$, $SD = .80$). In addition, QC members differed markedly in the degree to which they perceived proposals for solutions to problems being implemented by management in their organizations. The maintenance organization QC group indicated

Table 8

Comparison of Means on a Posteriori Items

Between the DOD Supply Center and Steel et al.'s (1985) Studies

Variable	Supply		Maintenance*		Hospital*	
	M	SD	M	SD	M	SD
Management Support	2.09	.69	2.61	.66	1.57	.80
Implementation of QC Changes	1.92	.65	2.85	.61	1.18	.55
Effectiveness of QCs	2.19	.65	2.50	.59	1.43	.81
Satisfaction with QC Process	3.09	1.04	3.92	1.22	1.88	1.28

Note: *Source--Steel, R. P., Mento, A. J., Dilla, B. L., Ovalle, N. K., & Lloyd, R. F. (1985) Factors influencing the success and failure of two quality circle programs. Journal of Management, 11(1), 99-119.

Legend: An Interpretation of the Data

Management Support:	2 represents "are somewhat supportive" 3 represents "are very supportive"
Implementation:	1 represents "never" 2 represents "some of the time"
Effectiveness:	2 represents "somewhat effective" 3 represents "very effective"
Satisfaction:	3 represents "cannot decide" 4 represents "satisfied"

greater proposal implementation (M = 2.85, SD = .61) than the support center QC personnel (M = 1.92, SD = .65) or the hospital QC respondents (M = 1.18, SD = .55).

The items assessing effectiveness of the QC groups and satisfaction with the QC process produced consistent results. In order of magnitude, the maintenance organization respondents indicated that their circles were more productive in generating solutions to problems (M = 2.50, SD = .59) when compared with QC personnel from the supply center sample (M = 2.19, SD = .65) or the hospital facility sample (M = 1.43, SD = .81). In addition, satisfaction with the QC process ranged from a high for the maintenance personnel (M = 3.92, SD = 1.22) to a low for the hospital group (M = 1.88, SD = 1.28) with the supply center (M = 3.09, SD = 1.04) reporting moderate satisfaction. In general, the supply organization scores on these variables were between those of the two contrasting organizations described by Steel et al. (1985).

V. Discussion and Recommendations

Overview

This chapter begins with the findings of the study followed by factors limiting the reliability of the results. Next, a discussion of the findings is presented, followed by conclusions and recommendations.

Findings

The results of this study suggest that there were significant differences between attitudes of employees from work groups with QCs and employees from work groups without QCs; however, the differences were such that they did not favor the QC process. Members of non-QC work groups had significantly higher scores on six of the 12 variables measured (job satisfaction, job involvement (III), organizational commitment, group cohesiveness, participation in decision making, and interpersonal trust). Also, there were significant differences between attitudes of QC members and non-QC members, but again, the differences did not support the claims of QC advocates who predict higher attitudinal scores for QC participants. On the contrary, non-QC members had significantly higher scores on three variables (job satisfaction, group cohesiveness, and interpersonal trust).

Results of the supplementary analyses indicated that there were no significant differences in attitudes between members of more and less productive QCs, when productivity was defined as the number of improvements suggested to management. However, when QCs were split on the median number of improvements adopted by management, members of the more productive group reported significantly higher job satisfaction, job involvement (III), and group cohesiveness, but significantly lower

self-appraised job performance. Generally speaking, these results parallel those reported by Griffin and Wayne (1984) (see Evaluation Research on QCs, Chapter II). They also measured significantly higher attitudinal scores for members of QCs that had more than the median number of recommendations adopted. But their study also reported significantly higher scores for members of QCs submitting more than the median number of suggestions to management, whereas this study found no significant differences in that analysis.

In addition, members of more productive QCs (in terms of improvements adopted) reported significantly higher job involvement (III) than non-QC members.

Limitations

Several limitations of this study weaken any conclusions that may be drawn from the results. They are as follows:

1. Significant differences existed between members of QC work groups and non-QC work groups on the demographic measures of education level and pay grade. Also, there was not an even mix of males and females in the groups. Hence, this evidence suggests that the QC and control groups were compositionally different, and therefore these differences may have influenced the study's results.
2. The sex of the respondents may have had an effect on their responses. Preliminary analysis suggested that three of the 12 measures used had a link to gender.
3. The sample size (29%) may not have been truly representative of the population at the supply center.
4. Some QCs were not represented in the study due to work schedules and

poor communication regarding the survey administration times.

5. The study was cross-sectional, that is, a "snap-shot" of the sample at one point in time. As a result, the attitudes measured in this study cannot be compared with measures of attitudes before QCs were initiated. As discussed in the next section, one can only speculate on how attitudes have evolved over time and what effect the QC process has had on them.

