

Effects of Participation in Decision Making on Performance and Employee Attitudes: A Quality Circles Meta-analysis

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Published online: 6 July 2007
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Abstract This study explores the effects of a participative technique, quality circles (QCs), on several employee attitudes and performance. The sample included 36 studies with 42 independent samples. Mean effect sizes were small for employee attitudes and moderate for job performance suggesting QCs affected job performance to a greater degree than employee attitudes. For organizations involved in quality management these results seem to suggest that quality interventions have a stronger impact on job performance than on employee attitudes. The study conclusions provide a positive outlook on the effects of total quality management interventions on productivity.

Keywords Quality circles · Participation in decision making · Meta-analysis · Job performance · Employee attitudes

Introduction

Many U.S. organizations are implementing participative quality programs to improve productivity and the quality of their products (Barrick and Alexander 1987; Lawler et al. 1998). Product and service quality was ranked the most critical issue of concern by top executives in U.S. companies (Gallup survey 1986) and organizations are always looking for a competitive advantage (Porter 1998). Quality

programs are considered a way of gaining that competitive advantage and a strategy used by high performance organizations to increase productivity and participation in decision making (PDM; Lawler et al. 1998). There has been a marked increase in the attention paid to quality, quality circles (QCs), and total quality management (TQM) in management and business journals. Lawler et al. (1998) estimated that in 1996, 66% of companies had a quality program. TQM programs, QCs, and improvement groups are the main avenues organizations use to allow employees to make suggestions and change work processes (Lawler et al. 1998). Companies that focus on high-quality products expect to receive benefits in terms of lower manufacturing costs, higher profit margins, and larger shares of the market (Deming 1986; Harrington 1987; Scherkenbach 1988). Quality programs also are expected to result in improvements in employee's reactions to work (Ishikawa 1985; Scherkenbach 1988).

The quality management literature is full of anecdotal evidence on the benefits of quality programs in such areas as productivity, increased sales, product quality, and employee attitudes (Crosby 1979, 1984; Gallup survey 1986; Lawler et al. 1998). However, few empirical studies have been conducted on TQM initiatives. Data-based research is badly needed. On the other hand, the QCs literature has been studied somewhat more extensively (Marks et al. 1986; Rafaeli 1985; Steel and Lloyd 1988). Although QCs and quality management have some differences, most organizations have modified QCs to fit the quality management approach (Gray 1993). Since there is a scarcity of quantitative data regarding the effectiveness of TQM, the evaluation of the effectiveness of QCs can provide a speculative evaluation of quality management. This study seeks to explain how a particular participative technique, QCs, influences employee's reactions to the workplace.

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Quality circles are a participative technique that allows employees to have input into issues at work (Cotton et al. 1988; Spector 2006). QCs typically consist of a group of coworkers in similar jobs that meet frequently to improve work problems. The group uses statistical and problem solving techniques to recommend solutions to management. Sometimes the group is also responsible for implementing the proposed solution. Barrick and Alexander (1987) suggested that the problem-solving procedures involved in QCs could modify the work processes thereby influencing productivity and performance. Steel and Shane (1986) also concurred that QCs are designed to influence work performance. They stated that attitudinal outcomes are a secondary and indirect effect (Steel and Shane 1986). QCs were developed by practitioners of statistical quality control processes and social scientists had little influence in the development of QCs (Van Fleet and Griffin 1989; Ledford et al. 1988). However, we can use the PDM literature to explain how QCs would impact employee's reactions.

Participation in Decision Making

The mechanisms by which a participative intervention such as QCs might impact employee's reactions have been studied in the PDM literature (Cotton et al. 1988; Locke and Schweiger 1979; Miller and Monge 1986). Miller and Monge (1986) proposed three models by which participative techniques work. The cognitive model proposes an effect on job productivity and satisfaction as a product of increased job knowledge (Miller and Monge 1986) whereas the effect on productivity will be stronger than the effect on job satisfaction. The affective model states that participative interventions will fulfill employees' higher order needs which will impact job satisfaction and subsequently job productivity (Miller and Monge 1986). In this model the effect on job satisfaction will be stronger than on job productivity. The last model is a contingency model predicting different outcomes for participative techniques depending on the situation. In their meta-analysis of participative techniques, Miller and Monge (1986) found stronger correlations for job satisfaction (.34) than for productivity (.15) supporting the affective explanation that working in a participative climate is strongly related to job satisfaction. Miller and Monge (1986) studied several participative techniques but did not include QCs in their meta-analysis. Cotton et al. (1988) argued that participative techniques should be studied in similar clusters in order to truly see the effects on job performance or job satisfaction. In their literature review of participative techniques, Cotton et al. (1988) found that interventions involving participation in work decisions, such as QCs, had

a positive effect on performance and mixed effects on job satisfaction.

