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Title: High Performance in Self-
Managing Industry Teams:
A Review of the Literature

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High Performance in Self–Managing Industry Teams:
A Review of the Literature

by Dr. Carol Beatty

Technological and organizational change, so crucial now to modern economies is best planned and monitored by senior level, cross-functional teams and best implemented by cross-functional task forces at lower levels of the organization (Beatty, 1992; Beatty & Gordon, 1991). There is also increasing evidence that ongoing, continuous improvement is best performed by organizations using empowered work teams. Beatty and Garces (1992) found that in Canadian companies adopting fully integrated CAD/CAM systems, superior performance was linked less with technological innovations than with radical administrative innovations such as pay for knowledge systems, various types of teams, flattening of the hierarchy, job rotation and enrichment, and changes in reporting relationships.

But how prevalent is the use of work teams in industry? One survey of manufacturing companies in Ontario (Gordon, Beatty, Wiseman & Bolton, 1993) found that:

- at 18% of the responding plants, all employees participate teams
- only 6% had no teams
- an average of 48% of plant employees were organized in teams of various kinds
- 70% of the teams were cross-functional
- 75% of the teams included workers as well as managers

Despite the movement in North America towards team-based management, the transition period is likely to be turbulent for adopting organizations. Teams will solve some problems, but will create others.

Types of Teams

McGrath's (1984)typology divided groups into natural and composed and their tasks into natural and imposed or artificial. Much of the research on teams has been generated on composed groups such as groups of undergraduate students assembled for the purposed of an experiment. However, work teams in organizations are overwhelmingly natural teams dealing with natural tasks. These types of teams are more difficult to study, and the majority of the research has been comprised of individual case studies and field observational studies. Thus more research is available concerning behaviour in ad hoc experimental groups, often composed of undergraduate students, than exists about the dynamics of naturally occurring work groups.

McGrath further divided these naturally occurring groups into four categories according to whether their activities were broad or narrow and whether these activities were performed over a limited or very long term.

		Very Long Term
Broad Band of Activities	Expeditions (e.g. space crews)	Embedding Systems (e.g. families)
Limited Band of Activities	Task Forces (e.g. study commissions)	Standing Crews (e.g. work crews, sports teams)

In this typology, most long-standing work groups or teams would be classified as standing crews because of their limited band of activities. However, in the new team-based structures, self-managing or autonomous work teams perform a broader band of activities. Thus, they could become more like a family group, more tightly-knit and interdependent, with all the of the family's well-known attendant interpersonal problems and emotional responses. And so, the author would predict that the organization's transformation to a truly team-based management system will not always be a smooth one.

Conceptual Framework for Studying Self-Managing Teams

The following framework provides a good starting point for studying self-managing teams.

INPUTS	GROUP INTERACTION PROCESSES	RESULTANT BENEFITS
Environmental Factors: Organizational performance standards and team management		Decision Quality
Individual Factors: Abilities Skills	Leadership	Member Satisfaction/Benefits
Group Factors: Composition Size Longevity	Group Cohesion Communication Processes Conflict Resolution Stage of Group Development	Group Performance

Team performance cannot help but respond to the environment in which the team operates. For example, Katzenbach and Smith's (1992) in-depth case analysis of teams in high performing organizations concluded that a strong organizational performance ethic is a necessary condition of team performance. Organizations and organizational leaders who promote performance results that are measured and rewarded appropriately and who offer clarity of purpose and goals, create a climate in which teams can strive for excellence. In another study of 105 basketball players, Seifritz, Duda and Chi (1992) concluded that both the players' enjoyment and their belief that effort leads to achievement were associated with a mastery-oriented motivational climate. Finally, West and Wallace (1991) studied patient care teams in U.K. hospitals and concluded that the organizational climate for innovation was one of the strongest predictors of team innovativeness.

