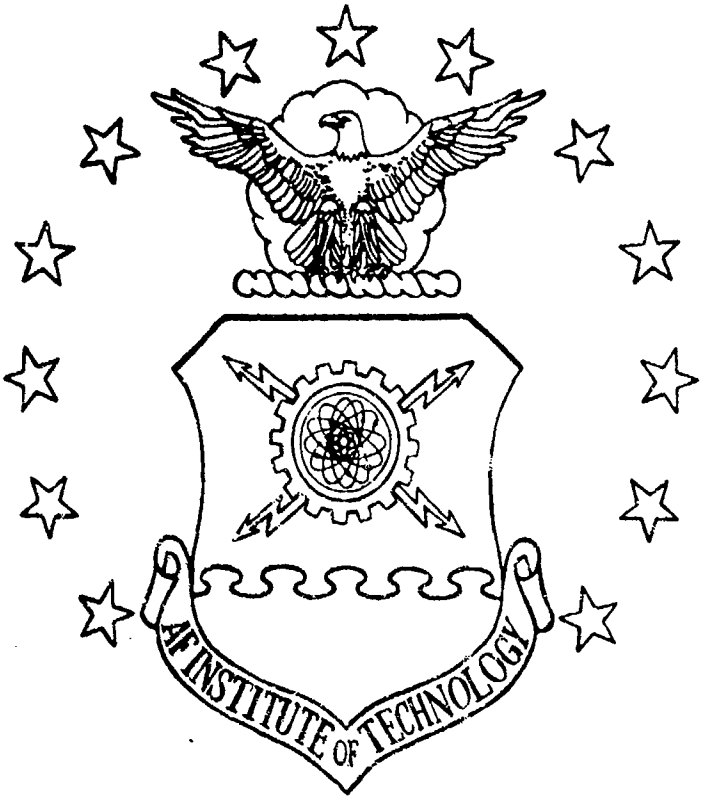


# THE QUALITY CIRCLES ORGANIZATIONAL INTERVENTION: AN ATTITUDINAL OUTCOME STUDY

Kyu Yeol Lyu, Major, ROKA
Arthur E. Roffey, 1st Lt, USAF

LSSR 19-83



DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
**AIR FORCE INSTITUTE OF TECHNOLOGY**

Wright-Patterson Air Force Base, Ohio

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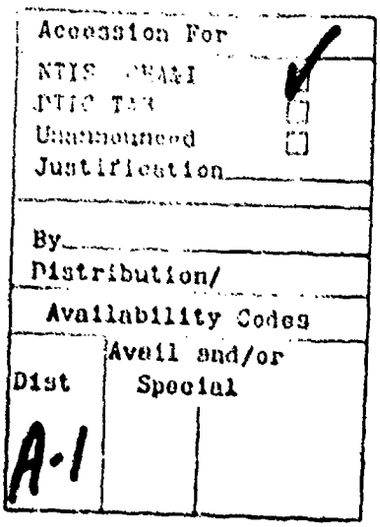

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Quality Circles

QC programs are currently receiving a great deal of managerial attention both within civilian institutions and the DOD despite the virtual absence of empirical studies concerning the effects of this organizational intervention. This thesis assessed the impact of participation in a QC program at two military facilities with regard to five work-related attitudes; decision-making effectiveness, participative decision making, communication climate, job satisfaction and job involvement; and found that such participation resulted in no significant attitude change. One implication of these findings is that the glowing success stories provided by QC consultants must be considered with caution and that the widespread initiation of QCs, particularly within the DOD where organizations are characterized by high rates of personnel turnover, should be tempered with restraint.

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# THE QUALITY CIRCLES ORGANIZATIONAL INTERVENTION: AN ATTITUDINAL OUTCOME STUDY

A 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

By

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COMMITTEE CHAIRMAN

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# CHAPTER I

# INTRODUCTION

## Background

A Quality Circle (QC) is a voluntary group of approximately 10 employees who participate in discussions and decisions relevant to the improvement of their organization's productivity and quality of products. QC suggestions are forwarded to upper management for consideration and, if approved, the QC group may become involved in implementing corrective action(s).

The QC process is a modern interpretation of an old idea: that workers can provide meaningful suggestions for improvement of organizational efficiency. Frederick Taylor, as early as 1911, stated in Principles of Scientific Management that:

> Every encouragement . . . should be given to him [the employee] to suggest improvements, both in methods and in implements. And whenever a workman proposes an improvement, it should be the policy of the management to make a careful analysis of the new method, and if necessary conduct a series of experiments to determine accurately the relative merits of the new suggestion and of the old standard. (1911; 1967, p. 128)

Taylor's suggestion for the most part fell on deaf ears for decades as many large corporations and industrial firms became characterized by bureaucratic organizational structures with strict hierarchies of authority, clear

definitions of tasks, many formal rules and procedures with few, if any, outlets for employee creativity. Employee suggestion programs went largely ignored.

The QC concept is a practical application of principles consistent with Taylor's early advice to management. Though the philosophy and techniques which eventually gave rise to the QC concept were developed in the United States, it was in Japan where they received their first large-scale application (Cole, 1980a; Deming, 1980b; Juran, 1981; Patchin, 1981).

Post-World War II Japan was forced to rebuild an industrial capability that had been largely destroyed and which had developed a reputation for producing poorly constructed products. During the rebuilding process, advances in statistical quality control as espoused by Americans such as William Deming and Joseph Juran were applied by Japanese manufacturers to the technology provided by occupying forces, resulting in the establishment of an industrial capability which was both quality-minded and technically sophisticated. Government-applied quality standards were invoked, and The Union of Japanese Scientists and Engineers (JUSE) became committed to the statistical control of quality. It was JUSE that developed the first QC training materials in 1962. The methods of QCs became so popular in Japan that within a few years QC concepts were taught on public television.

The QC concept was first applied in the United States when Lockheed Missile and Space Company initiated QC groups in October, 1974. By early 1981, approximately 750 American companies had initiated QC programs in which about 75,000 workers participated (Blair & Hurwitz, 1981). The rapid growth in popularity of the QC concept may partially be explained by domestic industry's concern for quality control issues--15% to 40% of the typical American manufacturing firm's productive capacity is engaged in the rework of unsatisfactory parts, re-testing or re-inspecting of rejected parts, or the replacement of products recalled from the field (Feigenbaum, 1980). The need for American industry to improve product quality in order to remain competitive in the international marketplace is widely recognized; the QC concept is one approach to quality improvement.

## Justification of Research

Systematic research of the QC intervention has been strikingly absent in the literature. Yet the widespread initiation of QC programs in the absence of rigorous research on QC effectiveness and the circumstances most conducive to QC implementation is a reality and a cause for concern. Much of the literature written on QCs is the product of QC consultants and is written from a marketing, rather than a scientific, perspective. Nor has the

International Association of Quality Circles (IAQC) been aggressive in insisting that scientifically rigorous articles appear in its publication, The Quality Circles Journal, or that research papers are presented at its annual conferences. At the fourth annual conference of the IAQC 56 papers were presented--not one was a research report.

Despite the glowing success stories provided by QC consultants, QC programs can and do fail. While actual statistics are unavailable, Robert Cole, Director of the Center for Japanese studies at the University of Michigan, has noted:

> The fact is that the circles do not work very well in many Japanese companies. Even in those plants recognized as having the best operating programs, management knows that perhaps only one-third of the circles are working well, with another third borderline and one-third simply making no contribution at all. For all the rhetoric of volunteerism, in a number of Japanese companies the workers clearly perceive circle activity as coercive. Japanese companies face a continuing struggle to revitalize circle activity to insure that it does not degenerate into ritualistic behavior. In short, they have not got all the answers on how to conduct such participatory activity. (1980b, p. 30)

The Air Force Institute of Technology (AFIT) has been designated by the Department of Defense (DOD) as the focal point for all research on DOD QC undertakings. Dr. A. Mento, program director of the AFIT QC program, has estimated that as many as 1,000 QC groups are presently being conducted within the DOD (reported in Steel, Ovalle & Lloyd, 1982). With such an investment in time and manpower, the

DOD is most interested in the outcomes associated with the QC process. The proposed research is justified as it is consistent with DOD intent and further offers to contribute the first rigorous analysis of QC outcomes to the existing body of knowledge concerning this organizational intervention.

## Problem Statement

There is a need to assess the outcomes associated with Quality Circles interventions in Department of Defense settings through systematic research. Specifically, this study will evaluate whether work-related attitudes are modified through participation in QC activity. The following work attitudes are considered in the present research: decision making, participative decision making, job involvement, communication climate, and job satisfaction. The formal definitions of these terms are presented in Chapter II, Literature Review. The operational definitions appear in Chapter III, Method.

## Definition of Terms

1. Quality Circle--a voluntary group of approximately 10 employees, usually led by a supervisor or senior worker, who generally perform similar work and who, collectively, constitute an organizational intervention characterized by direct participation in discussions, suggestions, decisions, and evaluations related to the improvement of their

organization's productivity and quality of products. Participants in a QC program are trained in problem-solving and data analysis so that production, quality, and related issues and problems can be discussed and investigated with the aim of recommending and possibly initiating necessary corrective actions upon managerial approval (Blair, Cohen, & Hurwitz, 1982).

2. Organizational Intervention--an action or series of actions approved by management aimed at promoting increased efficiency and/or morale within an organization.

3. Intervention--the imposition of a change in the organizational environment for the purposes of empirical assessment of consequent effects (outcomes) on participating individuals and/or the efficiency of the workplace.

4. AFIT Survey of Work Attitudes--the survey instrument employed by this study comprised of 13 demographic items and 119 Likert-type statements sensitive to work attitudes. The later require the respondent to respond to each statement on a five-point or seven-point continuum from, for example, "strongly disagree" to "strongly agree" or "very dissatisfied" to "very satisfied." A number of different attitudes are measured by this assessment tool but only those items sensitive to decision making, participative decision making, job involvement, communication climate and job satisfaction are considered in this study.

Scope

This controlled longitudinal study employs the Non-equivalent Control Group Design described by Campbell and Stanley (1963). Subjects are drawn from participating work centers at a southeastern United States USAF installation and a southwestern United States military hospital.

Assumptions

1. The AFIT Survey of Work Attitudes is an appropriate instrument for measuring attitudes concerning decision making, participative decision making, job involvement, communication climate and job satisfaction.

2. The criteria selected for analysis are sensitive to the effects of the intervention.

3. Pre-existing unmeasured differences between QC and control groups will not have measurable effects on measured criteria.

4. Experimental mortality will impact the composition of both treatment and control conditions in a similar fashion.

5. Sufficient time was allowed between QC initiation and posttest data collection to permit all experimental groups to reach maturity (i.e., the bulk of membership time was spent on problem solving and decision making related to product quality rather than dealing with issues of group formation and maintenance).

Limitations

1. Drawing subjects from intact work groups reduces experimenter control and neglects to control for several potential study contaminants such as differing group composition and pre-existing social structures within work groups.

2. There were no controls for changes in group membership due to subject mortality. This may be of significant impact in a military environment which is characterized by a high degree of personnel reassignment.

3. The experimenters had no control over the extent to which managerial support of the QC programs differed in the work groups and organizations under study.

4. As the QC training was provided by the base QC facilitator, the experimenters had no control over any differences in training emphasis and/or technique to which the various QC groups were exposed.

5. Non-attitudinal measures of QC outcomes (such as number of problem solutions suggested or implemented) were not investigated.

Hypotheses

This study empirically tests the following five hypotheses:

1. The membership of QC work groups perceive greater decision-making effectiveness than those individuals comprising control groups.

2. QC members perceive greater personal participation in decisions affecting them than do members of control groups.

3. QC members view themselves as more job involved than those who make up the control work groups.

4. The QC work group members believe themselves to be more aware of, and contributing to, the information flow relevant to effective job performance within their work environment than do control work group members.

5. The membership of QC work groups experience more job satisfaction than the members of the control groups.

# CHAPTER II

# LITERATURE REVIEW

## Introduction

The literature review for this thesis covers the following major topics: Quality Circles (QC), participative decision making (with selected consideration of the broader area of decision making in an organization), job involvement, communication climate and job satisfaction.

Literature concerning participative decision making, decision making, job involvement, communication climate and job satisfaction is reviewed because this study seeks to determine whether QC membership results in any changes with respect to these work attitudes (as measured by the AFIT Survey of Work Attitudes). Each of the above-listed topics is reviewed separately.

## Quality Circles Research

Few studies have attempted to evaluate the attitudinal or behavioral outcomes associated with participation in a QC program. Also, there is a severe shortage of research involving quantitative assessments of factors which are considered necessary for QC success. It is with a discussion of the suggested "basic elements" necessary for a

successful QC program that this review of the literature will begin.

The most notable listing of significant factors related to QC success arises from the results of a survey administered to 50 QC experts attending the third annual conference of the International Association of Quality Circles (Stevens & Moore, 1981). Ranked according to frequency of mention, these factors are:

1. Management acceptance/support/understanding
2. Training for the circle leader(s) and facilitator(s)
3. Voluntary participation
4. A "people-building" managerial philosophy
5. Allowance of sufficient time for assessment of results and return on investment
6. Open channels of communication with upper management
7. A "team effort" approach to problem solving
8. Team member and management participation
9. Recognition
10. Confining circle activities to work-related problems

Stevens and Moore believe that the presence of each of the above 10 factors is crucial for the survival of a QC program.