QCs Narrative and Empirical Reviews

If we examined the QCs narrative reviews, we find mixed results on the effects of QCs on job performance and employee attitudes. Steel and Shane (1986) reviewed 14 QCs studies that use control group and longitudinal designs and concluded that no trends were evident from the results. Another narrative review by Park (1990, 1991) found that most of the studies examining productivity and work performance found a positive impact of QCs and almost half of the studies examining job satisfaction and organizational commitment reported positive impact of QCs. However, Cotton (1993) concluded that the findings concerning employee attitudes were almost always negative and the results for performance and productivity were mixed. He found that half of the studies reported positive findings regarding performance or productivity. The other half reported negative findings. The QCs narrative review studies do not lead to a consistent conclusion about the impact of QCs on performance or employee attitudes. On a meta-analysis of the QCs literature, Eskew (1989) found small relationships between QCs and job involvement and job satisfaction, weighted correlations of .09 and .05, respectively. These results are consistent with Barrick and Alexander (1987) and Steel and Shane's (1986) theoretical argument that attitudinal effects are indirect and secondary to performance effects. QCs seem to affect performance more than employee attitudes, supporting Miller and Monge's (1986) cognitive model but contrary to the findings for other participative techniques.

QCs Moderators

The effects of QCs could also be affected by several moderators studied in the literature. Ledford et al. (1988) categorized the factors that might affect QCs effectiveness into individual differences, group interaction, and organizational variables. Individual differences might include skill and knowledge, self-esteem, feelings of accomplishments and volunteering for QCs (Brockner and Hess 1986). Group differences might include group cohesion, small group dynamics, and social rewards of team membership (Griffin and Wayne 1984). Organizational variables will include management recognition, organizational type, characteristics of the job situation, quality program life cycle, and organizational support (Tang et al. 1987). There is some support for the effect of length of QCs on outcomes. Barrick and Alexander (1987) found that the more

experience participants have with QCs the more favorable outcomes the research reported. Ledford et al. (1988) also emphasized the importance of the age of the QCs program as a variable that might affect outcomes. Cotton et al. (1988) suggest that short-term PDM interventions might have no effect on job performance and job satisfaction. Also the type of organization might have an impact on QCs outcomes. Barrick and Alexander (1987) found that public organizations reported more negative results than private organizations. The difficulty with studying moderators of QCs is that many studies don't report data on moderators. Although many individual, group, and organizational variables have been suggested and studied as moderators of QCs, this study focuses on two moderators: organization type and length of exposure to QCs.

Several articles have studied positive-finding bias in QCs research. Barrick and Alexander (1987) did not find a positive-finding bias in the sample of QCs research although they stated that most studies reported a positive outcome. However, Park (1990) studied a sample larger than Barrick and Alexander (1987) and concluded that there was evidence for published positive-finding bias. Given the inconclusive findings in the QCs literature reviews and the criticism of this literature, there is a need to accurately assess the impact of QCs on employee attitudes and performance. A meta-analysis will provide an accurate estimate of the relationship between QCs and employee attitudes and performance. Although Eskew (1989) conducted a meta-analysis of this literature, she utilized a small sample of studies and only included published research making it difficult to generalize to all QCs. The meta-analysis was also limited to only two effects of QCs. A more complete meta-analysis will provide estimates between the relationship of QCs and other employee attitudes not explored in past literature reviews, for example, organizational commitment, PDM, and intention to leave the organization. These effects could be examined in the light of the PDM literature to expand on that body of knowledge. It will expand the model of Miller and Monge (1986) to delineate the contingencies by which participative techniques work, in particular QCs, and whether job satisfaction or job performance have stronger effects. A meta-analysis will also address the criticisms of positive-finding bias in this literature. The meta-analysis will answer this criticism by determining whether the variability in study results is due to statistical artifacts, like sampling error or unreliability, or due to the methodological quality of the studies.

This study will examine the effect sizes of the most common outcomes found linked to QCs such as changes in affective outcomes (i.e., job satisfaction, PDM, organizational commitment, and intention to remain in the organization) and changes in task results (i.e., self-appraised job performance and supervisor-appraised job performance).