Many researchers state that team performance is influenced by organizational systems, such as of performance evaluation, goal setting and rewards. Fandt (1991) studied 460 managers assigned to four or five-member teams and found that when accountability was increased, teams experienced higher success and satisfaction. There is also ample research evidence that both individual and team performance are enhanced by the existence of clear goals (Locke; 1978; Latham & Locke, 1979). However, group goals can be far more complex than individual goals, so group goals are best based on member discussion and negotiation, defined and prioritized until the group's vision emerges (Bassin, 1988). For example, Mitchell and Williams (1990) confirmed that group plus individual goal setting results in high performance when people work interdependently. Furthermore, group performance has been shown to increase when all members of the team are committed to the group's goals (Zaccaro & Lowe, 1988).

Some theorists believe that performance measurement and reward systems must reflect group rather than individual effort in a team-based structure. For example, Slavin's (1990) study of cooperative learning groups found that high performance in interdependent tasks can be predicted by goals structures involving both team rewards and individual accountability in combination. In addition, Hanlon and Taylor's (1991) study of 228 employees before and after the implementation of a gainsharing plan as compared to 343 employees at a control facility, showed a significant increase in work-group communication, productivity and effectiveness six months after its introduction.

However, group rewards may be counterproductive if they pit team against team. Niehoff and Mesch (1991) examined the effects of cooperative, intergroup competitive, individualistic and no-reward structures on academic performance and group processes

with data from groups of 156 undergraduate students. Group effectiveness was rated significantly higher under the cooperative and no-reward conditions compared to the intergroup competitive reward condition.

Furthermore, empowerment can affect team performance. Magjuka and Baldwin (1991) studied 72 employee involvement teams and suggested that one of the significant predictors of team effectiveness was openness of a team's information access structure. If higher levels are unwilling to share management information and decisions with self-managing teams, it is unlikely they will reach their full potential.

In summary, it can be inferred that self-managing teams will be more effective if they are held accountable for results, have clear, negotiated and accepted goals, have incentive systems based on team rather than individual performance, and if they are given sufficient authority and power to carry out their tasks.

Individual Factors

Experts are divided on the question of whether or not groups contribute more or less than the sum total of individuals' contribution to certain organizational outcomes. Some argue that group outcomes depend more on the ability of individual members than on any sort of synergy effect of teams (Steiner, 1972). For example, Ganster, Williams and Poppler (1991) reported that decision performance of groups depends more on the individual abilities of the group's members and the influence of the more able group members than on the process that the group uses to reach a decision.

However, group results which are superior to the sum of individual efforts depend on the type of task undertaken. More complex tasks undertaken by natural groups over a longer time period must be studied. For example, Jones (1974) in an investigation of sports teams found that 90% of the variation in baseball team effectiveness was predictable from a measure of individual members' skills, as compared to only about 35% for basketball teams. Basketball team members' tasks are more interdependent than those of baseball players and thus are more comparable to the tasks of self-managing work teams, where a high degree of interdependence obtains.

Another line of research asserts that both task-related and "maintenance" or interpersonal skills of members are determinants of group performance (Bennis & Shepard, 1961; Burke, 1988). Performance is increased when task functions such as initiating discussion or action, clarifying, summarising, testing for consensus and seeking or giving information are performed (Alexander, 1985). However maintenance functions such as encouraging involvement and participation, sensing and expressing group feelings, reconciling disagreements, and setting standards are also necessary.

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Groups perform better when all members perform both task and maintenance functions (Alexander, 1985).

Various other skills and abilities have been proposed as important to group performance. For example, studies of R&D project teams have concluded that high performers are individuals with high levels of self-esteem, job satisfaction, innovative orientation and formal education (Allen, 1977; Keller, 1986). Bouchard (1969) reported that individual member intelligence predicted group performance on a creative task, and groups whose members have high levels of these would perform well.

In summary, from the above it appears that individual members of high performing teams should also be high performing individuals, should have the requisite technical skills to complete the team's tasks, should possess the human skills and the individual characteristics to promote team functioning and should demonstrate a balance of task and maintenance behaviours.