Metz (1980) and Cole (1980b) have warned that failure to include and/or educate middle management personnel when QC programs are initiated can lead to oppositional and obstructional attitudes and behaviors on the part of supervisors. These attitudes and behaviors stem from the belief that circle activities are an infringement on their (the supervisors') own job responsibilities and/or QC suggestions are a reflection of their own inadequate job performance (and hence represent a threat to their job security). Burck (1981) points to the importance of a trusting relationship between management and employees as a necessary ingredient for QC success. Cole (1980b) further emphasizes the importance of financial incentives and recognition as additional motivators for QC members.

These impressions of QC experts concerning the necessary ingredients for QC success all assume that QC programs indeed result in improvements related to increased organizational effectiveness. However, given the lack of research on the subject even this most basic of assumptions cannot be made. Despite the assertion by Rieker and Sullivan (1981) that assessing QC effectiveness may not be possible or cost effective in the near term because of the difficulty in isolating the effects of one relatively small component of an integrated organizational structure, research must be conducted into the area if the QC concept is to be anything more than merely a passing fad (Ouchi, 1981).

Only four studies of QC outcomes presently appear in the literature. The first, an uncontrolled field experiment conducted by General Dynamics Pomona Division (Hunt, 1981) reports the results of a six-month pilot program, the purpose of which was to provide information for management as an aid for the evaluation of the long-range potential of QCs within the firm. Several morale, motivation and performance criteria were monitored with "before" and "after" comparisons made for Quality Circle members and other employees. No mention was made of controls for possible differences between members of the QC group and the "other employees" comparison group; nor were there indications of controls made for changing group composition. Though the author noted that quality circle members demonstrated superior performance on measures of product quality, error reduction, job involvement and problem-solving capabilities when contrasted with other employees, these conclusions must be viewed with caution due to the limitations of the experimental design. Results of this study therefore should not be generalized to other organizations. The value of this experiment is that it demonstrates an interest by management in empirically evaluating QC success before organization-wide adoption of the QC concept.

In noting the need for QC program evaluation, Donovan and Van Horn (1980) have provided the following suggestions:

1. Measurement of "multiple levels" which includes objective measures of productivity and quality (such as hours/unit and defects/unit) and assessments which provide an overview of program costs.

2. Effective research tools including surveys and questionnaires which provide information concerning job and climate variables related to high productivity and satisfaction.

3. Adequate research designs providing pre- and post-circle implementation comparisons and, where possible, control groups for baseline information.

The authors conducted five independent studies of QC effectiveness at Honeywell, Inc. upon which they concluded that the intervention was responsible for dramatic performance and efficiency improvements. However, due to significant flaws in study design, it is impossible to assess the true impact of the circles. No controls for the changing memberships of the QC and control groups were incorporated into the study. Further, the authors made no specific mention of the composition of the various circle and control groups. If circle membership was voluntary, it was likely that the circle members exhibited differences of personality and motivation which distinguished them from those who chose not to participate. If the composition of the QC groups was not a representative sample of employees performing similar work at Honeywell, Inc., then no generalizations of

study results can be made which will apply to other organizational employee groups. On the other hand, if existing work groups were designated as QC groups and controls, group equivalence is not assured through randomization though pretests were administered to both QC and control groups; no mention was made as to whether pretest observations were used to develop correction factors to be used to compensate for pre-existing group differences.

Tortorich et al. (1981) developed a method of QC evaluation at Martin Marietta Corporation's Michoud Assembly Division which avoids some of the pitfalls discussed above. The following three categories of effectiveness measures were developed for internal use by managers, program administrators, facilitators and the circles themselves:

1. Program measures are obtained which are direct measures of QC growth and efficiency and include assessments of the number of supervisors and management personnel completing circle leadership training, the number of employees completing circle training, the number of circles formed, the average circle membership size, success rate, the ratio of trained employees volunteering for circle activity, the number and rate of presentations made by circles to management, the percentage of approved proposals, and the direct cost savings resulting from circle activities.

2. Personal outcomes are assessed. These are defined as the effects of QCs on employee attitudes concerning their job situation as measured by various attitude questionnaires.

3. Organizational outcomes are also evaluated. Organizational outcomes are the effects of QCs on such cost-related criteria as performance rates, defect rates, scrap rates, attrition rates, lost time, grievance rates and accident rates.

Depending on need, assessment information is calculated monthly or at six-month intervals. The former approach is used to identify and quickly respond to problems or to provide managers with summary information about circle-related variables. Six-month interval data is used to contrast the personal and organizational outcomes of QC group members with those of non-circle employees. The effectiveness of the QC program is also analyzed in terms of individual changes on measures of personal and organizational outcomes which are attributed to the effects of circle membership or non-membership. To perform this analysis, performance data for each circle member is analyzed in six-month intervals using the data of entry into the circle as the point of reference. Hence, data collected six months prior to entry into a QC group is compared with data collected six months following initial circle membership. A similar analysis is conducted on performance

information collected on employees not joining circles within the same time frame under study for circle members. Therefore, for both circle and non-circle employees, data are collected for staggered, but identical, time intervals thus controlling for the fact that circle members join and resign QC groups at different times during the life of the program. Circle effectiveness can then be analyzed by calculating the difference within Circle members six months before and six months after entry into the QC program while concurrently performing a similar analysis of non-circle members over the identical six-month intervals. Group and individual comparisons can then be made.

Summary data is presented in Tortorich et al.'s paper though rigorous statistical analysis is not included. Between 90 to 100% of the suggestions offered to management by the QC groups in the areas of quality improvement, cost reduction, tooling and training were approved over the January, 1980 to June, 1981 time period.

Employee attitudes, as measured by a survey, were assessed. When the work attitudes of those who had participated in QC activity for at least six months were concurrently compared with the work attitudes of untrained QC members, the former were found by Tortorich et al. to demonstrate a number of more positive work attitudes. For the year 1980, significant differences ($p=.05$) were found between the comparison groups for the following

job related attitudes: employee-supervisor relations, satisfaction with supervisor, employee influence, internal motivation, job satisfaction, team climate, growth satisfaction and job performance. In short, the results suggested that QC groups can provide potentially helpful inputs to the managerial decision-making process as well as promote improved employee work attitudes.

The most rigorous evaluation of QC outcomes in the literature is reported by Steel, Lloyd, Ovalle and Hendrix (1982) and Steel, Ovalle and Lloyd (1982). The Organizational Assessment Package (OAP), a survey questionnaire consisting of 109 items (rating scales) and 24 factors, was administered to all members of a base civil engineering division at a Department of Defense installation shortly before a QC program was initiated in December, 1980. Employees of 14 departments were trained in QC techniques and then offered the opportunity to participate in one of several QC groups. Members of an additional 37 departments from the same division were provided no direct exposure to the QC program and served as the control group for this study. There were no controls for changing group membership. This is a serious methodological limitation but one which is difficult to incorporate in field study research. Considerable fluctuations in the demographic measures during the six-to-nine month interval between administration of the pretest and posttest measures suggest changes in the

composition of treatment groups during the course of this experiment. The absence of controls for changing group memberships such as those employed by Tortorich et al. (1981) are likely to limit the interpretability of findings for any study where QC and control groups are characterized by high mortality of subjects.

Utilization of intact work groups as experimental (QC) and control subjects necessitated the use of the Nonequivalent Control Group Design (Campbell & Stanley, 1963). This quasi-experimental design is characterized by taking pretest measures of both experimental and control groups before the intervention is initiated. A statistical correction adjusting for pretest differences was then made when group differences on the posttest were evaluated in order to compensate for pre-existing group differences. The data were analyzed employing stepwise hierarchical regression analysis with the result that no significant increases in $\underline{R}^2$ were observed for the 23 OAP attitudinal measures. This suggests that QC participation did not significantly impact employee work attitudes though the authors state that the following methodological limitations severely impacted study results:

1. Because QC groups were formed at staggered intervals, some did not have enough time to reach maturity prior to posttest data collection. Three of the six QC groups

had functioned for less than one month when posttest data was collected.

2. Experimental mortality (discussed above).

3. Several significant demographic differences existed between the treatment and control groups at the study's outset.

4. Behavioral and group effectiveness outcomes of QC participation were not measured.

5. The sample size was small, the treatment condition contained only 14 functional work units, enhancing the likelihood of Type II errors.

The interpretability and generalizability of findings are restricted by these limitations, yet this study is important from a historical perspective. It is the first research reported in the QC literature that assesses attitudinal outcomes of QC activity while employing an experimental design that incorporates control group comparisons and statistical controls for nonequivalence of matched groups.

Whereas research regarding the outcomes associated with the QC approach to employee participation in decision making is quite immature in both its scope and methodology, much work has been done concerning the more general area of participative decision making. It is to the body of literature addressing this topic that we now turn.

Participative Decision Making

In the context of QC groups, participative decision making may be defined as the process whereby QC members arrive at decisions related to the improvement of organizational productivity and product quality. These decisions are then forwarded to upper management in the form of suggestions and evaluation results. More generally, participative decision making refers to the process whereby individuals and groups are included in the decision-making processes which affect them. Closely akin to participative decision making is participative goal setting, a process whereby individuals and groups are included in the goal-setting decisions which affect them.

Employee participation in decision making is a characteristic basic to the QC concept. While no research has yet been conducted which specifically assesses the participative decision-making component of a QC intervention, many studies have assessed participative decision making and participative goal setting both in the laboratory and in the field. One general criticism may be levied against much of the recent literature on these subjects, however. Kast and Rosenzweig (1973) have noted that many of today's behavioral scientists place a high value on

> more democratic, less authoritarian, less hierarchically structured organization. They tend to advocate a "power equalization" system which emphasizes morale, sensitivity, and psychological security--one which values human growth and fulfillment. (p. 7)

This philosophical orientation held by many of today's social scientists leads to assumptions and value judgements regarding the intrinsic merit of increased employee participation in management decision making and goal setting. In a recent review of the participative decision-making literature, Locke and Schweiger (1970) found that "ideological pre-commitment" to participative decision making is clearly evident even in research articles.

> This participative decision making bias can be seen at every stage of the research process: in the design of experiments, in the interpretation of results, and in the reporting of findings. (p. 268)

Nevertheless, in an extensive review of the literature produced from 1969 to 1980 concerning goal setting and task performance, Locke et al. (1981) found that when goal difficulty is held constant, participative decision making does not appear to lead to any greater goal commitment or superior task performance than when goals are prescribed by one in authority.

There is evidence to suggest that superior performance is obtained when goals are specific and quantifiable as contrasted with conditions where goals are vague and general, such as "do your best" goals. In a representative field experiment by Ivancevich (1977), maintenance department technicians from medium-sized parts and equipment manufacturing plants were assigned to participation, assigned, and "do your best" goal conditions. The participation group received two and one-half days of

participative goal-setting training which included role playing, case analysis, small group discussions and lectures pertinent to job-related goal setting. Members of the assigned group received two and one-half days of training pertinent to assigned goal setting in which the supervisor was given the final responsibility for assigning challenging goals to subordinates. The participative and assigned goal-setting training constituted the formal initiation of one-year trial goal-setting programs in both plants. The comparison group was drawn from a plant similar to those described. These individuals were instructed to "Do your best."

Consistent with other laboratory and field research findings (Locke & Brian, 1966; Latham & Yukl, 1975), members of the two goal-setting conditions were significantly more satisfied and effective in performance than were participants in the comparison "do your best" group. Initial performance and satisfaction improvements for the participation and assigned groups began to dissipate between six to nine months following goal-setting training, a finding which is consistent with the results of an earlier study by the same author (Ivancevich, 1976). Ivancevich inferred from his results that if task performance and satisfaction improvements resulting from assigned or participative goal-setting programs are to be sustained, reinforcement programs or "refresher training" would be needed.

In 99 out of the 110 relevant studies reviewed by Locke et al. (1981), specific, hard goals were demonstrated to produce more effective performance than medium, easy, "do your best," or no goals. In those cases where participative goal setting resulted in concrete, difficult goals, performance was enhanced (Latham et al., 1978; Latham & Yukl, 1975). Latham and Saari (1979) noted that, in addition, participative goal setting may positively impact performance by contributing to a fuller understanding of how goals can be attained.

French and Caplan (1972) conducted a study of employee stress as related to organizational structure at the Goddard Space Flight (one of NASA's bases). Questionnaires sensitive to various aspects of job stress were voluntarily filled out by 205 male administrators, engineers and scientists. Blood samples were also taken along with measures of blood pressure and pulse rate which were used to determine if physiological conditions associated with stress (conditions such as high blood pressure, rapid pulse rate and elevated cholesterol levels) were present in subjects. Of all stressors which were shown to be associated with low job satisfaction and/or job-related threat (e.g., an individual's belief that job-related stress threatens his health, peace of mind and sense of self-worth) including role conflict; role ambiguity; qualitative and quantitative work overload; having to make work contacts outside

the organization; having a job in an organization where the dominant occupation is different than one's own; having responsibility for subordinates; and poor relations with superiors, peers, and subordinates--of all of these stresses, low participation was shown to have the greatest harmful effect. The correlation between job satisfaction and opportunities for participation in decisions affecting one's job was r=.50; the correlation between high opportunities for participation and reduced job-related feelings of threat was r=.51. Other correlations were demonstrated between participative decision making and: high feelings of self-worth (r=.32), high role ambiguity (r=-.55), better relations with the immediate superior, colleagues and subordinates (r's range from .24 to .52), high utilization of administrative and non-administrative skills and abilities (r's=.50 and .52, respectively), and tendencies to prefer more, rather than less, work (r=.34). French and Caplan determined through statistical analysis that when the amount of participation a person reports is held constant

> the correlations between all the above stresses and job satisfaction and job-related threat drop quite noticeably. This suggests that low participation generates these related stresses, and that increasing participation is an efficient way of reducing many other stresses which also lead to psychological strain. (1972, p. 327)

"Bottom-up" approaches to worker participation such as job enlargement, job enrichment, management by objectives, team building and profit sharing seek to promote worker

input in day-to-day operational decisions, communications, or benefits. Kovach, Sands, and Brooks (1981) note that such approaches meet with varying success and are often seen by today's better educated workers as superficial. In lower-level jobs, where the caliber of worker intellectual and skill development is demonstrably poor, participative programs have had limited success. Kovach et al. conclude that

> in the area where changes envisioned by the introduction of such programs are most urgently needed--at the lowest levels where major motivation and identification problems arise and the potential for increased productivity is greatest--participative management programs have realized the least success. (p. 8)

Nevertheless, participative decision making is widely advocated (Argyris, 1964; Likert, 1967; McGregor, 1960) and increasingly adopted by organizations. Reasons given by top managers for adoption of participatory principles include decision acceptance, decision quality and enhanced communication between themselves and their employees (Dickson, 1982).