Discussion

The results of our main analysis (the mean difference tests between members of QC work groups and members of non-QC work groups, and between QC members and nonmembers) suggest that the QC process has not yet been successful in improving attitudes. However, the cross-sectional nature of the study makes it impossible to draw any definite conclusions based on the findings. Two interpretations do seem possible. One is that the QC process had a negative effect on the attitudes of employees associated with it. This could have resulted from failure of the process to satisfy the expectations of those who believed that great benefits would result from membership in a QC. Very enthusiastic employees may have become QC members only to find that the process did not deliver results quickly enough, if at all. The attitudes of these employees then could have declined and, if they were vocal about their dissatisfaction with the process, they may also have had a negative effect on the attitudes of their co-workers.

Another possible explanation of the results is that the attitudes of QC work group members were much lower before QCs were started and, in spite of improvements caused by QCs, those attitudes are still

significantly lower than employees in non-QC work groups.

The results of the supplemental analyses suggest the importance of QC members being able to develop improvements that are implemented by management. Seeing a recommendation adopted appears to act as a positive reinforcement for the attitudes of those who developed it.

Conclusion

While this research did suggest that quality circle participation had little positive effect on the attitudinal variables examined in this study numerous confounding elements previously identified made the statistical results difficult to interpret. As evaluations go, this one was not very rigorous. However, some tentative observations may be made.

The study's results suggest a less than perfect QC intervention. The lower attitudinal scores for employees associated with the QC process, and the measure of QC participants satisfaction with the process suggest the potential for a more effective QC process. Key managerial issues, reward systems, and cultural value systems warrant further examination.

The issue of management support cannot be overemphasized. Nearly every study in the literature review cited management support, both top and middle, as critical to a successful QC process. Goodman (1980) takes this one step further discussing the long-run viability of Quality of Work Life (QWL) projects such as Quality Circles. For a QC program to be successful, all supporting and actively involved personnel must be committed toward that goal. Not only top management but middle management and co-workers who are part of the surrounding organizational

environment (but not as QC members) must be involved.

The traditional American managerial styles and middle management support dramatically impact a QC intervention. Alexander (1981), Ingle (1982), and Kanarick (1981) remark that crucial changes are required in America for successful QC implementation. Two changes needed are improved management/employee communications and managerial belief in employees' ability to improve the work environment. Cole (1980) found that U.S. managers had to adapt Quality Circles to fit the needs of American management. Another aspect of this topic is the congruency between QC values and existing organizational values. Values inherent in the QC process such as increased control in the work environment, increased participation in decision making, and possibly, increasing responsibility in areas traditionally considered to be middle management functions may be at odds with widely accepted values within the organization. As Goodman (1980, p. 491) states, "Although a sponsor may initially promote the QWL effort, the conflicts in values work against long-run QWL effectiveness."

Since participation in a QC requires additional effort and commitment by an employee, attractive, long-run rewards must be enacted. If an inadequate reward system and tentative system support do not exist, few QC members will remain committed. Moreover, even if available rewards are initially attractive, there is always the chance that such rewards will not remain effective over time. Although the DOD Supply Center had a rewards program, the effectiveness or potency of the rewards had not been seriously examined.

Cultural factors impact the organization and the QC

intervention. According to Goodman (1980) and other researchers, the American worker's individualism and lack of team oriented attitudes will have an effect on the QC process. Cole (1980) found the homogeneous nature of the Japanese culture crucial to management's willingness to invest in the training of the workers and sharing responsibibity with them. Due to the heterogeneous culture of the U.S., a contingency approach, should be implemented in which management recognizes the impact of cultural phenomena. If American managers meet this difficult challenge with an open mind and flexibility, the probability of successful QC interventions will be enhanced.

Recommendations

Based on the results of this study, several recommendations are offered. One is that QC members at the supply center be surveyed further on the subject of their satisfaction with the QC process. The results of this study suggest that participants in QCs are less than satisfied with the process. An analysis of why they are not satisfied with the process, and a request for suggestions for improvement of the QC process itself may prove beneficial.

A second recommendation is that the supply center, as well as any organization having the goal of making the best use of limited resources, continually monitor the benefits and costs of the QC process and all other initiatives which make well intentioned claims of improvement in an organization, yet require a substantial amount of those limited resources to operate. As mentioned earlier, this study cannot be considered a comprehensive assessment of the QC process since it only dealt with one measure, that of attitudes, and was limited even

in that sense. A different, commonly recommended measure of QCs that complements attitudinal studies is the calculation of quantifiable savings realized from implementation of QC recommemdations.