Hypothesis 1: The mean corrected d for the effect of QCs on job performance will be higher than the mean corrected d for affective outcomes.

Based on past research (Barrick and Alexander 1987; Eskew 1989; Steel and Shane 1986) we expect to find stronger effects on job performance and smaller effects on job satisfaction and other affective outcomes such as organizational commitment, PDM, and intention to remain in the organization.

Hypothesis 2: The mean corrected d for QCs in private organizations will be stronger than the corrected d for QCs in public organizations.

Hypothesis 3: The mean corrected d for participants exposed to QCs for a longer time period will be stronger than the mean corrected d for less exposure to QCs.

We expect to find that organization type and length of exposure to QCs moderate the effects of QCs on the previous outcomes. We expect effects to be stronger for private organizations since Barrick and Alexander (1987) found more negative results on public organizations. We also expect stronger for QCs where the participants are exposed to QCs for a longer time period since various studies suggest the length of the QCs program could be an important factor affecting QCs results (Cotton et al. 1988; Ledford et al. 1988).

Method

Sample of Studies

Business, social science, and general reference databases were searched to collect the largest possible number of studies evaluating QCs. These databases covered articles and research papers published between 1966 and 2003. The databases included Business Source Premier, PsycInfo, Dissertation Abstracts, Periodical Abstracts, NTIS, ERIC, ABI/Inform, Social Sciences Index, and Sociological Collection. Using the keyword "QCs," a total of more than a 1,000 articles were found in the area of QCs. The majority of these articles were practitioner-oriented and popular press articles.

Criteria for Inclusion of Studies

The articles needed to present a quantitative evaluation of QCs in an organization. Studies in the sample included posttest-only designs, pretest-posttest designs, and repeated measures designs. Studies needed to report enough descriptive or inferential information to make it possible to compute an effect size. Means, standard deviations, t tests, F values, and correlations were used to compute effect sizes.

A total of 36 studies were included in the sample. Of these, 14 were journal articles, 20 were theses or dissertations, one was an unpublished manuscript, and one was a technical report. These studies provided 42 independent samples. Although the focus was on U.S. literature, some studies were conducted in Israel and Saudi Arabia.

Coding of Studies

Sample size and reliability estimates were coded to obtain an estimate of the variance due to sampling error and unreliability in the dependent measure. An effort was made in the case of published scales to obtain test developers reliabilities if the study did not report sample reliabilities.

Organization type and QC intervention exposure were coded as possible moderators. The type of organization was coded as private and public. Public organizations included government, military organizations, public schools, and public universities. To code the exposure by the participants to the QC intervention the studies were divided by the median split of length of exposure to QCs by participants.

Meta-analytic Calculations

Effect Size

A d statistic was calculated for each independent sample using the method presented by Hunter and Schmidt (2004). Where several time frames were given, the data associated with the longest time frame was used to compute the effect size. For some studies the number of participants in a QC varied and the study only supplied sample sizes as a range of participants. In the cases where the sample size was given as a range, the smaller number was used to compute the effect size.

Corrections for Artifacts

The studies were corrected for two artifacts: measurement error in the dependent variable and sampling error. Since most of the studies either reported reliabilities or reliabilities were available in test developer's reports, an individually corrected effect size was computed. For those studies without reliability estimates the mean reliability of the available estimates was used. The corrected for attenuation effect size was used in the meta-analysis. For the studies measuring supervisor-appraised job performance an artifact distribution was used to correct for unreliability in the dependent variable. A distribution of criterion reliabilities for proficiency measures from Schmidt et al. (1980) was used for the correction.

Correction for sampling error was performed by subtracting the variance due to sampling error from the

variance of the d statistic. This was done to obtain the variance of the population effect size. If the variance of the population effect size was small it was concluded that the variance in effect sizes was due to artifacts. However, if the variance was large, then a search for moderators to explain this variance was conducted.

Moderator Analysis

To conduct a moderator analysis, the sample was divided into subsets based on the moderator and a separate meta-analysis was conducted for each subset (Hunter and Schmidt 2004). A moderator was concluded to affect the variance of the effect sizes if there was a large difference in the mean effect size between subsets and a reduction in the variance within subsets (Hunter and Schmidt 2004). The moderator analysis was conducted when there were enough studies to form subgroups.

Results

Table 1 presents summary information for the effect sizes utilized in the study. Specifically, the sample size, number of studies, and number of positive and negative effect sizes are presented.