Victor Vroom has developed a "normative model" of participative decision making (1976, pp. 1538-1549) which includes a taxonomy of leadership decision-making methods, ranging from a purely autocratic style to a participative/democratic style, and a set of seven rules intended to protect both the quality and acceptance of a leader's decision.

Vroom provides a decision-process flowchart (Vroom, 1976, p. 1542, figure 2) which specifies the appropriate leadership method(s) after his seven rules are applied to solve a group problem where a decision is required.

The important contribution of Vroom's model is that it recognizes that the appropriate decision-making method (i.e., leadership style) varies with the situation. Participative decision making is not always indicated in decision-making situations and in certain circumstances it is contraindicated, such as when "the quality of the decision is important and if the subordinates do not share the organizational goals to be obtained in solving the problem"--Vroom's "Goal Congruence Rule" (p. 1541). Circumstances where some degree of participation is indicated, according to the Vroom Model, are when acceptance of the decision toward a particular course of action is required for its effective implementation. The importance of participation in decision making is best summarized by Vroom who, in reviewing some descriptive studies of participative decision making, came to the conclusion that "the decisions made by the typical manager are more likely to prove ineffective due to deficiencies of acceptance by subordinates than to deficiencies in decision quality" (p. 1546). When all things are equal, the significance of participative decision making as a potential stress-reducer (French &

Caplan, 1972) may make it preferable to a more authoritarian decision-making approach.

Job Involvement

Job involvement concepts were first advanced by Dubin (1956) who regarded the job-involved person as one who regards the job as a central life interest and the most important part of his or her life. In 1964, Vroom posited that job involvement is brought about through an individual's attempt to maintain a sense of self-esteem via work on the job. In his view, greater autonomy extended to the worker results in a series of attitudinal outcomes beginning with greater intrinsic need satisfaction. The latter promotes more intensified ego involvement which, in turn, culminates in heightened job involvement and improved performance on the job.

The elusiveness of a precise definition of job involvement was foreshadowed by Lodahl and Kejner (1965) who provided two distinctly different definitions of the construct. The first of these definitions describes a psychological state born of early individual socialization wherein the "protestant work ethic" is internalized to the extent that "it is probably resistant to changes in the person due to the nature of a particular job" (p. 25). Lodahl and Kejner also define job involvement as "the degree to which a person is identified psychologically with his work, or the

importance of work to his total self-image" (p. 24). Since these early formulations concerning job involvement, a number of authors have commented on the complexity of the construct. Weissenberg and Gruenfeld (1971) referred to it as a "quasi-indicator of motivation" which "may be, at least in part, influenced by job satisfaction" (pp. 469-470). Batlis (1978) states that "job involvement is a construct which has eluded adequate explication since Lodahl and Kejner's (1965) original presentation" (p. 275). Rabinowitz and Hall (1977) in their critical review found that theories of job involvement were surrounded by confusion and ambiguity and that "the confusion does not stop at the theoretical level, but rather continues in the empirical studies of involvement" (p. 267). These authors note that theory and research concerning job involvement fall into three broad categories. The first such category includes those works which regard job involvement as a personal characteristic resistant to change (Dubin, 1956; Lodahl, 1964; Siegel, 1969; Hall & Mansfield, 1971; Hulin & Blood, 1968; Lawler, Hackman, & Kaufman, 1973; Runyun, 1973). Generally, the emphasis of this view is that job involvement is a product of values regarding work which trace to the socialization process beginning during the worker's infancy and childhood.

Job involvement has also been linked to situationally-induced processes. Theorists in this camp include Vroom (1962), Argyris (1964), McGregor (1960), Bass (1965), and

Blauner (1964). Among the situational variables which have been researched in relation to job involvement are job level, social factors, leader behavior, and participation in decision making. White and Ruh (1973) performed a correlational study of the relationship between participative decision making and job involvement using a sample of 2,755 employees from six manufacturing organizations. Correlations of .44 ($p < .01$) and .53 ($p < .01$) between participative decision making and job involvement were obtained for samples of workers and managers, respectively. In another study (Siegel and Ruh, 1973) of 2,628 manufacturing organization employees, job involvement and participative decision making were again found to be significantly correlated ($r=.51$, $p < .01$).

The third perspective concerning job involvement discussed by Rabinowitz and Hall (1977) treats job involvement as an outcome of the interaction between individual and situational variables. Lodahl and Kejner (1965) studied job involvement as an interaction between the impact of social conditions within an organization and the socialized value system of an individual. Further, Lawler and Hall (1970), Farris (1971), Wanous (1974), Hackman and Lawler (1971) and Brief and Aldag (1975), have emphasized the interactive aspects of job involvement. An important finding of the latter study, which is a replication of Hackman and Lawler's (1971) research, was that the psychological demands of jobs must be matched to the personal needs of

employees if job satisfaction and involvement are to be maximized. In a recent study, Batlis (1978) determined that for his sample of 84 hourly employees in an Ohio electrical manufacturing firm, job involvement moderates the relationship between perceptions of the work environment and job satisfaction. The job satisfaction measure employed in this study was the Cornell Job Descriptive Index (Smith, Kendall, & Hulin, 1969) and the job involvement measure was a variant of the six-item short-form Job Involvement Scale developed by Lodahl and Kejner (1965). Perceived environmental conditions were assessed by two measures of organizational climate. The small sample size limits the strength of their findings, but the fact that those individuals who were designated as highly job involved (subjects falling at or above the 66th percentile on the job involvement scale) demonstrated significant organizational climate-satisfaction correlations in nine of 13 cases compared to only one for the low job involvement group (who scored at or below the 33rd percentile on the job involvement scale) is notable.

Based on their classic review, Rabinowitz and Hall (1977) concluded that:

1. Job involvement is associated with personal and situational characteristics as well as work outcomes such as satisfaction and turnover. Participatory leadership

and job stimulation are the best predictors of job involvement.

2. Job involvement remains quite stable even in the face of major organizational stresses and job redesign efforts.

3. Major determinants of job involvement are unexplained by the research to date.

4. Job involvement is more accurately defined in terms of the employee's perception of the importance of his or her job than with a definition which relates job performance and self-esteem.

5. Job behavior results in, and is effected by, job involvement.

6. Multiple regression studies suggest that situational and personal variables have independent effects on involvement.

7. Low job-involved persons are more effected by situational variables than are highly job-involved individuals.

The confusion surrounding the job involvement construct is often a consequence of how broadly it is defined. Jans (1982), based on his factor analysis of questionnaire responses of 484 professional Army officers, considers job involvement to be the worker's psychological identification with the job. He distinguished between job involvement and the importance of job performance to self-esteem in his

(three-dimensional) description of "work involvement." But many authors consider these (two) factors isolated by Jans as being included in the same construct, job involvement. A broader definition of job involvement is provided by Saleh and Hosck (1976) who consider it 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. 233)

Based on their review of the literature, four different interpretations of the concept of involvement were identified. They profiled an individual as job-involved when he (1) considers his job as a central life interest, (2) participates actively in his job, (3) regards job performance as centrally related to his self-esteem, and (4) considers performance on the job as consistent with his self-concept.

The disagreement over job involvement definitions has resulted in confusion over how to measure the construct. There are two popular measures presently in use, the Central Life Interest Scale (Dubin, 1956) and Job Involvement Scale (Lodahl & Kejner, 1965). The former measures the degree of the employee's work involvement in relation to his or her network activities whereas the latter assesses the extent of worker involvement in the job without reference to other activities. Ben-Porat (1980), using short forms of each of these measures and a blue-collar employee subject pool drawn from eight industrial organizations in Israel,

determined that both are moderately correlated with job satisfaction (.42 for the Job Involvement Scale and .23 for the Central Life Interest Scale) while Job Involvement was the better predictor of job behavior for this sample.

Steel, Kohntopp, and Horst (1983) in an unpublished paper employed a third job involvement measure, an abbreviated version of the Saleh and Hosek (1976) measure called the Job Involvement Index. Consistent with the factor structure reported in Saleh and Hosek (1976), three distinct factors were identified from the questionnaire responses of two predominantly female samples of nursing home (n = 274) and hospital employees (n = 205). These factors correspond to the Work Participation, Central Life Interest and Self-concept definitions of Saleh and Hosek (1976). Steel et al. (1983) therefore consider Job Involvement to be a "unitary psychological process" comprised of three job involvement factors. This position is at variance with the views of Jans (1982) and Kanungo (1982) who argue that three factors of job involvement imply three distinct constructs.

Communication Climate

Communication climate is defined as the extent to which communication is permitted or encouraged within an organization. A precise definition of "communication" is more difficult to provide as was noted by Dance (1970) who,

thirteen years ago, identified 95 different versions. For simplicity's sake, communication can be viewed in terms of the four-step model depicted in Figure 1. Barriers to communication may emanate from three sources: (1) Organizational--as mirrored in organizational policy and hierarchy; (2) Group--imposed through peer-group pressures and mores; and (3) Individual--the attitudes, expectations, values and motives held by a person. Feedback provides the sender of the message information concerning the extent to which the message has been understood and accepted by the receiver and, in turn, can result in further attempts by the sender to exchange feelings, ideas or information. This two-way feedback process requires channels, whether these be verbal or nonverbal, formal or informal, spoken or written.

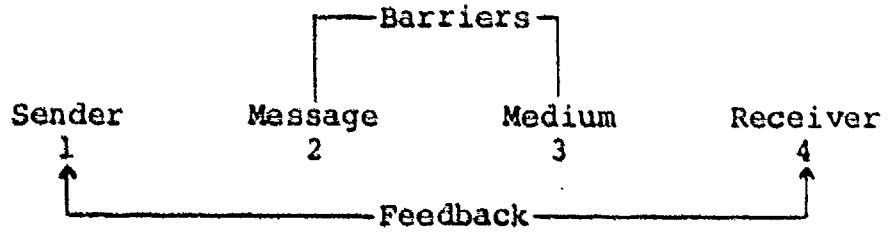


Figure 1. Four-step communication model described by Samaras (1980). (Source: Samaras, T. J. Two-way communication practices for managers. Personnel Journal, 1980, 59 (8), p. 645.)

The importance of organizational communication is suggested by a recent study by Murray (1976). When members of his sample of local and state public administrators were asked to rank eight skills necessary for effective

performance of younger managers in public service, 40 of the 70 respondents ranked communication skills (oral and written) as number one.

Despite the fact that organizational goals can neither be formulated nor maintained without communications, a number of papers (e.g., Porter and Roberts, 1976; Connally, 1977; and Tushman, 1979) address the relative lack of research and the absence of integration of existing findings in this area. Klaus and Bass (1982) noted that by 1972 only 22 major studies had been reported in the area of organizational communication as contrasted with over 4000 investigations concerning job satisfaction. This relative paucity of research may be partially attributed to the difficulty and awkwardness of studying an area which is a process rather than an outcome.

Much of the early research in the field of organizational communication were laboratory studies of structural constraints on communication employing introductory psychology students as subjects. The extent to which the findings of these experiments can be generalized to actual work settings is open to question due to their oftentimes contrived nature with regard to behavioral consequences (such as reinforcement and punishment) or organizational phenomena (including job-performance goals and expectations, and long-range continuity).

A number of communication structures have been described in the literature. For the purposes of comparison, the two "extremes" are discussed here. The most centralized pattern of communication is termed the "wheel" wherein all members in the group communicate only with the most central group member, pictorally represented as Figure 2. Bavelas (1950) noted that organization evolves more rapidly, is more stable, and performance errors are fewer in communication patterns such as the wheel which are characterized by high, localized centrality. Other authors have found the wheel communication pattern to be associated with very distinct, centralized leadership (Leavitt, 1951), rapid organization (Guetzkow & Simon, 1955), adaptivity (Guetzkow & Simon, 1955; Butler, 1981) and low satisfaction of membership (Guetzkow & Simon, 1955; Leavitt, 1951; Bavelas, 1950; Shaw, 1964).

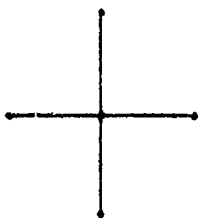

Figure 2. Wheel network

The least centralized pattern of communication is one in which each individual is linked to two other members of the group as depicted in Figure 3. Research has indicated that the circle pattern of communication is associated

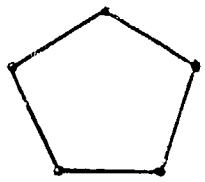

Figure 3. Circle communication

with: higher incidence of performance errors and slower problem solution (Leavitt, 1951; Bavelas, 1950; Shaw, 1964), poor efficiency in message transmission (Shaw, 1964), greater time required for leader development (Leavitt, 1951) and group organization (Guetzkow & Simon, 1955), and higher levels of satisfaction for group members (Guetzkow & Simon, 1955; Leavitt, 1951; Bavelas, 1950; Shaw, 1964). Guetzkow and Simon (1955) found the circle pattern of communication to be the least adaptive of all communication nets.