A final recommendation is intended for future researchers attempting analyses similar to the type done in our suppplemental analysis. The recommendation is that QC members be asked to indicate, on the survey form, which QC they are a member of. This would simplify the task of separating QC members into the "more" and "less" productive groups. In this study, the separation was done through use of the work code provided by QC respondents on the survey form, and data collected from the QC facilitator which identified work codes associated with all QCs. Implementation of this recommendation would simplify the data collection required from the facilitator.

Appendix A: Background Information

This section of the survey contains several items dealing with personal characteristics. This information will be used to obtain a picture of the background of the "typical employee."

	Number of Respondents	Relative Frequency
1. Your age is:		
1. Less than 20	3	0.4
2. 20 to 25	83	11.4
3. 26 to 30	106	14.5
4. 31 to 40	193	26.5
5. 41 to 50	172	23.6
6. 51 to 60	147	20.2
7. More than 60	18	2.5
Miscoded/Nonresponse	7	0.9
Total	729	100.0
2. Your highest educational level obtained was:		
1. Non high school graduate	7	1.0
2. High school graduate or GED	123	16.9
3. Some college work	334	45.8
4. Associate degree or LPN	78	10.7
5. Bachelor's degree or RN	113	15.5
6. Some graduate work	39	5.3
7. Master's degree	27	3.7
8. Doctoral degree	1	0.1
Miscoded/Nonresponse	7	1.0
Totals	729	100.0
3. Your sex is:		
1. Male	289	39.6
2. Female	428	58.7
Miscoded/Nonresponse	12	1.5
Totals	729	100.0

	Number of Respondents	Relative Frequency
4. Total months in this organization is:		
1. Less than 1 month	10	1.4
2. More than 1 month, less than 6 months	76	10.4
3. More than 6 months, less than 12 months	103	14.1
4. More than 12 months, less than 18 months	78	10.7
5. More than 18 months, less than 24 months	41	5.6
6. More than 24 months, less than 36 months	61	8.4
7. More than 36 months	355	48.7
Miscoded/Nonresponse	5	0.7
Totals	729	100.0
5. How many people do you directly supervise (i.e., those for which write performance reports)?		
1. None	659	90.4
2. 1 to 2	8	1.1
3. 3 to 5	16	2.2
4. 6 to 8	20	2.7
5. 9 to 12	6	0.8
6. 13 to 20	14	1.9
7. 21 or more	4	0.5
Miscoded/Nonresponse	2	0.3
Totals	729	100.0
6. You are a (an):		
1. Officer	4	0.5
2. Enlisted	0	---
3. Civilian (GS)	705	96.7
4. Civilian (WG)	12	1.6
5. Non-appopriated Fund (NAF employee)	0	---
6. Other	5	0.7
Miscoded/Nonresponse	3	0.4
Totals	729	100.0

7. Your grade level is:	Number of Respondents	Relative Frequency
1. 1 - 2	7	1.0
2. 3 - 4	150	20.6
3. 5 - 6	160	21.9
4. 7 - 8	90	12.3
5. 9 - 10	156	21.4
6. 11 - 12	142	19.5
7. 13 - 15	20	2.7
8. Senior Executive Service	0	---
Miscoded/Nonresponse	4	0.5
Totals	729	100.0

Appendix B: Job Satisfaction

Below are 5 items which relate to the degree to which you are satisfied with various aspects of your job. Read each item carefully and choose the statement below which best represents your opinion.

1 = Delighted
2 = Pleased
3 = Mostly satisfied
4 = Mixed (about equally satisfied and dissatisfied)
5 = Mostly dissatisfied
6 = Unhappy
7 = Terrible

1. How do you feel about your job? (R)

2. How do you feel about the people you work with--your co-workers? (R)

3. How do you feel about the work you do on your job--the work itself? (R)

4. What is it like where you work--the physical surroundings, the hours, the amount of work you are asked to do? (R)

5. How do you feel about what you have available for doing your job--I mean equipment, information, good supervision, and so on? (R)

Appendix C: Job Involvement (Factor II)

Use the rating scale below for the following statements to express your own feelings about your present job or work.

1. Means you strongly disagree with the statement.
2. Means you moderately disagree with the statement.
3. Means you slightly disagree with the statement.
4. Means you neither disagree nor agree with the statement.
5. Means you slightly agree with the statement.
6. Means you moderately agree with the statement.
7. Means you strongly agree with the statement.

1. The most important things that happen to me involve my work.

2. The most important things I do involve my work.

3. The major satisfaction in my life comes from my job.

4. The activities which give me the greatest pleasure and personal satisfaction involve my job.

5. I live, eat, and breathe my job.

Appendix D: Job Involvement (Factor III)

Use the rating scale below for the following statements to express your own feelings about your present job or work.