Tests of Meta-analytic Hypotheses

Table 2 presents the results of the meta-analysis for each dependent variable. The mean corrected d for job satisfaction was .10 ($SD = .29$). The large standard deviation suggests the possibility of a moderator affecting the variability of the effect sizes. The mean corrected d for PDM was .12 with a $SD = .29$ also suggesting a moderator. For organizational commitment and intention to remain in the organization the mean corrected effect size was very small and close to zero (.03 and $-.04$, respectively). The large standard deviations also suggest the possibility of moder-

Table 1 Summary of effects for QCs studies included in meta-analysis

Dependent variable	<i>N</i>	<i>K</i>	Number of positive effects	Number of negative effects
Job satisfaction	6,738	35	25	10
Participation	3,813	21	12	9
Org. commitment	2,539	17	9	8
Intention to remain	2,295	12	5	7
Self-appraisals	1,570	8	8	0
Supervisor-appraisals	830	6	5	1

Table 2 Results of the meta-analytic hypotheses

Dependent variable	<i>N</i>	<i>K</i>	mean <i>d</i>	<i>SD_d</i>	<i>SD_{res}</i>	% Var Acc. for	90% Lwr Cred. V.
Job satisfaction	6,738	35	.10	.3318	.2908	23	-.38
Participation	3,813	21	.12	.3355	.2923	24	-.36
Org. commitment	2,539	17	.03	.2700	.2061	42	-.31
Intention to remain	2,295	12	-.04	.2448	.1598	57	-.30
Self-appraisals	1570	8	.20	.1933	.1207	61	.00
Supervisor-appraisals	830	6	.19	0	0	100	.19

Note: *SD_d* = standard deviation of *d*; *SD_{res}* = standard deviation after correction for sampling error; % Var Acc. for = percent of variance accounted for by sampling error; 90% Lwr Cred. V. = 90% lower credibility value

ators. The mean corrected *d* for intention to remain was negative, contrary to what was hypothesized. The mean corrected *d* for self-appraisals of job performance was .20 but the size of the residual variance suggest a moderator is operating (*SD* = .12). The mean corrected *d* for supervisor-appraisals was .19 (*SD* = 0). All the credibility values for the effect sizes include zero except the effect size for supervisor-appraised job performance.

The variability of effect sizes suggests the possibility of moderators influencing the effects of QCs, except for supervisor-appraised job performance. Therefore, moderator analyses were conducted for job satisfaction, PDM, and organizational commitment since there were enough studies to form subgroups.

Test of Moderator Hypotheses

Organization Type as Moderator

Subgroups were meta-analyzed for studies conducted in private and public organizations. These data are presented in Table 3. Overall, the mean corrected *d* for public organizations was negative and close to zero and the mean

corrected *d* for private organizations was larger than the respective overall mean effect size. The subgroup residual variance was reduced for all the variables. Significance tests were performed to detect significant differences between the mean effect size of public and private organizations. All the *t* tests were significant at *p* < .05 (for job satisfaction *t*(32) = 3.60, for PDM *t*(19) = 3.10, for organizational commitment *t*(15) = 2.13).

QC Exposure as Moderator

The information available on amount of exposure by participants to QCs varied among studies. In some studies the participants had a fixed level of exposure to QCs; other studies had variability in the length of exposure among participants. Within the latter the exposure to QCs varied from less than a year to more than 5 years. Given the information available and in the absence of theoretical arguments, a median split was used for dichotomizing the studies on length of the QCs. Table 4 presents the results of the meta-analysis for this moderator.

In general, those studies where participants were exposed longer to QCs had a larger effect size on all the

Table 3 Results of meta-analysis for organizational type as moderator

Dependent variable	<i>N</i>	<i>K</i>	mean <i>d</i>	<i>SD_d</i>	<i>SD_{res}</i>	% Var Acc. for	90% Lwr Cred. V.
<i>Job satisfaction</i>							
Private	3,843	20	.25	.2874	.2390	31	-.14
Public	2,790	14	-.11	.2782	.2285	32	-.48
<i>Participation in decision making</i>							
Private	1,541	9	.35	.3187	.2692	29	-.09
Public	2,272	12	-.03	.2436	.1825	44	-.33
<i>Organizational commitment</i>							
Private	864	6	.22	.2347	.1311	69	.005
Public	1,811	11	-.04	.2440	.1789	46	-.33

Note: *SD_d* = standard deviation of *d*; *SD_{res}* = standard deviation after correction for sampling error; % Var Acc. for = percent of variance accounted for by sampling error; 90% Lwr Cred. V. = 90% lower credibility value