Summarizing the above, group performance tends to be better for centralized communication networks while morale is usually higher for less centralized patterns of group communication. However, with tasks of increasing complexity, the performance differences between these networks tend to disappear or even result in decentralized groups outperforming those characterized by centralized communication structures (Lawson, 1965; Shaw, 1954) without further decrements in morale.

Only one study has been conducted which assesses how structural communication patterns are affected when a group is embedded within a larger group--a situation more

representative of the actual job setting. This laboratory study conducted by Cohen, Robinson and Edwards (1969) found that when subgroups characterized by greater restriction of communication freedom (such as the "wheel" network) were embedded within larger wheel organizations, members of the subgroup tended to subvert the internally oriented, centralized system by communicating with people outside the subgroup. The authors suggest that "such behavior is probably due to the resistance of members to the imposed constraints of centralized structures" (p. 219). Members of the circle network did not communicate outside of their group as much as members of the wheel network when each subgroup was embedded within a larger wheel organization. The results of this study argue for the exercise of caution in attempting to extrapolate laboratory network findings to organizational settings.

Porter and Roberts (1976), in their classic review of organizational communication literature, arrived at the following general conclusions:

> (1) no adequate theories exist to explain the nature of communication in organizations; (2) considerable extrapolation of relevant research findings from other areas (i.e., attitude change) is required when these findings are applied to organizations; (3) available research findings are of limited usefulness in providing guidelines for effective ways to cope with communication problems in organizations; and (4) more varied and more innovative methodologies for studying organizational communication are necessary for future advances in knowledge in this area. (p. 1553)

Bacharach and Aiken (1977) add to this list another observation concerning communication research.

> A review of the various comparative organizational studies undertaken in the las 10 years reveals a lack of empirical research on organizational constraints on communication. (p. 336)

By constraints, these authors are referring to communication barriers which were discussed previously in this review. In their study of data gathered in 44 local administrative bureaucracies in Belgian cities, these authors found that size, shape, technology, and authority are good predictors of the type of communication between lower level bureaucrats. But these organizational constraints were not good predictors of communication patterns between department heads. As much as 50 percent of the variance in the frequency of subordinate communication was explained by organizational variables though department head communication accounted for little of the variance. These results are consistent with two prior studies (Barnlund & Harland, 1962; Allen & Cohen, 1969) which suggest that communication patterns are affected by the hierarchical level of the individual under study. These findings should serve to warn against broad generalizations concerning communication patterns based on limited sample populations.

Some studies have addressed the effects of the physical dispersement of an organization on communications. Whereas Gullahorn (1952) found that greater distance

between clerical work locations resulted in diminished communication, more recent studies suggest that greater physical space between employees results in more communicative behaviors (Allen & Gerstberger, 1973; Hage, 1974). In this context, Klauss and Bass (1982) observe that

> while most research views communication as a consequence of structuring (or as operating within a structural constraint), we should not exclude consideration of a reverse relationship--namely, that communication processes may also determine structure. (p. 20)

Thomas and Fink in their 1963 review of empirical studies of communication found that both the distribution of participation and the nature of interaction of group members were affected by the size of the group. However, the nature of this effect remains unclear. Most studies suggest a linear relationship (Bacharach & Aiken, 1977; Blau, 1968) whereas Klaus and Bass (1982) suggest that this may be an oversimplification. Basing their conclusions on the work of Blau and Schoenherr (1971) and Hall, Haas, and Jonnson (1976), these authors state:

> It might be that once total organization size reaches a certain level, its impact on communication diminishes as other factors take over in importance (number of departments, work unit size, or such other considerations as work flow and overriding technology constraints). (p. 21)

When the impact of technology on organizational communication is considered, the problem of how to define the unit analysis--the total organization or departmental units and/or subunits--comes into play (Comstock & Scott,

1977). Nevertheless, a number of studies (Randolph & Finch, 1977; Van de Ven, Delbecq, & Koenig, 1976; Penley, 1977; Allen & Cohen, 1969; Tushman, 1977) suggest that communication patterns and processes are significantly related to technology

> and that in the more complex technology environments special communication roles and needs frequently emerge to compensate for and deal with the increasing uncertainty or lack of predictability of the work. (Klauss & Bass, 1982, p. 25)

The importance of defining the unit of analysis can not be overemphasized when organizational communication is considered. The one generality that can be made with certainty concerning research in this area is that no generalities may be made which apply for all organizations and their subunits. As an example of this point, a number of studies have suggested that the more turbulent (uncertain) the task environment, the greater will be the need for increased communication (Glanzer & Glaser, 1961; Taylor & Utterback, 1975; Burns & Stalker, 1966; Negandhi & Reimann, 1973; Lawrence & Lorsch, 1976). All of these studies measured communication at an aggregate level. Yet, when Tushman (1979) tested the hypothesis that subunits operating under changing environmental conditions would increase the amount of work-related communication both within the project and outside the organization he found instead that there was no overall change in intraproject communications. Such communications were contingent on the nature of the

task. Extra-unit communications demonstrated an inverse relationship to environmental uncertainty.

Aside from the varying contexts in which organizational communication takes place, a host of other factors also have a bearing on the favorability of an organization's communication climate including: intrapersonal and interpersonal factors, hierarchical considerations and, as King (1978) notes, "the amount or quantity of information exchanged among people, its quality, and the number and nature of channels available for relaying the information" (p. 204). For a comprehensive review of these facets of organizational life which impact the communication climate, the reader is referred to Klaus and Bass (1982) and Porter and Roberts (1976).

Before moving on to the topic of job satisfaction, three of the 16 propositions (plus corollaries) offered by Ference (1970) are here reproduced. These are helpful in shedding light on the communication process which occurs when a QC group interacts with management.

> PROPOSITION 2. When information is evaluated and integrated at a position in a communications network, the weight given to the information will depend on the source providing the information.
>
> PROPOSITION 4. The extent to which information is altered as it is carried through a communication network will depend on the source, content, and point of entry of the information.
>
> PROPOSITION 4.1. To the extent that influence is differentially distributed among the members of an

> organization, the susceptibility of information to alteration will vary directly with the influence of the source providing the information. (pp. B-85 to B-86)

Job Satisfaction

Edwin Locke (1976) defines job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (p. 1300). The apparent simplicity of this definition tends to understate the complexity of the construct. As Locke implies, job satisfaction can not be understood merely by studying the job and its objective influences. The construct also embodies the expectations and subjective perceptions of an individual concerning his work. Therefore the literature concerning job satisfaction is both voluminous and difficult to integrate.

Systematic study of job satisfaction began in the 1930s. Based on data collected from samples which included 500 school teachers from several dozen communities and most adults in one small town, Hoppock, in his classic 1935 monograph on job satisfaction, determined that job satisfaction is affected by a number of factors including achievement, fatigue, working conditions, monotony and supervision. His findings were also consistent with work relating job satisfaction to mental health and life satisfaction. Hoppock's work is notable because his was the first major study of job satisfaction to employ attitude scales and

survey methods. Nevertheless, it was Elton Mayo's 1933 report of studies conducted at the Hawthorne plant of the Western Electric Company that proved to be the most influential.

Mayo's research began by studying the effects of changes in the physical working environment on productivity. This work evolved to an exploration of the effect of social factors on this same dependent variable. These studies established the foundations for the development of the Human Relations school of organizational psychology. This school of thought significantly influenced job satisfaction research for the next two to three decades by holding as its basic tenants: (1) increased job satisfaction results in increased job performance, and (2) job satisfaction is directly linked to the nature of human relationships in organizations.

The notion that a "happy worker is a productive worker" has some intuitive appeal though research has failed to demonstrate any consistent relationship between performance and job satisfaction. In a review of the literature, Brayfield and Crockett (1955) concluded that

> there is little evidence that employee attitudes of the type usually measured in morale surveys bear any simple--or for that matter, appreciable--relationship to performance on the job. (p. 422)

A later review of the satisfaction/performance relationship by Vroom (1964) confirmed these conclusions. The median

correlation for the 23 studies he reviewed was statistically nonsignificant (r = .14). These findings, in combination with a 1959 monograph by Herzberg, Mausner and Snyderman, tended to reorient empirical and theoretical efforts toward a consideration of the contextual features of the job (i.e., pay, working conditions, managerial style, etc.) and their relationship with employee satisfaction on the job. Though Herzberg's famous "two-factor" theory first presented in 1959 has undergone considerable criticism (Locke, 1976), "the emphasis on attaining job satisfaction through the work itself," a view strongly advocated by Herzberg, "is perhaps the major interest of contemporary workers in the field of job satisfaction" (Gruenberg, 1979, p. 8).

More recently, the satisfaction/performance issue has been revisited. Organ (1977) has noted that only three of the 23 studies reviewed by Vroom (1964) demonstrated negative correlations, one of which was -.03. The probability of obtaining by chance such a high percentage (87%) of studies yielding positive correlations is only .0002. He additionally claims that correlations within the range of .10 to .30 (which constitute the majority of studies reviewed by Brayfield and Crockett and Vroom) are typical of those obtained in the behavioral sciences, especially when the criterion is evaluated in terms of a single variable. Further, as Ivancevich (1978) observes, none of the

studies reviewed by Vroom assessed the causality of the satisfaction/performance relationship. This latter point was of particular interest to Lawler and Porter (1967) who speculated that

> good performance may lead to rewards, which in turn lead to satisfaction; this formulation then would say that satisfaction, rather than causing performance, as was previously assumed, is caused by it. (p. 23)

Ivancevich, in his 1978 field study of 108 experienced machinists and 62 machine repair technicians, employed a passive quasi-experimental (cross-lag correlation) design with sophisticated methodological techniques (corrected cross-lag procedures, dynamic correlations, and frequency-of-change-in-product-moment (FCP) technique) in order to assess the nature (i.e., source and direction) of any relationship between job satisfaction and performance. His findings suggest that this relationship, when it exists, is sensitive to situational variables and hence "there is no single 'correct' relationship between performance and satisfaction" (p. 363).

Lawler and Porter's (1967) theoretical work concerning the performance/satisfaction relationship incorporates rewards as an intervening mechanism. A study which lends support to this proposal was conducted by Green (1973) who found that second-period satisfaction was moderately correlated with first-period managerial performance ($r = .49$) and that the correlation between performance and later merit

pay (a contingent reward) was .17. Lawler and Porter's (1967) theory predicts that the level of job satisfaction is dependent upon the strength of association between rewards and job performance. The interpretation of these results is complicated, however, by the fact that prior merit pay correlated .44 with later performance and that there was a .17 correlation between prior satisfaction and subsequent performance. A more recent field study by Orpen (1982) also addressed the issue of reward contingency and noncontingency and this effect on employee satisfaction and performance. Subjects for this research were 63 black factory workers in South Africa. Participants in this study were randomly assigned to one of three reward conditions. The first group received a monetary reward for all instances of error-free performance, the result being that satisfaction and performance were highly correlated ($r = .70$; $p < .001$) for this group. The second group was aware that they only had a 25% chance of financial remuneration for every error-free performance. Though their "reward" was four times greater than the first group's, this group's data yielded a .39 correlation between performance and satisfaction. The remaining group received noncontingent reward. A payment was received regardless of whether their performance was correct or incorrect. The correlation between their performance and measured satisfaction was $r = .01$ ($p < .05$). These findings demonstrate that the

strength of the relationship between satisfaction and performance is highly dependent upon the contingency of the reward system upon performance.

Basing her conclusions on the work of attitude theorists (Fishbein & Aizen, 1975) and researchers (Tittle & Hill, 1967), Fisher (1980) observes that a probable reason for the low correlation between job satisfaction and job performance is that in the typical study

> performance is measured at one point in time, by one method. In essence, a single-act, single-observation is obtained. It is then correlated with a "traditional attitude measure" as defined by Fishbein (1973)--that is, a measure of overall satisfaction with an object, the object in this case being the job as a whole. It should not be surprising that such relationships are weak. One way to strengthen them would be to obtain a patterned or multiple-observation criterion of behavior. Such a criteria could include repeated observations of performance measured in several ways, such as objective measures and rating from several sources. (p. 609)

Another observation made by Fisher is that instead of employing measures of overall job satisfaction, more specific satisfaction measures are needed which assess the respondent's satisfaction with various facets of his job. She further suggests that these measures emphasize the assessment of employee attitudes toward actually performing the aspect of the job under study rather than measuring an attitude toward the job or its components. This emphasis upon increased specificity of attitude measurement was advocated by Fishbein in 1973 and successfully employed in several studies (e.g., Heberlein and Black, 1976).

Another approach toward understanding of the satisfaction/performance relationship is to consider other factors which mediate their relationship. A discussion of the affect of rewards and their mediational role has already been presented. Other intervening variables which have been suggested include the employees' need for satisfaction (Slocum, 1971), need for achievement (Steers, 1975), and self-esteem (Korman, 1977). Hackman and Lawler (1971) found that job satisfaction in combination with four core dimensions of jobs (autonomy, variety, identity and knowledge) was positively correlated with production. Also, the effects of the four dimensions were found to be additive; job satisfaction and performance were greater with increases in the composite score of these dimensions. Katzell and Yankelovich's 1975 review of research linking job satisfaction and productivity supported Hackman and Lawler's (1971) findings. They conclude that a number of job dimensions must be changed before there is a perceptible effect on productivity or satisfaction.