Group Factors:

Group Composition

According to Anderson (1985), little is known about how to compose groups, even though a great deal of research has been devoted to this issue (Slavson, 1955; Stava and Bednar, 1979). One general principle that has evolved is that groups should be composed homogeneously in regard to objective criteria (age, sex, socioeconomic status, and so forth) but heterogeneously in regard to behavioral characteristics (Bertcher and Maple, 1977). Some suggest that it pays to compose the group in such a manner that each member is compatible with at least one other member (Stava and Bednar, 1979). This position seems to prevent the evolution of neglected isolates or scapegoats in the group.

Heterogeneity with respect to roles within the team must also be considered. Too much overlap or homogeneity of roles can lead to confusion and conflict. Much research has found that individual member roles in effective teams are clear and consensual (Varney, 1989; Shepard, 1964). Also, in highly cohesive groups, role clarity, role acceptance and role performance is higher (Bass, 1980; Stogdill, 1972). And conversely, groups with high role differentiation may develop higher levels of cohesion.

Tziner (1986 & 1988) studied the effects of heterogeneity of ability and motivation on performance in a study of 64 three-man military teams. He found that performance could be predicted additively by knowing the levels of motivation and ability of each individual team member, and that interaction effects were absent even though tasks

were interdependent. However, when Hooper & Hannafin (1991) studied heterogeneous and homogeneous ability dyads among 6th and 7th grade math students, they found that low-ability students performed better in heterogeneous groups, whereas high-ability students did better in homogeneous dyads.

Large age differences among employees in work groups have been associated with higher work group turnover (McCain O'Reilly and Pfeffer, 1983; Wagner, Pfeffer & O'Reilly, 1984). However, the role of other variables such as gender composition or personality on performance has not been thoroughly investigated. Seibert and Gruenfeld (1992) correlated undergraduate groups' behaviour during a complex decision-making task with individual members' measures of "masculinity", "femininity" and "androgyny". They reported significant relationships between masculinity scores and dominance behaviour; however no analysis of performance was reported.

Brocato and Seaburg (1987) used the Meyers/Briggs Type Indicator to investigate whether homogeneous (same type) or heterogeneous groups (complementary types) would perform better on two different types of tasks, one structured and one ambiguous. The results provided evidence that psychological type is more significant than type of task. In another study, Nettleton and Sandstrom (1976) found that successful football teams were composed by a majority of task oriented, cooperative members with a smaller set of self-oriented members. However, in a study of 288 basketball teams, Eitzen (1973) reported that the more homogeneous the group the less likely that cliques would form and the higher the goal attainment. Finally, Aamodt, Kimbrough and Alexander (1983) reported that slightly heterogeneous teams won a higher percentage of their games than did heavily heterogeneous or homogeneous groups. The preponderance of evidence appears to favour a small degree of heterogeneity, but how much and on which dimensions remain unclear.

Some research has addressed the effects of homogeneity of norms and values on group outcomes. Goodman, Ravlin and Schminke's (1987) review of this literature found very little evidence, however, for a significant relationship between norms and performance. Nevertheless, Anderson (1985) found that higher performance groups had loose norms about content (almost anything could be discussed), have norms that favour breadth of participation, and have a large number of norm regardless of their content.

Self-managing teams may have little choice about team composition, unless the organization allows teams to select members. However, several important questions may well be investigated by examining the relationships between such variables as age, tenure, skill balance, degree of homogeneity, etc. on team performance and member satisfaction.

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Group Size

Research suggest that work groups should be relatively small in size. Small groups have been shown to increase cohesiveness, but their optimal size depends on the degree of member interdependency needed for the task (Steiner, 1972). Reviews of the literature point out that size and performance may also have a curvilinear relationship (McGrath, 1984; Shaw, 1981). For example, Johnson and Johnson (1991) suggest six as the optimal size for cooperative learning groups, whereas Bridges and Hallinger (1991) recommend five to seven as optimal for problem-based learning project teams. In brainstorming groups, Osborn (1954) argued that groups of no more than twelve were most effective, but subsequent research tended to confirm that seven was the optimal number (Hackman and Vidmar, 1970; Lewis, Sadosky & Connolly, 1975).