Table 4 Results of meta-analysis for QC exposure as a moderator

Dependent variable	<i>N</i>	<i>K</i>	mean <i>d</i>	<i>SD_d</i>	<i>SD_{res}</i>	% Var Acc. for	90% Lwr Cred. V.
<i>Job satisfaction</i>							
QC Length < 15 months	2,442	16	.00	.2769	.2107	42	–.34
QC Length > 15 months	2,390	14	.15	.2935	.2389	34	–.25
<i>Participation in decision making</i>							
QC Length < 15 months	1,449	10	.04	.3234	.2638	33	–.39
QC Length > 15 months	1,600	9	.29	.3359	.2920	24	–.19
<i>Organizational commitment</i>							
QC Length < 13 months	864	7	–.03	.2913	.2196	43	–.39
QC Length > 13 months	911	8	.18	.2935	.2142	47	–.17

Note: *SD_d* = standard deviation of *d*; *SD_{res}* = standard deviation after correction for sampling error; % Var Acc. for = percent of variance accounted for by sampling error; 90% Lwr Cred. V. = 90% lower credibility value

dependent variables. The mean corrected *d* for the longer length QCs was consistently larger than for the shorter length QCs. The shorter length QCs had mean corrected effect sizes close to zero and in one case the effect size was negative. In addition, the variance within subgroups was reduced in the job satisfaction and PDM samples. However, *t* tests revealed no significant differences between the means at *p* < .05 (for job satisfaction *t*(28) = 1.44, for PDM *t*(17) = 1.65, for organizational commitment *t*(13) = 1.39). *T* tests did not detect a significance difference between longer QCs and shorter QCs.

Discussion

Comparing the effects of QCs on employee attitudes and job performance, these results suggest that QCs affect job performance to a greater degree than employee attitudes. This conclusion conflicts with what the PDM literature has found. Participative techniques seem to impact employee attitudes more than job performance (Miller and Monge 1986; Spector 1986). QCs were originally developed to involve employees in the quality control of their products. The main emphasis in QCs is in addressing productivity problems and implementing solutions to improve both the quality and quantity of products or services provided. In light of this, it is not surprising to find that QCs have a higher impact on performance.

A factor that could help explain the small effect sizes found for employee attitudes is the fact that QC studies measure actual participation and not perceived participation. The PDM literature has found higher effects on employee attitudes when the studies measure perceived participation versus actual participation (Miller and Monge 1986; Spector 1986). The meta-analytic results of the effects of QCs on PDM found small effects. Given the small

impact of participation in QCs on perceived participation, results might be expected to differ with respect to employee attitudes if perceived participation is measured instead of actual participation.

Also, the focus of QCs is usually limited to work-related problems and therefore employee participation in decisions is limited to a single issue. There is support for higher relationships between PDM techniques that addressed multiple issues and job satisfaction versus PDM techniques that address single issues (Miller and Monge 1986). Thus, studying perceived PDM due to participating in QCs versus actual membership in QCs might have a stronger impact on employee attitudes. Also expanding QCs to address multiple issues besides those impacting productivity might also impact this relationship. The results suggest that participative techniques that aim to impact employee attitudes should measure perceived participation.

The significant mean difference in the effect sizes for private and public organizations and all other indicators (i.e. substantial difference in mean effect size, reduction in residual variance, and increase in percent of variance accounted for by sampling error) suggest there is a real difference between private and public organizations in the effects of QCs on job satisfaction, PDM, and organizational commitment. The results suggest that QCs are more effective in impacting employee attitudes in private organizations than public ones.

A contradictory result was the small negative effect of QCs on the intention to remain in the organization. Given past research it was expected to find a positive relationship between participating in QCs and intention to remain in the organization (Jennings 1988). Mobley et al. (1978) model of employee turnover established the link between dissatisfaction in the job and turnover intentions. Perhaps due to the small effects of QCs on job satisfaction the intention to remain in the organization was not impacted. Also a longer

time span might have been necessary to assess the employees' intentions to remain or leave the organization. The residual variance suggested the possibility of moderators affecting this relationship. Thus, further moderator analyses are necessary before concluding that QCs do not affect intention to remain in the organization.

One limitation of this study was the small number of studies available for moderator analyses. Moderator analyses could not be conducted on the variables intention to remain in the organization and self-appraised job performance because of the number of studies available. Given the substantial residual variance for these variables, it is expected that the effects of QCs are affected by moderators. Also, a full hierarchical moderator analysis could not be conducted because there were too few studies to yield adequate cell sizes.