Whereas the extent of the relationship between job satisfaction and performance still is unclear, the evidence concerning the relationship between job satisfaction and employee turnover appears far more conclusive. Porter and Steer's (1973) review of 15 studies published between 1955 and 1972 revealed all but one demonstrated a positive relationship between turnover and job satisfaction. These

authors found that a number of factors related to employee satisfaction appeared to have a significant effect in precipitating resignation. The first of these factors is satisfaction with pay (both actual level of pay and perceived equitable level) and perceived promotional opportunities. Other factors include job content (most notably task repetitiveness), social support (from both the work supervisor and one's peers) and personality factors. With regard to the latter, Porter and Steers conclude that

> a tendency exists for employees manifesting very high degrees of anxiety, emotional insecurity, aggression, self-confidence, and ambition, to leave the organization at a higher rate than employees possessing such traits in a more moderate degree. (p. 167)

The research on job satisfaction is far too extensive to completely address here. For the most complete literature review to date, the reader is referred to Edwin Locke's (1976) paper. His conclusions are that

> work satisfaction is engendered by work which is varied, allows autonomy, is not physically fatiguing, which is mentally challenging and yet allows the individual to experience success, and which is personally interesting. Satisfaction with rewards such as pay, promotions, and recognition depends on the fairness or equity with which they are administered and the degree to which they are congruent with the individual's physical needs and the degree to which they facilitate the attainment of his work goals. (p. 1342)

# CHAPTER III

# METHOD

## Subjects

A total of 583 predominently male subjects completed pretest questionnaires. Of these, 284 were drawn from 22 work centers at a southwestern United States military hospital. The remaining 299 participants worked in one of 14 work centers at a southeastern United States USAF installation. Posttest results were collected approximately one year later. During that interval, the number of work centers actively participating in this study was significantly reduced, a topic which is addressed in Chapter V, Discussion and Conclusions. At the hospital, 4 work centers terminated their QC involvement thereby reducing work center participation from 22 to 18 with 101 individuals actually completing the posttest questionnaire (all but one of whom were participants in the pretest survey). Only 4 of the original 14 work centers at the USAF installation provided post-intervention data involving 94 individuals, none of whom participated in the pretest phase of this study.

A summary of subject participation in this study is presented as Table 1.

Table 1

Summary of Pretest and Posttest Participation at a Southeastern U.S. USAF Installation and a Southwestern U.S. Military Hospital

| USAF Installation | | | Military Hospital | | |
|---|---|---|---|---|---|
| | # of individuals participating | | | # of individuals participating | |
| Work Center | Pretest | Posttest | Work Center | Pretest | Posttest |
| 1* | 63 | 39 | 1 @ | 9 | 2 |
| 2 | 17 | 40 | 2 @ | 7 | -- |
| 3* | 52 | 4 | 3* | 8 | 2 |
| 4 | 64 | 11 | 4 | 10 | 3 |
| 5*@ | 14 | -- | 5* | 24 | 11 |
| 6 @ | 6 | -- | 6 | 16 | 5 |
| 7*@ | 8 | -- | 7 | 11 | 5 |
| 8 @ | 10 | -- | 8 | 15 | 3 |
| 9*@ | 17 | -- | 9 @ | 4 | 2 |
| 10 @ | 12 | -- | 10 @ | 2 | -- |
| 11*@ | 7 | -- | 11 | 20 | 5 |
| 12 @ | 6 | -- | 12 | 25 | 11 |
| 13*@ | 14 | -- | 13* | 9 | 5 |
| 14 @ | 9 | -- | 14* | 7 | 1 |
| | | | 15 | 22 | 4 |
| | | | 16*@ | 7 | -- |
| | | | 17 @ | 1 | -- |
| | | | 18 | 24 | 13 |
| | | | 19 @ | 2 | 1 |
| | | | 20 | 41 | 24 |
| | | | 21 @ | 12 | 2 |
| | | | 22 @ | 8 | 2 |
| Total | 299 | 94 | Total | 284 | 101 |

* indicates the work center was a QC group.

@ indicates that the work center was excluded from regression analysis due to insufficient posttest data.

## Measures

Data collection procedures employed a survey questionnaire (AFIT Survey of Work Attitudes) which was comprised of 13 demographic items and 119 Likert-type statements sensitive to beliefs, attitudes and behavioral intentions related to work and organizational factors. The survey provided data on five attitudinal variables for the current study--participation in decision making, decision-making effectiveness, job involvement, communication climate and job satisfaction. The psychometric and conceptual attributes of these measures are described below. Appendices A, B, and C provide listings of survey questions.

Reliability. Reliability coefficients were tabulated using pretest data collected from work centers 1 to 14 at the USAF installation (Table 2) and work centers 1 to 22 at the military hospital (Table 3). This large data base was used to derive Cronbach's alpha in preference to using the smaller subset of data derived from those work centers from which posttest data could be collected so that N could be kept as large as possible. Those measures with lower reliabilities (e.g., participative decision making, communication climate, extrinsic and general satisfaction, and self-concept definition) suffer risk of masking potentially significant findings.

Participation in decision making. The subjects were asked to respond on a 7-point scale (ranging from "strongly

Table 2

Reliabilities of AFIT Survey of Work Attitudes' Scales Based on Southeastern U.S. USAF Installation Data Base

| Scale | Variable | M | Scale M | Scale SD | Reliability (alpha) |
|---|---|---|---|---|---|
| Participative Decision Making | DM1 | 3.78 | 7.80 | 3.32 | 0.62 |
| | DM2 | 4.02 | | | |
| Decision Making Effectiveness | DM3 | 4.49 | 8.90 | 3.27 | 0.85 |
| | DM4 | 4.41 | | | |
| Communication Climate | COMM1 | 4.25 | 13.15 | 4.09 | 0.64 |
| | COMM2 | 4.70 | | | |
| | COMM3 | 4.20 | | | |
| Extrinsic Satisfaction | SAT5 | 3.19 | 17.34 | 4.90 | 0.72 |
| | SAT6 | 3.42 | | | |
| | SAT12 | 2.34 | | | |
| | SAT13 | 2.81 | | | |
| | SAT14 | 2.86 | | | |
| | SAT19 | 2.73 | | | |
| Intrinsic Satisfaction | SAT1 | 3.64 | 43.19 | 8.06 | 0.84 |
| | SAT2 | 3.85 | | | |
| | SAT3 | 3.76 | | | |
| | SAT4 | 3.20 | | | |
| | SAT7 | 3.80 | | | |
| | SAT8 | 4.02 | | | |
| | SAT9 | 3.70 | | | |
| | SAT10 | 3.41 | | | |
| | SAT11 | 3.66 | | | |
| | SAT15 | 3.23 | | | |
| | SAT16 | 3.32 | | | |
| | SAT20 | 3.60 | | | |
| General Satisfaction | SAT17 | 3.19 | 67.56 | 12.65 | 0.57 |
| | SAT18 | 3.84 | | | |
| | EXTRINSIC | 17.34 | | | |
| | INTRINSIC | 43.19 | | | |
| Work Participation | JI1 | 5.66 | 23.35 | 7.13 | 0.83 |
| | JI2 | 4.34 | | | |
| | JI3 | 4.17 | | | |
| | JI4 | 4.45 | | | |
| | JI5 | 4.73 | | | |
| Central Life Interest | JI6 | 3.31 | 15.03 | 8.14 | 0.92 |
| | JI7 | 3.58 | | | |
| | JI8 | 3.05 | | | |
| | JI9 | 3.00 | | | |
| | JI10 | 2.10 | | | |
| Self-Concept | JI12 | 6.11 | 16.85 | 3.68 | 0.75 |
| | JI13 | 5.85 | | | |
| | JI14 | 4.88 | | | |

Table 3

Reliabilities of AFIT Survey of Work Attitudes' Scales Based on Southwestern U.S. Military Hospital Data Base

| Scale | Variable | M | Scale M | Scale SD | Reliability (alpha) |
|---|---|---|---|---|---|
| Participative Decision Making | DM1 | 3.73 | 7.80 | 3.29 | 0.63 |
| | DM2 | 4.06 | | | |
| Decision Making Effectiveness | DM3 | 4.39 | 8.71 | 3.41 | 0.84 |
| | DM4 | 4.32 | | | |
| Communication Climate | COMM1 | 4.57 | 13.78 | 4.24 | 0.68 |
| | COMM2 | 4.92 | | | |
| | COMM3 | 4.29 | | | |
| Extrinsic Satisfaction | SAT5 | 3.19 | 18.28 | 5.22 | 0.79 |
| | SAT6 | 3.54 | | | |
| | SAT12 | 2.62 | | | |
| | SAT13 | 3.06 | | | |
| | SAT14 | 2.84 | | | |
| | SAT19 | 3.04 | | | |
| Intrinsic Satisfaction | SAT1 | 4.03 | 44.62 | 8.26 | 0.85 |
| | SAT2 | 3.91 | | | |
| | SAT3 | 3.72 | | | |
| | SAT4 | 3.29 | | | |
| | SAT7 | 3.85 | | | |
| | SAT8 | 4.22 | | | |
| | SAT9 | 4.07 | | | |
| | SAT10 | 3.54 | | | |
| | SAT11 | 3.53 | | | |
| | SAT15 | 3.36 | | | |
| | SAT16 | 3.49 | | | |
| | SAT20 | 3.62 | | | |
| General Satisfaction | SAT17 | 3.18 | 69.66 | 13.64 | 0.63 |
| | SAT18 | 3.58 | | | |
| | EXTRINSIC | 18.28 | | | |
| | INTRINSIC | 44.62 | | | |
| Work Participation | JI1 | 5.48 | 24.07 | 7.49 | 0.84 |
| | JI2 | 4.57 | | | |
| | JI3 | 4.52 | | | |
| | JI4 | 4.36 | | | |
| | JI5 | 5.15 | | | |
| Central Life Interest | JI6 | 3.59 | 16.22 | 7.79 | 0.90 |
| | JI7 | 3.86 | | | |
| | JI8 | 3.34 | | | |
| | JI9 | 3.27 | | | |
| | JI10 | 2.17 | | | |
| Self-Concept | JI12 | 6.45 | 17.87 | 3.12 | 0.66 |
| | JI13 | 6.11 | | | |
| | JI14 | 5.32 | | | |

disagree" to "strongly agree") to the following two statements:

> "Within my work-group the people most affected by decisions frequently participate in making the decisions."
>
> "In my work-group there is a great deal of opportunity to be involved in resolving problems which affect the group."

Decision-making effectiveness. Subjects were instructed to indicate on a 7-point scale (from "strongly disagree" to "strongly agree") their endorsement/rejection of the following two statements:

> "My work-group is very effective in making decisions."
>
> "My work-group is very effective in the process of group problem solving (i.e., clearly defining/specifying the problem(s), developing and evaluating alternative solutions, and selecting, implementing and evaluating a solution)."

Communication climate. Three statements were used to index the organization's communication climate. Subjects were asked to respond on a scale ranging between 1 (strongly disagree) and 7 (strongly agree) to the following:

> "My organization provides all the necessary information for me to do my job effectively."
>
> "My work group is usually aware of important events and situations."
>
> "My supervisor asks members of my work group for our ideas on task improvements."

Job satisfaction. The AFIT Survey of Work attitudes incorporates the short form of the Minnesota Satisfaction Questionnaire (Weiss, Davis, England, & Lofquist, 1976)

which was used to assess employee satisfaction. Subjects' responses were measured on a 5-point scale from "very dissatisfied" to "very satisfied." Indices of a worker's satisfaction with intrinsic, extrinsic and general aspects of the job were determined. A copy of the job satisfaction items used in this study is presented as Appendix B.

Job involvement. The fifteen statements which Steel, Kohntopp, and Horst (1983) extracted from the lengthier Job Involvement Index (Saleh & Hosek, 1976) were used in this study to assess subjects' perceptions of their job involvement. Consistent with the factor analytic work of Saleh and Hosek (1976), Steel et al. (1983) selected five items with high average loadings from each of the three identified factors. The three factors, as labeled by Steel et al. (1983) and defined by Saleh and Hosek (1976), are: (1) Work Participation--"the degree to which an employee is participating in his job and meeting such needs as prestige, self-respect, autonomy, and self-regard" (p. 214); (2) Central Life Interest--"the degree to which the total job situation is a central life interest" (p. 213); and (3) Self-Concept Definition--"the degree to which the employee perceived that his job performance is central to his self-concept" (p. 214). The job involvement items used in this study are presented in Appendix C.

Steel, Kohntopp, and Horst (1983) estimated internal consistency reliabilities for each job involvement scale

factor based on Cronbach's coefficient alpha. As three different samples of subjects were studied, reliabilities for each factor are presented as a range of values. The work participation scale yielded reliabilities ranging from .77 to .85. The reliability of the Central Life Interest scale ranged from .87 to .91. Lastly, the alphas obtained for the Self-Concept Definition factor demonstrated a much broader range; from .63 to .93. These reliabilities are consistent with those presented in Tables 2 and 3.

Procedure

Pre-intervention measures were taken in January, 1981 after which QC training was initiated by the QC facilitators at both the hospital and the USAF base. Training for experimental subjects consisted of 10 hour-long sessions conducted during working hours. Following the 10 weeks of training, the QC program was initiated. Posttest data for both experimental and control groups were collected approximately one year following pretest administration.

Study participants were not randomly assigned to treatment conditions but instead were drawn from intact work groups. Because the QC and experimental groups could not be assumed to be equivalent with respect to work-related attitudes, beliefs and behavioral intentions at the study's onset, baseline observations were made in order to:

(1) determine if group differences did exist prior to initiation of the QC program, and (2) correct for pre-existing group differences which might otherwise contaminate interpretation of the study's results. After this correction is applied, posttest differences between groups should indicate the effect of QC participation upon experimental group members. This research design is called a Nonequivalent Control Group Design (Campbell & Stanley, 1963).