1. Means you strongly disagree with the statement.
2. Means you moderately disagree with the statement.
3. Means you slightly disagree with the statement.
4. Means you neither disagree nor agree with the statement.
5. Means you slightly agree with the statement.
6. Means you moderately agree with the statement.
7. Means you strongly agree with the statement.

1. How well I perform on my job is extremely important to me.

2. I feel badly if I don't perform well on my job.

3. I am very personally involved in my work.

Appendix E: Organizational Commitment

Listed below are a series of statements that represent possible feelings that individuals might have about the company or organization for which they work. Use the following rating scale to indicate your own feelings about the particular organization for which you are now working.

1 = Means you strongly disagree with the statement.
2 = Means you moderately disagree with the statement.
3 = Means you slightly disagree with the statement.
4 = Means you neither agree nor disagree with the statement.
5 = Means you slightly agree with the statement.
6 = Means you moderately agree with the statement.
7 = Means you strongly agree with the statement.

1. I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful.
2. I talk up this organization to my friends as a great organization to work for.
3. I feel very little loyalty to this organization. (R)
4. I would accept almost any type job assignment in order to keep working for this organization.
5. I find that my values and the organization's values are very similar.
6. I am proud to tell others that I am part of this organization.
7. I could just as well be working for a different organization as long as the type of work was similar. (R)
8. This organization really inspires the very best in me in the way of job performance.
9. It would take very little change in my present circumstances to cause me to leave this organization. (R)
10. I am extremely glad that I chose this organization to work for over others I was considering at the time I joined.
11. There's not too much to be gained by sticking with this organization indefinitely. (R)

12. Often, I find it difficult to agree with this organization's policies on important matters relating to its employees. (R)

13. I really care about the fate of this organization.

14. For me this is the best of all possible organizations for which to work.

15. Deciding to work for this organization was a definite mistake on my part. (R)

Appendix F: Communication Climate

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. My organization provides all the necessary information for me to do my job effectively.

2. My work group is usually aware of important events and situations.

3. The people I work with make my job easier by sharing their ideas and opinions with me.

4. People in my work group are never afraid to speak their minds about issues and problems that affect them.

Appendix G: Group Cohesiveness

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. There is a high spirit of teamwork among my co-workers.

2. Members of my work group take a personal interest in one another.

3. If I had a chance to do the same kind of work for the same pay in another work group, I would still stay here in this work group.

Appendix H: Participation in Decision Making

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. Within my work-group the people most affected by decisions frequently participate in making the decisions.

2. In my work-group there is a great deal of opportunity to be involved in resolving problems which affect the group.

3. I am allowed to participate in decisions regarding my job.

4. I am allowed a significant degree of influence in decisions regarding my work.

5. My supervisor usually asks for my opinions and thoughts in decisions affecting my work.

Appendix I: Relationship-oriented Supervision

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. My immediate supervisor makes an effort to help people in the work group with their personal problems.

2. My immediate supervisor seeks the advice of our work group on important matters before going ahead.

AD-A162 250 A CROSS-SECTIONAL STUDY OF THE EFFECT OF QUALITY CIRCLES ON TWELVE ATTITU..(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYST.. 2/2

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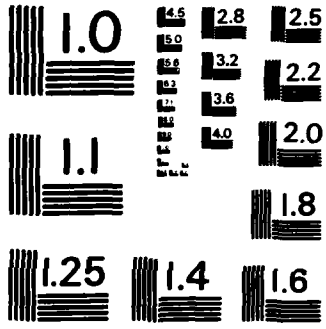

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

Appendix J: Task-oriented Supervision

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. My immediate supervisor insists that members of our work group follow to the letter all policies and procedures handed down to him.

2. My immediate supervisor pushes the people under him (or her) to insure they are working up to capacity.

Appendix K: Job Feedback

Use the rating scale below to indicate how you feel about the following two questions.

1 = Very little
2 = Little
3 = A moderate amount
4 = Much
5 = Very much

1. To what extent do you find out how well you are doing on the job as you are working?

2. To what extent do you receive information from your superior on your your job performance?

Use the same rating scale to indicate how much job feedback is present in your job.

3. The feeback from my supervisor on how well I am doing.

4. The opportunity to find out how well I am doing in my job.

5. The feeling that I know whether I am performing my job well or poorly.

Appendix L: Interpersonal Trust

This section of the questionnaire contains a number of statements that relate to feelings about your work group, the demands of your job, and the supervision you receive. Use the following rating scale to indicate the extent to which you agree or disagree with the statement shown below.