Because QCs require the voluntary participation of employees, using a truly experimental design to study QCs is not feasible. This threatens the internal validity of the results since a possible rival hypothesis will be that volunteers to QCs have some particular individual characteristic that accounts for the effects of the intervention. Japhet-Michaeli (1991) conducted the only known randomized experiment studying the effects of QCs. He found significant improvements in performance for the QC participants. This offers evidence of the effects of the QCs on job performance even when the participants were randomly chosen instead of volunteers. In this study, when comparing QC members (volunteers) to nonvolunteers the effects of QCs were not different than when QC members were compared to a sample of employees who were randomly chosen.

Practical Recommendations

It is important for organizations to evaluate QCs in longitudinal designs. The results seem to suggest that if QCs are evaluated too early (i.e., less than a year) the effects would be small, and evaluators probably will arrive to the conclusion that QCs do not have an effect. Differential attrition could also explain these results. There is the possibility that less effective QCs tend to disband earlier than more effective ones. Also, it is very important that organizations take into consideration the organizational climate and the support of management when implementing and evaluating QCs. The QCs literature and the TQM movement stress the importance of management showing commitment to participative interventions with supportive actions (Deming 1986; Ishikawa 1985) but researchers have not studied its effects when studying the effectiveness of QCs.

For organizations involved in quality management these results seem to suggest that quality interventions have a stronger impact on job performance than on employee

attitudes. Given that one of main goals of quality interventions is to enhance productivity, these results provide a positive outlook on the effects of TQM interventions on productivity.

References

***References marked with an asterisk indicate studies included in the meta-analysis.**

- *Adam, E. E. (1991). Quality circle performance. *Journal of Management*, 17(1), 25–39.
- *Atwater, L., & Sander, S. (1984). *Quality circles in navy organizations: An evaluation* (Technical Report No. NPRDC TR 8453). San Diego: Navy Personnel Research & Development Center. (NTIS No. AD-A146).
- Barrick, M. R., & Alexander, R. A. (1987). A review of quality circle efficacy and the existence of positive finding bias. *Personnel Psychology*, 40, 579–592.
- Brockner, J., & Hess, T. (1986). Self-esteem and task performance in quality circles. *Academy of Management Journal*, 29, 617–623.
- *Bruning, N. S., & Liverpool, P. R. (1993). Membership in quality circles and participation in decision making. *The Journal of Applied Behavioral Science*, 29, 76–95.
- *Buch, K., & Raban, A. (1990). Quality circles: How effective are they improving employee performance and attitudes? *Psychology: A Journal of Human Behavior*, 27, 11–17.
- *Buch, K., & Spangler, R. (1990). The effects of quality circles on performance and promotions. *Human Relations*, 43, 573–582.
- *Byrd, P. A. (1986). An analysis of the impact of quality circles in an applied setting (Doctoral dissertation, University of Southern Mississippi, 1985). *Dissertation Abstracts International*, 46, 2854A.
- Cotton, J. L. (1993). *Employee involvement: Methods for improving performance and work attitudes*. Newbury Park, CA: Sage Publications.
- Cotton, J. L., Vollrath, D. A., Froggatt, K. L., Lengnick-Hall, M. L., & Jennings, K. R. (1988). Employee participation: Diverse forms and different outcomes. *Academy of Management Review*, 13, 8–22.
- Crosby, P. B. (1979). *Quality is free: The art of making quality certain*. New York: McGraw-Hill Book Company.
- Crosby, P. B. (1984). *Quality without tears: The art of hassle-free management*. New York: McGraw-Hill Book Company.
- Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.
- *Dutta, R. N. (1989). Relationships between participation in quality circles and employee attitudes in aerospace industries (Doctoral dissertation, United States International University, 1988). *Dissertation Abstracts International*, 49, 1875A.
- *Elizur, D. (1990). Quality circles and quality of work life. *International Journal of Manpower*, 11(6), 3–7.
- *Elmuti, D., & Kathawala, Y. (1990). Effects of computer aided quality circles on organizational productivity and satisfaction. *Information & Management*, 19, 33–40.
- Eskew, D. M. (1989). The effect of quality circle participation on job involvement, productivity, and satisfaction. (Master's thesis, Michigan State University, 1988). *Masters Abstracts International*, 27, 328.
- *Feagan, S. Y. (1986). Relationships of a quality circle process on job satisfaction and organizational commitment in elementary