Analysis

Cronbach's coefficient alpha was used to estimate the internal consistency reliability of each of the attitudinal variables under study. Alpha statistics were computed for both the USAF installation and hospital pretest subject pools.

Mean scores for attitudinal variables were computed for each of the work centers participating in this study. The pattern of means between treatment and control group conditions is presented and discussed in Chapter IV.

Hierarchical regression analysis was employed to evaluate the effect of the QC intervention on employee attitudes. This analysis was performed using work center group mean data. An additional analysis was performed using the subset of 100 hospital employees who participated in both pretest and posttest phases of this study. A

A two-step regression was used with each attitude variable. In step one, posttest results were regressed on pretest scores. In step two, a dummy variable, coded (0) for the control group or (1) for the treatment group, next entered the regression equation. Significant increments in criterion variance as a function of the entry of the dummy variable indicate that the treatment produced group differences above those existing at the advent of the study.

# CHAPTER IV

# RESULTS

## Demographic Comparison

The demographic variables which were measured in this study include the subject's age, schooling, work tenure (i.e., time in the current organization), job time (i.e., total months in present position) and occupational time (i.e., total months in present occupation). t-tests were performed to test for significant changes in demographic composition of the QC and control groups during the course of the study at both the USAF installation and at the military hospital. These results appear in Tables 4 and 5, respectively. The legend to interpret Tables 4 and 5 is as follows:

Age:

2 represents ages 26 to 30

3 represents ages 31 to 40

School:

2 represents some college work

3 represents associate degree or LPN

Tenure:

3 represents more than 12 months, less than 18 months

4 represents more than 18 months, less than 24 months

Table 4

QC and Control Groups' Pretest and Posttest Demographic Characteristics at the USAF Installation

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Age | 2.59 | 1.21 | 2.08 | 0.92 | -3.37* | 2.77 | 1.11 | 2.67 | 0.95 | -0.47 |
| School | 2.59 | 0.94 | 2.32 | 0.66 | -2.37* | 2.91 | 0.97 | 2.80 | 1.14 | -0.49 |
| Tenure | 4.49 | 1.80 | 3.79 | 1.89 | -2.55* | 4.74 | 2.01 | 4.49 | 1.50 | -0.68 |
| Job Time | 4.06 | 1.75 | 3.49 | 1.69 | -2.26* | 4.42 | 1.86 | 3.75 | 1.48 | -1.89 |
| Occupational Time | 5.22 | 1.74 | 3.92 | 1.86 | -4.84* | 5.07 | 2.05 | 4.90 | 1.81 | -0.42 |

Note: *$p < 0.05$.

Table 5

QC and Control Groups' Pretest and Posttest Demographic Characteristics at the Military Hospital

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Age | 3.04 | 0.96 | 3.22 | 1.42 | 1.00 | 3.33 | 1.28 | 3.90 | 1.34 | 1.61 |
| School | 3.02 | 1.03 | 3.40 | 1.51 | 2.01* | 3.17 | 1.25 | 3.74 | 1.70 | 1.60 |
| Tenure | 4.11 | 1.86 | 4.88 | 1.93 | 2.45* | 6.00 | 0.84 | 6.41 | 1.00 | 1.78 |
| Job Time | 3.91 | 1.89 | 3.59 | 1.85 | -1.07 | 4.33 | 1.72 | 4.84 | 1.93 | 1.01 |
| Occupa-tional Time | 5.56 | 2.03 | 4.78 | 2.02 | -2.34* | 6.06 | 1.47 | 5.88 | 1.54 | -0.42 |

Note: *$p < 0.05$.

Job Time:

3 represents more than 12 months, less than 18 months

4 represents more than 18 months, less than 24 months

Occupational Time:

3 represents between 1 and 2 years

4 represents between 2 and 3 years

5 represents between 3 and 4 years

For a more detailed listing of demographic categories, refer to Appendix D.

Tables 4 and 5 indicate that there were significant demographic differences between QC and control groups at the time of this study's initiation. All such differences were absent at the time of the posttest for both the USAF installation and the military hospital. These results reveal that the composition of the QC and control groups changed significantly over the length of the study with initial demographic differences disappearing with time.

Variable Intercorrelation

Pearson product-moment correlation coefficients were computed between all pretest and posttest variables under study. The purpose was to determine whether correlations among measures of participative decision making, decision making effectiveness, communication climate, job satisfaction and job involvement remained stable with time.

Table 6 displays the matrix of correlations when USAF installation and hospital data are combined. Values below the main diagonal are correlations derived using pretest data. Correlations from the posttest data appear above the main diagonal.

For both pretest and posttest data certain correlational trends are evident. There is significant intercorrelation among measures of job satisfaction and between participative decision making and decision-making effectiveness. However, strong intercorrelations between job involvement measures are not in evidence suggesting that they are not strongly related. The work participation measure of job involvement correlates more strongly with two of the three satisfaction measures. Another moderately strong correlational relationship is in evidence between extrinsic and general job satisfactions and communication climate. It is notable that no correlation falls below .21 and that pretest and posttest patterns of intercorrelation are similar.

Tests of Quality Circles Effects

Appendices E and F provide pretest and posttest means for each of the nine attitudinal variables under study by work center at the USAF installation and the military hospital, respectively. These work center means were then aggregated and summed dichotomously for each attitudinal

Table 6

Intercorrelation Matrix of Nine Attitudinal Variables for Pretest and Posttest Survey Administrations at a USAF Installation and a Military Hospital

| Attitudinal Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Participative Decision Making | POSTTEST / PRETEST | 0.61 | 0.25 | 0.33 | 0.33 | 0.36 | 0.35 | 0.33 | 0.28 |
| 2. Decision Making Effectiveness | 0.59 | | 0.38 | 0.31 | 0.26 | 0.31 | 0.34 | 0.23 | 0.30 |
| 3. Communication Climate | 0.34 | 0.42 | | 0.56 | 0.48 | 0.67 | 0.46 | 0.34 | 0.37 |
| Job Satisfaction | | | | | | | | | |
| 4. Extrinsic | 0.44 | 0.43 | 0.57 | | 0.62 | 0.84 | 0.43 | 0.32 | 0.30 |
| 5. Intrinsic | 0.41 | 0.39 | 0.45 | 0.67 | | 0.94 | 0.70 | 0.39 | 0.29 |
| 6. General | 0.46 | 0.46 | 0.55 | 0.87 | 0.94 | | 0.66 | 0.40 | 0.32 |
| Job Involvement | | | | | | | | | |
| 7. Work Participation | 0.40 | 0.39 | 0.46 | 0.49 | 0.72 | 0.69 | | 0.39 | 0.37 |
| 8. Central Life Interest | 0.35 | 0.35 | 0.37 | 0.41 | 0.46 | 0.49 | 0.47 | | 0.38 |
| 9. Self-Concept Definition | 0.21 | 0.26 | 0.35 | 0.26 | 0.39 | 0.37 | 0.43 | 0.46 | |

Note: All values $p < 0.01$.

variable according to whether the work center was a QC or a control group. t-tests were performed using these aggregate means to test for significant differences between QC group and control group responses to each of the attitudinal variables (Tables 7-10). Tables 7 and 8 reveal that significant differences existed between QC and control groups at both sites. At the USAF installation a significant pretest difference existed for all satisfaction measures and work participation; at the military hospital the significant pretest difference involved the attitudinal variable "self-concept definition" of job involvement. When work group means for the two facilities are combined (as depicted in Table 9), all pretest differences wash out. No significant posttest attitudinal differences were in evidence at either facility or when data from the USAF installation and the military hospital are combined. These findings are consistent with the results presented in Table 10. Table 10 was developed by reducing the military hospital's data base to include only those individuals who participated in both the pretest and posttest surveys. t-tests were performed using individual, rather than group, data. To summarize the results from Tables 7-10, it can be said that over the spectrum of attitudes considered there are no significant differences between QC and control groups for posttest data from these two samples.

Table 7

Means, Standard Deviations and t-tests for QC and Control Groups from the USAF Installation

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Participative Decision Making | 7.60 | 3.33 | 7.20 | 3.22 | -0.83 | 7.22 | 3.28 | 8.43 | 2.64 | 1.92 |
| Decision Making Effectiveness | 8.55 | 3.19 | 8.64 | 3.20 | 0.20 | 8.67 | 2.87 | 9.59 | 2.63 | 1.60 |
| Communication Climate | 12.94 | 4.13 | 12.33 | 3.72 | -1.07 | 13.37 | 3.90 | 14.37 | 3.73 | 1.27 |
| Job Satisfaction | | | | | | | | | | |
| Extrinsic | 17.23 | 4.57 | 15.83 | 4.85 | -2.05* | 18.16 | 4.58 | 18.52 | 5.14 | 0.35 |
| Intrinsic | 43.17 | 7.98 | 39.98 | 7.61 | -2.81* | 44.58 | 8.03 | 43.10 | 8.71 | -0.85 |
| General | 67.44 | 12.10 | 62.36 | 12.33 | -2.88* | 69.70 | 12.39 | 68.55 | 12.86 | -0.43 |

Table 7--Continued

| Variable | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| | M | SD | M | SD | t | M | SD | M | SD | t |
| Job Involvement | | | | | | | | | | |
| Work Participation | 23.40 | 6.69 | 20.88 | 6.77 | -2.59* | 24.58 | 6.65 | 23.80 | 6.82 | -0.56 |
| Central Life Interest | 13.91 | 7.89 | 13.81 | 7.36 | -0.09 | 14.65 | 7.93 | 15.10 | 8.73 | 0.26 |
| Self-Concept Definition | 16.81 | 3.42 | 15.73 | 4.33 | -1.87 | 16.79 | 3.62 | 17.02 | 3.60 | 0.31 |

Notes:

*$p < 0.05$.

$N = 4$.

Table 8

Means, Standard Deviations and t-tests for QC and Control Groups from the Military Hospital

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Participative Decision Making | 7.75 | 3.77 | 7.71 | 3.25 | -0.06 | 8.11 | 3.25 | 8.36 | 3.77 | 0.29 |
| Decision Making Effectiveness | 8.13 | 3.66 | 8.79 | 3.33 | 1.14 | 9.47 | 3.63 | 9.40 | 3.38 | -0.08 |
| Communication Climate | 13.83 | 3.95 | 13.74 | 4.41 | -0.14 | 15.47 | 4.56 | 15.56 | 4.07 | 0.07 |
| Job Satisfaction | | | | | | | | | | |
| Extrinsic | 17.58 | 5.23 | 18.36 | 5.26 | 0.91 | 19.00 | 5.70 | 20.24 | 5.42 | 0.88 |
| Intrinsic | 44.21 | 8.01 | 44.76 | 8.54 | 0.40 | 46.26 | 11.45 | 48.92 | 6.98 | 0.96 |
| General | 68.31 | 12.98 | 70.01 | 14.00 | 0.79 | 71.58 | 17.26 | 76.96 | 12.58 | 1.27 |

Table 8--Continued

| Variable | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| | M | SD | M | SD | t | M | SD | M | SD | t |
| Job Involvement | | | | | | | | | | |
| Work Participation | 25.02 | 6.85 | 23.96 | 7.90 | -0.91 | 27.84 | 6.46 | 28.48 | 5.39 | 0.40 |
| Central Life Interest | 18.10 | 7.68 | 16.01 | 7.71 | -1.68 | 18.63 | 7.40 | 18.81 | 9.07 | 0.09 |
| Self-Concept | 18.67 | 2.33 | 17.71 | 3.37 | -2.30* | 18.89 | 2.42 | 18.90 | 2.49 | 0.01 |

Notes:

*$p < 0.05$.

$N = 13$.

Table 9

Means, Standard Deviations and t-tests for QC and Control Groups for Combined Data (USAF Installation and Military Hospital)

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Participative Decision Making | 7.64 | 3.46 | 7.56 | 3.24 | -0.25 | 7.50 | 3.27 | 8.39 | 3.34 | 1.70 |
| Decision Making Effectiveness | 8.42 | 3.33 | 8.74 | 3.28 | 0.97 | 8.92 | 3.12 | 9.48 | 3.08 | 1.16 |
| Communication Climate | 13.20 | 4.09 | 13.31 | 4.25 | 0.26 | 14.02 | 4.19 | 15.07 | 3.96 | 1.64 |
| Job Satisfaction | | | | | | | | | | |
| Extrinsic | 17.34 | 4.76 | 17.57 | 5.26 | 0.48 | 18.42 | 4.92 | 19.53 | 5.35 | 1.41 |
| Intrinsic | 43.47 | 7.98 | 43.26 | 8.54 | -0.26 | 45.10 | 9.15 | 46.58 | 8.20 | 1.08 |
| General | 67.70 | 12.33 | 67.60 | 13.93 | -0.07 | 70.27 | 13.94 | 73.55 | 13.31 | 1.55 |

Table 9--Continued

| Variable | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| | M | SD | M | SD | t | M | SD | M | SD | t |
| Job Involvement | | | | | | | | | | |
| Work Participation | 23.88 | 6.75 | 23.01 | 7.69 | -1.21 | 25.58 | 6.71 | 26.56 | 6.42 | 0.96 |
| Central Life Interest | 15.15 | 8.03 | 15.33 | 7.66 | 0.23 | 15.87 | 7.93 | 17.28 | 9.09 | 1.09 |
| Self-Concept | 17.36 | 3.24 | 17.10 | 3.79 | -0.74 | 17.44 | 3.42 | 18.14 | 3.12 | 1.36 |

Notes:

*$p < 0.05$.