1 = Strongly disagree
2 = Moderately disagree
3 = Slightly disagree
4 = Neither agree nor disagree
5 = Slightly agree
6 = Moderately agree
7 = Strongly agree

1. Most people are not always straightforward and honest when their own interests are involved. (R)

2. In these competitive times one has to be alert or someone is likely to take advantage of you. (R)

3. It is safe to believe that in spite of what people say, most people are primarily interested in their own welfare. (R)

Appendix M: Self-appraised Job Performance

The following statements deal with feedback you receive from your supervisor concerning your performance. Your frame of reference should be your supervisor's evaluation of your performance in terms of formal feedback (i.e., periodic, written performance appraisals) and informal feedback (i.e., verbal communication on a day-to-day basis). Please think carefully about his/her evaluations of you over the past six months or so.

Based upon the feedback you have received from your supervisor, use the rating scale below to indicate how your job performance would compare with other employees doing similar work.

1 = Far worse
2 = Much worse
3 = Slightly worse
4 = About average
5 = Slightly better
6 = Much better
7 = Far better

1. Compared with other employees doing similar work, your supervisor considers the quantity of the work you produce to be:

2. Compared with other employees doing similar work, your supervisor considers the quality of the work you produce to be:

3. Compared with other employees performing similar work, your supervisor believes the efficiency of your use of available resources (money, materials, personnel) in producing a work product is:

4. Compared with other employees performing similar work, your supervisor considers your ability in anticipating problems and either preventing or minimizing their effects to be:

5. Compared with other employees performing similar work, your supervisor believes your adaptability/flexibility in handling high-priority work (e.g., "crash projects" and sudden schedule changes) is:

Appendix N: A Posteriori Items (Quality Circle Questions)

	Number of Respondents	Relative Frequency
1. Are you aware of the Quality Circle Program?		
1 = Yes	602	82.6
2 = No	113	15.5
Miscoded/Nonresponse	14	1.9
Totals	729	100.0
2. Does your work group have Quality Circles?		
1 = Yes	239	32.8
2 = No	474	65.0
Miscoded/Nonresponse	16	2.2
Totals	729	100.0
Only answer the following questions if your work group has Quality Circles.		
3. What is the extent of your involvement in the quality circles process in your work group?		
1 = I was never a Quality Circle member	171	23.5
2 = I was but am no longer a member of a Quality Circle	36	4.9
3 = I am a Quality Circle member	66	9.1
Miscoded/Nonresponse	456	62.6
Totals	729	100.0
4. Do the managers and supervisors in your organization support the Quality Circles process?		
1 = Not at all	35	4.8
2 = Are somewhat supportive	94	12.9
3 = Are very supportive	52	7.1
4 = I don't know	81	11.1
Miscoded/Nonresponse	467	64.1
Totals	729	100.0

Only answer these questions if you are or were a member of a Quality Circle.

	Number of Respondents	Relative Frequency
5. Have the suggestions for change developed by the Quality Circle been implemented?		
1 = Never	30	4.1
2 = Some of the time	69	9.5
3 = Most of the time	20	2.7
Miscoded/Nonresponse	610	83.7
Totals	729	100.0
6. How effective was the Quality Circle in generating solutions to problems?		
1 = Not at all effective	16	2.2
2 = Somewhat effective	66	9.1
3 = Very effective	39	5.3
Miscoded/Nonresponse	608	83.4
Totals	729	100.0
7. How satisfied are you with the Quality Circles process?		
1 = Very dissatisfied	11	1.5
2 = Dissatisfied	20	2.7
3 = Can't decide	44	6.0
4 = Satisfied	39	5.3
5 = Very satisfied	7	1.0
Miscoded/Nonresponse	608	83.4
Totals	729	100.0

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This study analyzed differences in 12 attitudinal variables between employees associated with QCs and employees not associated with QCs at a DOD supply center. Variables measured were job satisfaction, job involvement, organizational commitment, communication climate, group cohesiveness, participative decision making, relationship-oriented and task-oriented supervision, feedback, interpersonal trust, and self-appraised job performance. 729 employees (29% of the population) responded in the survey. Members of non-QC work groups had significantly higher scores on six variables, when compared with members of QC work groups. Employees who were not QC members had significantly higher scores on three variables, when compared with QC members.

In a supplemental analysis, the number of improvements recommended and the number adopted were collected for all QCs. Based on median splits for these two productivity measures, significant differences were found between members of productive and less-productive QCs. Employees associated with QCs were also asked additional questions regarding the QC process. Based on their responses, and the results of the attitudinal measures, recommendations for future research are offered.

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