- schools (Doctoral dissertation, The University of Virginia, 1985). *Dissertation Abstracts International*, 47, 359A.
- *Frost, T. F. (1986). The effects of quality circles upon job enrichment, teamwork, and stress. *The Quality Circles Journal*, 9(4), 42–45.
- Gallup survey: Top executives talk about quality. (1986). *Quality Progress*, 19(12), 49–54.
- *Gantos, L. A. (1987). Quality circles: An exploratory study of their efficacy for improving school decision structures (Doctoral dissertation, University of Michigan, 1987). *Dissertation Abstracts International*, 48, 265A.
- *Grady, J. F. Jr. (1985). An investigation of the relationship between employee participation in quality circles and changes in their work life quality and productivity (Doctoral dissertation, University of Pittsburgh, 1984). *Dissertation Abstracts International*, 46, 989B.
- Gray, G. R. (1993). Quality circles: An update. *S. A. M. Advanced Management Journal*, 58(2), 41–47.
- Griffin, R. W., & Wayne, S. J. (1984). A field study of effective and less-effective quality circles. *Academy of Management Proceedings*, 217–221.
- *Ham, M. P., & McHenry, M. M. (1983). *An examination of the effects of a quality circles program on attitudinal variables in two DoD installations*. Unpublished Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- Harrington, H. J. (1987). *The improvement process: How America's leading companies improve quality*. New York: McGraw-Hill Book Company.
- *Head, T. C., Molleston, J. L., Sorensen, P. F. Jr., & Gargano, J. (1986). The impact of implementing a quality circles intervention on employee task perceptions. *Group & Organization Studies*, 11, 360–373.
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage Publications.
- Ishikawa, K. (1985). *What is total quality control? The Japanese way* (D. J. Lu, Trans.). Englewood Cliffs, NJ: Prentice-Hall, Inc. (Original work published 1981).
- Japhet-Michaeli, M. (1991). *Participation in quality circles and high expectations: Impact on attitudes and output*. Paper presented at the meeting of the Academy of Management, Miami, FL.
- *Jennings, K. R. (1987). Exploring employee involvement: A longitudinal study of the process and outcomes of a quality circle intervention (Doctoral dissertation, Purdue University, 1986). *Dissertation Abstracts International*, 48, 172A.
- Jennings, K. R. (1988). Testing a model of quality circles processes: Implications for practice and consultation. *Consultation*, 7(1), 19–28.
- Lawler, E. E. III, Mohrman, S. A., & Ledford, G. E. Jr. (1998). *Strategies for high performance organizations: The CEO report*. San Francisco: Jossey-Bass Publishers.
- Ledford, G. E., Lawler, E. E., & Mohrman, S. A. (1988). The quality circle and its variations. In J. P. Campbell, & R. J. Campbell (Eds.), *Productivity in organizations: New perspectives from industrial and organizational psychology* (pp. 255–294). San Francisco: Jossey-Bass.
- Locke, E., & Schweiger, D. (1979). Participation in decision-making: One more look. In B. Staw (Ed.), *Research in organizational behavior* (Vol. I, pp. 265–339). Greenwich, CT: JAI Press.
- *Marks, M. L., Mirvis, P. H., Hackett, E. J., & Grady, J. F. Jr. (1986). Employee participation in a quality circle program: Impact on quality of work life, productivity, and absenteeism. *Journal of Applied Psychology*, 71, 61–69.
- Miller, K. L., & Monge, R. R. (1986). Participation, satisfaction, and productivity: A meta-analytic review. *Academy of Management Journal*, 29, 727–753.
- *Miskin, V. D. (1986). Participation in successful quality circles and its relationship to leader behavior and employee job satisfaction (Doctoral dissertation, Washington State University, 1985). *Dissertation Abstracts International*, 46, 3213A.
- Mobley, W. H., Horner, S. O., & Hollingsworth, A. T. (1978). An evaluation of precursors of hospital employee turnover. *Journal of Applied Psychology*, 63, 408–414.
- *Mucklow, N. E., & Seger, D. H. (1985). *Cross-sectional study of the effects of quality circles on twelve attitudinal variables*. Unpublished Master's thesis. Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- *Nale, R. D. (1985). An investigation into the relationship between quality circles and employee attitudes (Doctoral dissertation, The University of Mississippi, 1984). *Dissertation Abstracts International*, 45, 3692A.
- *Nottenburg, G. (1985). An investigation of individual reactions to quality circles: Findings from two firms (Doctoral dissertation, University of Illinois at Urbana-Champaign, 1984). *Dissertation Abstracts International*, 45, 3650B.
- Park, S. J. (1990). A critical assessment of evaluative studies on quality circles change programs: Character, designs and outcomes (Doctoral dissertation, University of Georgia, 1990). *Dissertation Abstracts International*, 51, 1385A.
- Park, S. J. (1991). Estimating success rates of quality circle programs: Public and private experiences. *Public Administration Quarterly*, 15, 133–146.
- *Platten, P. E. (1984). The investigation of organizational commitment as a source of motivation in quality control circles (Doctoral dissertation, New York University, 1984). *Dissertation Abstracts International*, 45, 708B.
- Porter, M. E. (1998). *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press.
- *Rafaeli, A. (1985). Quality circles and employee attitudes. *Personnel Psychology*, 38, 603–615.
- *Schenkel, D. M. (1982). *The effects of quality circle participation in a large complex organization: A field test*. Unpublished Master's thesis, University of Georgia, Athens, GA.
- Scherkenbach, W. W. (1988). *The Deming route to quality and productivity: Road maps and roadblocks*. Rockville, MD: Mercury Press.
- Schmidt, F. L., Gast-Rosenberg, I., & Hunter, J. E. (1980). Validity generalization results for computer programmers. *Journal of Applied Psychology*, 65, 643–661.
- *Shaw, L. L. (1988). *The effects of quality circles on employee attitudes in a department of defense organization*. Unpublished Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- *Shian, L. L. (1990). A study of the relationship of quality circles to job satisfaction, absenteeism and turnover of nurses and patients' satisfaction with nursing care in Taiwan (Doctoral dissertation, George Mason University, 1990). *Dissertation Abstracts International*, 51, 2822B.
- *Shores, D. L. (1985). An exploratory study into the relationship between quality circles and job satisfaction (Doctoral dissertation, Iowa State University, 1984). *Dissertation Abstracts International*, 45, 2014A.
- Spector, P. E. (1986). Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. *Human Relations*, 39, 1005–1016.
- Spector, P. E. (2006). *Industrial and organizational psychology: Research and practice*. Hoboken, NJ: John Wiley.
- *Steel, R. P., Jennings, K. R., & Lindsey, J. T. (1990). Quality circle problem solving and common cents: Evaluation study findings from a United States federal mint. *The Journal of Applied Behavioral Science*, 26, 365–381.