$N = 17$.

Table 10

Means, Standard Deviations and t-tests for 100 Individuals from the Military Hospital

| | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| Variable | M | SD | M | SD | t | M | SD | M | SD | t |
| Participative Decision Making | 8.26 | 3.07 | 7.68 | 3.39 | -0.69 | 8.11 | 3.25 | 8.64 | 3.68 | 0.63 |
| Decision Making Effectiveness | 8.42 | 3.55 | 9.06 | 3.44 | 0.73 | 9.47 | 3.63 | 9.51 | 3.33 | 0.04 |
| Communication Climate | 13.63 | 3.50 | 14.27 | 4.22 | 0.69 | 15.47 | 4.56 | 15.58 | 3.98 | 0.09 |
| Job Satisfaction | | | | | | | | | | |
| Extrinsic | 18.21 | 5.12 | 18.81 | 5.24 | 0.45 | 19.00 | 5.70 | 20.09 | 5.36 | 0.79 |
| Intrinsic | 44.00 | 9.42 | 46.30 | 7.64 | 0.99 | 46.26 | 11.45 | 48.72 | 7.07 | 0.89 |
| General | 69.00 | 14.95 | 72.33 | 12.63 | 0.90 | 71.58 | 17.26 | 76.54 | 12.61 | 0.89 |

Table 10--Continued

| Variable | Pretest | | | | | Posttest | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quality Circle | | Control Group | | | Quality Circle | | Control Group | | |
| | M | SD | M | SD | t | M | SD | M | SD | t |
| Job Involvement | | | | | | | | | | |
| Work Participation | 25.61 | 7.02 | 25.41 | 7.15 | -0.11 | 27.84 | 6.46 | 27.99 | 5.94 | 0.09 |
| Central Life Interest | 19.74 | 7.48 | 16.41 | 7.83 | -1.68 | 18.63 | 7.40 | 18.30 | 9.01 | -0.17 |
| Self-Concept | 18.95 | 2.35 | 17.88 | 3.29 | -1.65 | 18.89 | 2.42 | 18.79 | 2.45 | -0.17 |

Notes:

*$p < 0.05$.

$N = 100$.

Combining the work center means found in Appendices E and F to form a data base with N equal to 17, a two-step hierarchical regression was performed to evaluate the effect of the QC intervention on employee attitudes. This procedure controls for the effects of initial differences between "nonequivalent" treatment groups. Table 11 indicates that the entry of the dummy variable (corresponding to the QC or control treatment condition) resulted in no significant increments in criterion variance; i.e., the QC treatment had no apparent effect on group attitudes.

A regression was also performed using data collection from the subset of military hospital participants who completed both the pretest and posttest surveys. Table 12 presents the results derived from this analysis. When a two-step hirarchical regression was performed using individual data, the QC intervention again demonstrated no significant impacts on any of the attitudinal variables under study.

To summarize, when all attitude variables were considered either at a group or individual level of analysis, the QC intervention was not found to promote any significant attitudinal change in study participants.

Table 11

Regression Analysis of Quality Circles Effects for Data Aggregated by Work Center

| Variable | $\Delta R^2$ | | $R^2$ | | Beta | | F | |
|---|---|---|---|---|---|---|---|---|
| | Pretest | Treatment | Pretest | Treatment | Pretest | Treatment | Pretest | Treatment |
| Participative Decision Making | 0.01 | 0.01 | 0.01 | 0.03 | 0.12 | -0.12 | 0.19 | 0.19 |
| Decision Making Effectiveness | 0.01 | 0.01 | 0.01 | 0.03 | 0.15 | 0.12 | 0.30 | 0.20 |
| Communication Climate | 0.13 | 0.14 | 0.13 | 0.27 | 0.31 | -0.38 | 1.79 | 2.71 |
| Job Satisfaction | | | | | | | | |
| Extrinsic | 0.00 | 0.19 | 0.00 | 0.20 | -0.02 | -0.44 | 0.01 | 3.37 |
| Intrinsic | 0.00 | 0.17 | 0.00 | 0.17 | 0.01 | -0.41 | 0.00 | 2.78 |
| General | 0.00 | 0.24 | 0.00 | 0.24 | -0.03 | -0.49 | 0.02 | 4.39 |
| Job Involvement | | | | | | | | |
| Work Participation | 0.00 | 0.05 | 0.00 | 0.06 | -0.01 | -0.24 | 0.00 | 0.80 |
| Central Life Interest | 0.08 | 0.01 | 0.08 | 0.10 | -0.29 | -0.11 | 1.27 | 0.20 |
| Self-Concept Definition | 0.07 | 0.10 | 0.07 | 0.17 | 0.31 | -0.33 | 1.55 | 1.75 |

Notes:
*$p < 0.05$.
$\underline{N} = 17$.

Table 12

Regression Analysis of Quality Circles Effects for 100 Individuals from the Military Hospital

| Variable | $\Delta R^2$ | | $R^2$ | | Beta | | F | |
|---|---|---|---|---|---|---|---|---|
| | Pretest | Treatment | Pretest | Treatment | Pretest | Treatment | Pretest | Treatment |
| Participative Decision Making | 0.04 | 0.01 | 0.04 | 0.04 | 0.19 | -0.07 | 3.75 | 0.48 |
| Decision Making Effectiveness | 0.04 | 0.00 | 0.04 | 0.04 | 0.21 | 0.01 | 4.40* | 0.02 |
| Communication Climate | 0.09 | 0.00 | 0.09 | 0.09 | 0.30 | 0.00 | 9.55** | 0.00 |
| Job Satisfaction | | | | | | | | |
| Extrinsic | 0.13 | 0.00 | 0.13 | 0.13 | 0.35 | -0.07 | 13.45** | 0.49 |
| Intrinsic | 0.10 | 0.01 | 0.10 | 0.11 | 0.31 | -0.09 | 10.03** | 0.86 |
| General | 0.08 | 0.02 | 0.08 | 0.10 | 0.28 | -0.12 | 7.88** | 1.49 |
| Job Involvement | | | | | | | | |
| Work Participation | 0.04 | 0.00 | 0.04 | 0.04 | 0.19 | 0.00 | 3.55 | 0.00 |
| Central Life Interest | 0.19 | 0.00 | 0.19 | 0.20 | 0.45 | -0.06 | 23.48** | 0.42 |
| Self-Concept | 0.10 | 0.00 | 0.10 | 0.10 | 0.31 | -0.03 | 10.47** | 0.07 |

Notes:
*$p < 0.05$.
**$p < 0.01$.
$N = 100$.

# CHAPTER V

# DISCUSSION AND CONCLUSIONS

## Findings

Based upon regression analysis of both group and individual data collected from a total of six QC work centers and eleven control work centers located at two facilities (a southeastern U.S. USAF installation and a southwestern U.S. military hospital) no significant attitude changes were found which could be attributed to Quality Circle participation. Therefore, the five hypotheses enumerated in Chapter I, pages 8 and 9, were not supported.

Lack of statistically reliable program effects did not come as a total surprise to the researchers based upon information and subjective impressions conveyed to the investigators by the QC facilitators at both the USAF installation and the military hospital. The next section provides a discussion concerning the events contributing to inhibited QC effectiveness at each facility along with an overview of some of the difficulties encountered in QC research in the DOD.

## Discussion

USAF installation. The initial QC effort at this facility involved three squadrons: aircraft maintenance,

civil engineering and base supply. Fourteen work centers were designated as study participants with half of these identified as QC groups. Most of the latter, however, quickly lost their momentum following the 10 weeks of initial training. Most of the QCs dissolved after only a few meetings. No QCs were active at the time of posttest data collection and only the aircraft maintenance squadron actually provided posttest data from four work centers. The QC facilitator at the USAF installation attributed these events to a general lack of commitment by both management and QC members (USAF installation QC facilitator, 1983).

Military hospital. In an unpublished draft entitled "QC Problems in a Medical Center Environment" Jackson and Morey (1983) discuss the problems encountered in initiating and maintaining a QC program at the military hospital which provided data for the present study. Specifically, five categories of problems were addressed:

1. Assessment of the complex hospital environment in which several organizational climates (i.e., administrative and support staff, nursing staff and medical staff) coexist simultaneously.

2. The establishment and maintenance of top management support for QCs in such a complex environment.

3. Middle management's resistance or lack of support for the program due to more pressing priorities, skepticism and/or a sense of job threat.

4. Experimental mortality due to changing shifts for nursing staff and relocations of military personnel.

5. Difficulties associated with the measurement and evaluation of QC effectiveness.

Interacting with the above was the fact that the hospital participating in this study was faced with a severe personnel shortage, estimated by manpower studies to be perhaps as high as 25 percent. The implication for the QC program was that many of the nursing areas could not even find time to attend the one-hour per week QC meetings. Other study participants, particularly support staff, were not enthusiastic about taking on additional responsibilities due to an already hectic workload. On the other hand, in contrast to the USAF installation some of the QC groups at the military hospital were still active when this study was completed.

Problems associated with QC research in the DOD. Many of the methodological limitations mentioned by Steel, Ovalle, and Lloyd (1982) in relation to their research in the DOD work environment hold true for the present study. Specifically, experimental mortality was very high, several significant demographic differences existed between the treatment and control groups at the study's outset (a problem common to studies utilizing pre-existing work groups and one which can only be imperfectly corrected for by means of statistical control), behavioral and group effectiveness

outcomes of QC participation were not measured and, lastly, the sample size was small. These observations, in combination with those highlighted above by the USAF installation QC facilitator (1983) and Jackson and Morey (1983), illustrate the major methodological limitations which must be considered in interpreting and generalizing the present findings.

Goodman (1980) has described a number of factors which adversely affect the long-run viability of Quality of Work Life (QWL) projects such as Quality Circles. Those factors identified by Goodman (1980) which contribute to a better understanding of the present study's results include:

1. Sponsorship. The QC programs at the USAF installation and the military hospital were organized and maintained by a QC facilitator with the approval of upper management. As other priorities more directly bearing short-term organizational effectiveness made demands on both the administrative sponsors' and the facilitators' time, the viability of the QC programs diminished. At the USAF installation in particular, the QC facilitator gave less and less attention to the QCs as time progressed after initial QC progress proved to be discouraging and his job evaluation did not even mention his role with the QC program.

2. Feedback. There was no feedback mechanism by which the extent to which QC activities were actually being

performed could be determined. Nor was there a means of determining the results of QC activities.

3. Congruency between QC values and existing organizational values. Values inherent in the QC process such as increased participation in decision making, increased control in the workplace and, in general, increased responsibilities in areas traditionally considered to be middle management functions may be at variance with widely accepted values within the organization. "Although a sponsor may initially promote the QWL effort, the conflicts in values work against long-run QWL effectiveness" (Goodman, 1980, p. 491).

4. Total system commitment. For a QC program to be successful all supporting and actively-involved personnel must be committed toward that end. This includes not only top management and QC members but also middle management and co-workers who are not QC members (but who are part of the surrounding organizational environment). According to the QC facilitators at both the USAF installation and the military hospital, the lack of a total system commitment was a major reason for the failure of many of the QCs.

5. Long-run reward systems. Participation in a QC requires additional effort and commitment by an employee. In order for an employee to continue his participation, attractive rewards must be available. In the face of an inadequate reward system and tentative system support and

commitment, few individuals will voluntarily remain active in a QC program. Further, even if available rewards are initially attractive there is always the danger that such rewards will not remain potent with time. Neither the USAF installation nor the military hospital provided QC participants with any extrinsic rewards.

6. Organizational environment. Consistent with Jackson and Morey's (1983) observations, an organization characterized by sudden changes in priorities and frequent interruptions in the daily routines may not be well suited for QC activities. In Goodman's (1980) words, "a benign organizational environment seems necessary for any long-term persistence of QWL efforts" (p. 491).

Additional factors mentioned by Goodman (1980) which did not have a direct bearing on this study's findings but nonetheless are relevant for the long-term viability of any QC program within the DOD include:

1. Transmission. There should be a rational mechanism for training new QC group members not only at the time of program initiation but also later, when new members enter existing QC groups.

2. Diffusion. Should a QC pilot program prove to be contributory to organizational effectiveness, there should be a carefully planned means by which QCs can be diffused to other parts of the organization.

3. Bounded mandate. The goals of the QC program should be clearly specified before such a program is initiated. When this is not done there is no means by which QC effectiveness can be measured. Lack of a defined purpose or mandate could later become a source of tension between management and labor, particularly when upper management attempts to assess the QCs' contribution to organizational goals.

## Conclusions

The effectiveness of an organizational intervention may be analyzed by a variety of different measures. Such assessments may consider changes in productivity, turnover, absenteeism, quality of work produced, number of parts requiring rework, work group cohesiveness or any number of work-related attitudes. Whereas management may emphasize one of these measures above the others, it is important to note that the effectiveness of any particular intervention within an organization can not be determined upon the basis of any single criterion. Promising indications on one variable may be counterbalanced or overshadowed by unfavorable results on others and vice versa. Likewise, neither can the success or failure of an intervention in one organization be considered as conclusive evidence of the relative feasibility of that procedure in other organizations. It is in this light that the results of the present study

should be interpreted. To put these current findings in proper perspective, this study should be viewed as but one contribution to a very young body of literature concerning Quality Circles.

This study assessed the impact of participation in a QC program at two military facilities with regard to five work-related attitudes; decision-making effectiveness, participative decision making, communication climate, job satisfaction and job involvement; and found that such participation resulted in no significant attitude change. The extent to which such findings may be generalized to other organizations, military or civilian, is unknown and must be determined by future research. However, one implication of this study is that the glowing success stories provided by QC consultants must be considered with caution and that the widespread initiation of QCs, particularly within the DOD, should perhaps be tempered with restraint.

## Recommendations for Future Research

As was mentioned in Chapter I, perhaps 1000 QC groups are presently being conducted within the DOD. Before additional manhours and resources are committed towards this end, further research is needed in order to assess QC effectiveness across a variety of measures so as to better determine relative costs and benefits. QC effectiveness needs to be assessed not only in terms of attitudinal outcomes

but also in terms of more tangible criteria such as turnover, number of suggestions offered and/or implemented, amount of reduced scrappage, number of quality defects, etc. Further, those characteristics of organizations which best promote QC success must be identified and, alternatively, those organizational features which tend to inhibit or preclude QC success must be determined through future research. In this regard, Jackson and Morey (1983) have noted that the rapid turnover within their organization was probably a significant factor in contributing to QC failures. As most DOD organizations are characterized by high rates of personnel turnover, a specific need for research lies in the area of determining the impact of membership turnover on QC effectiveness.

In addition to those authors who have contributed opinions concerning factors necessary for QC success (Stevens & Moore, 1981; Cole, 1980b), there also exists a body of literature in which various authors have presented theories concerning "necessary ingredients" for the long-term success of Quality of Work Life programs such as Quality Circles (Goodman, 1980; Nadler & Lawler, 1983). Longitudinal studies which empirically test these claims are warranted. Nadler and Lawler (1983) contend that

> Probably the most critical factor determining the success, viability, and long-term impact of QWL efforts is the structure of the participative processes that are created. (p. 28)

To support such a contention research is needed concerning the method of problem identification, the extent to which participative processes are supported and carried out, and the means and emphasis of the QC training procedure.

Goodman (1980) has observed that QWL projects have typically encountered a fair amount of initial success though many such programs have not stood the test of time. This observation highlights the need for longitudinal research of the QC intervention to determine both short-term and long-term effectiveness and to attempt to identify those obstructional factors which contribute to QC failures.

It is somewhat surprising that so many QC programs have been initiated throughout the country in light of the fact that so little is actually known about the intervention's effectiveness in American work settings. In contrast to the numerous testimonials found in the literature made by consultants who stand to financially gain from the proliferation of this organizational intervention, this study's findings should serve as a cautionary warning to DOD and USAF managers that QC programs can and do fail. Well-considered, methodologically-sound research is needed in virtually every aspect relating to the QC process and associated outcomes. As suggested by Jackson and Morey (1983), perhaps some settings are not suitable for this type of organizational intervention. Further, some modifications to the intervention process may be required in

military settings to compensate for high personnel turnovers. This study also highlighted a major shortcoming of the "part-time QC facilitator" concept. When the facilitator's time is divided among several differing job responsibilities, the viability of the QC program is likely to be jeopardized. Especially when the QC program is still in its infancy, great time demands are likely to be made upon the facilitator until the groups become more mature and self-sufficient. When the QC facilitator is forced to divide his efforts among conflicting priorities, the greater the probability of early program termination or inconsequential QC group contributions to the organization.

Unless all levels of organizational management are willing to commit to the QC program's success, it would be better that no such program is initiated. Likewise, workers must have the time and access to a viable reward system in order to assure that voluntary participation is given without future regret. Perhaps the most important contribution of this thesis is to draw attention to the obvious: Quality Circles programs will not succeed in an environment characterized by tentative or nonexistent organizational support, divided QC facilitator attention and manpower shortages. If QCs work, when QCs work, where QCs work and how QCs work are issues which must be determined by future research.

# APPENDICES

# APPENDIX A

## AFIT SURVEY OF WORK ATTITUDES: PARTICIPATIVE DECISION MAKING; DECISION-MAKING EFFECTIVENESS; AND 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 statements below.

1 = strongly disagree
2 = moderately disagree
3 = slightly disagree
4 = neither agree nor disagree
5 = slightly agree
6 = moderately agree
7 = strongly agree

## PARTICIPATIVE DECISION MAKING

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.

## DECISION-MAKING EFFECTIVENESS

1. My work-group is very effective in making decisions.

2. My work-group is very effective in the process of group problem solving (i.e., clearly defining/specifying the problem(s), developing and evaluating alternative solutions, and, selecting, implementing and evaluating a solution).

## COMMUNICATION CLIMATE

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. My supervisor asks members of my work-group for our ideas on task improvements.

# APPENDIX B

# AFIT SURVEY OF WORK ATTITUDES: JOB SATISFACTION

## JOB SATISFACTION

How satisfied are you in your present job? Use the following rating scale to indicate your satisfaction.

1. Means you are very dissatisfied with this aspect of your job.
2. Means you are dissatisfied with this aspect.
3. Means you can't decide if you are satisfied or not with this aspect of your job.
4. Means you are satisfied with this aspect.
5. Means you are very satisfied with this aspect of your job.

1. Being able to keep busy all the time.
2. The chance to work alone on the job.
3. The chance to do different things from time to time.
4. The chance to be "somebody" in the community.
5. The way my boss handles his men.
6. The competence of my supervisor when he makes decisions.
7. Being able to do things that didn't go against my conscience.
8. The way my job provides for steady employment.
9. The chance to do things for other people.
10. The chance to tell people what to do.
11. The chance to do something that makes use of my abilities.
12. The way company policies are put into practice.
13. My pay and the amount of work I do.
14. The chances for advancement on the job.
15. The freedom to use my own judgement.
16. The chance to try my own methods of doing the job.

17. The working conditions.

18. The way my co-workers got along with one another.

19. The praise I get for doing a good job.

20. The feeling of accomplishment I got from the job.

21. Enjoying the work itself.

# APPENDIX C

## AFIT SURVEY OF WORK ATTITUDES: JOB INVOLVEMENT

## JOB INVOLVEMENT

Use the following rating scale for the 15 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. I often have to use the skills I have learned for my job.

2. I often have a chance to try out my own ideas.

3. I often have a chance to do things my own way.

4. I often have a chance to do the kinds of things that I am best at.

5. I often feel at the end of the day that I've accomplished something.

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

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

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

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

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

11. I would rather get a job promotion than be a more important member of my club, church, or lodge.

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

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

14. I am very personally involved in my work.

15. I avoid taking on extra duties and responsibilities.

# APPENDIX D

## AFIT SURVEY OF WORK ATTITUDES: DEMOGRAPHIC QUESTIONS

## 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."

1. Your age is:

    1. Less than 20
    2. 20 to 25
    3. 26 to 30
    4. 31 to 40
    5. 41 to 50
    6. 51 to 60
    7. More than 60

2. Your highest educational level obtained was:

    1. Non high school graduate
    2. High school graduate or GED
    3. Some college work
    4. Associate degree or LPN
    5. Bachelor's degree or RN
    6. Some graduate work
    7. Master's degree
    8. Doctoral degree

3. Total months in this organization is:

    1. Less than 1 month
    2. More than 1 month, less than 6 months
    3. More than 6 months, less than 12 months
    4. More than 12 months, less than 18 months
    5. More than 18 months, less than 24 months
    6. More than 24 months, less than 36 months
    7. More than 36 months

4. Total months in present position:

    1. Less than 1 month
    2. More than 1 month, less than 6 months
    3. More than 6 months, less than 12 months
    4. More than 12 months, less than 18 months
    5. More than 18 months, less than 24 months
    6. More than 24 months, less than 36 months
    7. More than 36 months

5. Total months experience in your present occupation:

1. Less than 1 month
2. More than 1 month, less than 6 months
3. More than 6 months, less than 12 months
4. Between 1 and 2 years
5. Between 2 and 3 years
6. Between 3 and 4 years
7. More than 4 years

Note: Tables 4-6 present mean data for each of the demographic variables consistent with computer output. To compare the data in Tables 4-6 with the above, increment the categories for each of the above demographic questions by one.

# APPENDIX E

## WORK GROUP MEANS FOR USAF INSTALLATION

| Work Group | Variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Participative Decision Making | | Decision Making Effectiveness | | Communication Climate | | Extrinsic Satisfaction | | Intrinsic Satisfaction | |
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1* | 7.68 | 7.11 | 8.70 | 8.53 | 12.71 | 13.54 | 17.13 | 18.13 | 43.46 | 44.33 |
| 2 | 9.41 | 8.85 | 11.00 | 9.48 | 14.65 | 14.28 | 19.41 | 18.87 | 42.12 | 42.58 |
| 3* | 7.48 | 8.25 | 8.37 | 10.00 | 13.22 | 11.75 | 17.37 | 18.50 | 42.81 | 47.00 |
| 4 | 6.61 | 6.91 | 8.02 | 10.00 | 11.72 | 14.73 | 14.88 | 17.27 | 39.41 | 44.91 |

| Work Group | Variable | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | General Satisfaction | | Work Participation | | Central Life Interest | | Self-Concept Definition | |
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1* | 67.40 | 69.33 | 23.52 | 24.49 | 13.06 | 14.41 | 16.81 | 16.80 |
| 2 | 68.71 | 68.34 | 22.41 | 23.98 | 15.71 | 14.93 | 17.29 | 17.00 |
| 3* | 67.50 | 73.25 | 23.26 | 25.50 | 14.94 | 17.00 | 16.81 | 16.75 |
| 4 | 60.67 | 69.27 | 20.47 | 23.18 | 13.31 | 15.73 | 15.31 | 17.09 |

Note: * identifies a Quality Circle group.

# APPENDIX F

## WORK GROUP MEANS FOR MILITARY HOSPITAL

| Work Group | Variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Participative Decision Making | | Decision Making Effectiveness | | Communication Climate | | Extrinsic Satisfaction | | Intrinsic Satisfaction | |
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1* | 8.13 | 8.50 | 9.75 | 13.50 | 15.13 | 17.00 | 20.63 | 20.00 | 45.00 | 49.50 |
| 2 | 8.80 | 9.33 | 10.60 | 8.67 | 14.70 | 13.67 | 19.50 | 23.00 | 46.10 | 49.67 |
| 3* | 6.33 | 7.82 | 7.50 | 9.64 | 13.96 | 15.82 | 16.29 | 20.09 | 41.58 | 45.55 |
| 4 | 7.25 | 6.80 | 8.19 | 8.40 | 14.44 | 14.50 | 19.67 | 19.20 | 48.77 | 48.00 |
| 5 | 9.70 | 6.40 | 10.64 | 9.60 | 16.00 | 18.00 | 20.82 | 20.80 | 48.82 | 46.60 |
| 6 | 8.07 | 7.33 | 9.33 | 8.00 | 12.87 | 18.33 | 18.50 | 23.33 | 42.93 | 52.00 |
| 7 | 5.90 | 10.00 | 7.20 | 10.80 | 10.85 | 18.00 | 15.00 | 25.60 | 37.10 | 52.00 |
| 8 | 8.04 | 9.09 | 8.52 | 9.27 | 14.16 | 15.91 | 17.08 | 18.64 | 44.48 | 50.27 |
| 9* | 10.00 | 8.60 | 9.89 | 7.80 | 14.67 | 15.40 | 19.89 | 16.80 | 48.89 | 48.40 |
| 10* | 9.29 | 8.00 | 6.14 | 8.00 | 10.86 | 9.00 | 15.57 | 16.00 | 46.29 | 37.00 |
| 11 | 8.96 | 9.25 | 10.23 | 9.00 | 15.55 | 17.50 | 20.05 | 18.50 | 44.95 | 48.75 |
| 12 | 8.88 | 9.46 | 10.29 | 10.62 | 14.63 | 14.00 | 20.13 | 20.17 | 49.96 | 50.15 |
| 13 | 6.33 | 7.67 | 7.17 | 9.00 | 12.61 | 14.96 | 17.40 | 19.54 | 43.43 | 47.21 |

| Work Group | Variable | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | General Satisfaction | | Work Participation | | Central Life Interest | | Self-Concept Definition | |
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1* | 72.88 | 77.00 | 24.63 | 30.50 | 16.25 | 19.00 | 17.00 | 20.00 |
| 2 | 72.60 | 81.67 | 26.70 | 29.67 | 19.10 | 10.33 | 18.30 | 17.00 |
| 3* | 64.25 | 72.00 | 22.87 | 28.27 | 19.63 | 19.55 | 18.88 | 19.00 |
| 4 | 76.15 | 74.20 | 25.87 | 26.40 | 15.31 | 23.40 | 19.00 | 20.00 |
| 5 | 76.36 | 74.80 | 28.18 | 30.20 | 18.55 | 13.20 | 18.64 | 19.20 |
| 6 | 67.50 | 83.33 | 22.40 | 32.00 | 16.47 | 24.33 | 17.73 | 20.00 |
| 7 | 57.95 | 86.40 | 18.11 | 32.80 | 10.74 | 23.40 | 16.00 | 18.00 |
| 8 | 67.12 | 75.91 | 24.08 | 28.73 | 15.21 | 22.36 | 18.08 | 19.09 |
| 9* | 75.89 | 71.20 | 30.56 | 27.40 | 17.89 | 16.40 | 19.89 | 19.60 |
| 10* | 67.29 | 58.00 | 25.43 | 20.00 | 15.29 | 19.00 | 18.29 | 12.00 |
| 11 | 73.05 | 75.50 | 24.18 | 22.25 | 17.09 | 21.75 | 16.91 | 17.75 |
| 12 | 77.63 | 77.75 | 26.63 | 27.54 | 18.79 | 17.92 | 19.00 | 19.46 |
| 13 | 68.23 | 74.96 | 23.00 | 28.50 | 15.37 | 16.79 | 17.07 | 18.71 |

Note: * identifies a Quality Circle group.

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