- *Steel, R. P., & Lloyd, R. F. (1988). Cognitive, affective, and behavioral outcomes of participation in quality circles: Conceptual and empirical findings. *The Journal of Applied Behavioral Science*, 24, 1–17.
- *Steel, R. P., Lloyd, R. F., Ovalle, N. K., & Hendrix, W. H. (1982). Designing quality circles research. *The Quality Circles Journal*, 5(1), 40–43.
- Steel, R. P., & Shane, G. S. (1986). Evaluation research on quality circles: Technical and analytical implications. *Human Relations*, 39, 449–466.
- *Steel, R. P., Mento, A. J., Dilla, B. L., Ovalle, N. K. II, & Lloyd, R. F. (1985). Factors influencing success and failure of two circle programs. *Journal of Management*, 11(1), 99–119.
- Tang, T. L. P., Tollison, P. S., & Whiteside, H. D. (1987). The effect of quality circle initiation on motivation to attend quality circle meetings and on task performance. *Personnel Psychology*, 40, 895–898.
- *Thal, A. E. Jr. (1985). *Influence of quality circles on attitudinal outcomes among civil engineering personnel*. Unpublished Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- Van Fleet, D. D., & Griffin, R. W. (1989). Quality circles: A review and suggested future directions. In C. L. Cooper, & I. T. Richardson (Eds.), *International review of industrial and organizational psychology* (pp. 213–233). Oxford, England: John Wiley & Sons.
- *Vaughn, R. J. (1983). *The effects of a quality circle intervention on four behavioral outcomes*. Unpublished Master's thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- *Weiglein, S. A. (1989). Relationship of quality circles in nursing to leadership, job satisfaction, patient care, and cost containment (Doctoral dissertation, Western Michigan University, 1988). *Dissertation Abstracts International*, 49, 4239B.
- *Wiebe, F. A., & Zahra, S. A. (1985). A longitudinal study of the impact of quality circles. *Transactions IAQC Annual Conference*, 7, 175–177.
- *Zahra, S. A. (1982). An exploratory empirical assessment of quality circles (Doctoral dissertation, The University of Mississippi, 1982). *Dissertation Abstracts International*, 43, 2030A.