Furthermore, large groups may not gain the maximum benefit from individual members' skills. Ringlemann (in Gill, Menlo & Keel, 1984) observed a rope pulling experiment and reported that while groups pulled with more force than individuals, the force was not as much as would have been predicted by individual scores. This decrease in average individual performance increased with group size, and was termed "social loafing".

Self-managing teams come in various sizes, and presumably there is a logic to the size chosen that fits the particular organization and team tasks. It is important to investigate whether team functioning declines above or below some optimal numbers and whether the social loafing phenomenon takes place in self-managing teams.

Group Longevity

Katz (1982) studied the shifts in communication over time of 50 R&D project groups that varied in terms of group longevity. He found that project groups became increasingly isolated from key information sources both within and outside their organizations with increasing stability of project membership, and this reduction in communication affected project performance adversely. Katz (1982) also reported a curvilinear relationship between the mean tenure of members in project groups and ratings of group performance. Research is needed to examine whether Katz's findings about project groups also apply to self-managing teams.

Group Training

Various types of training ranging from team building to training in problem solving skills are recommended to increase team effectiveness. The research to date on a variety

of small group training experiences with as little as 10 to 12 total hours' duration indicates that positive changes are maintained by about 80% of trainees as much as six months to a year later (Lieberman, Yalom & Miles, 1973; Anderson, 1985).

For example, a study evaluating a team building intervention found that teams improved substantially following the intervention and the beneficial effects persisted two months later (Mitchell, 1986). Firestien (1991) investigated the differences in communication behaviours in small groups trained in creative problem solving (CPS) with groups not trained in CPS. Results indicated that groups trained in CPS participated more, criticized ideas less, supported ideas more, exhibited more verbal and nonverbal indications of humour, and produced more ideas than did untrained groups - all at a significant level.

In short, training in both cognitive and interpersonal skills may have significant effects on team performance.

Group Interaction Processes:

Group Cohesion

Group cohesion has been extensively studied both as an outcome of group member characteristics and as an input to performance outcomes. On the whole, evidence supports a positive relationship between group cohesion and group performance, but it is far from unanimous.

For example, Williams and Widmeyer (1991) examined the cohesion-performance outcome relationship by studying 83 female golfers from 18 teams who participated in a tournament. Cohesion significantly predicted performance outcomes, with task cohesion being the best predictor. O'Keefe, Kernaghan, & Rubenstein (1975) found cohesive scientific work groups to be more likely to adopt innovations than non-cohesive groups. Griffith & Mullins (1971) reported high levels of communication in. Furthermore, Keller's (1986) longitudinal study found that group cohesiveness was the strongest predictor of project groups' performance, both at the initial assessment and over time.

Greene's (1989) study, however, reported the opposite. He investigated the relationship between cohesion and productivity in 54 recently formed work groups in a nine-month longitudinal field study. The findings provided evidence that (1) the group's acceptance of organizational goals is antecedent to both cohesion and productivity and (2) causation between cohesion and productivity is reciprocal. Moreover, there is an increasing body of evidence that it is superior performance that causes increased

cohesion and not the reverse (Landers, Wilkinson, Hatfield and Barber, 1982; Williams and Hacker, 1982).

In short, highly effective self-managing teams are likely to be cohesive, but it is unclear whether cohesiveness promotes higher performance or vice versa.

Communication Processes

High performance teams are said to need good communication skills and processes, which minimize defensiveness and maximize openness. Several researchers have addressed these issues. Hirokawa (1987) systematically analyzed and compared the deliberations of a number of informed groups that arrived at low- or high-quality decisions. Findings pointed to superior communications processes as determinants of high quality decisions.

Elias, Johnson and Fortman (1989) investigated the relative effects of task-focused self-disclosure on group performance. Results indicated that self-disclosure led to significantly higher group cohesiveness, commitment to task and productivity. These results were especially strong for females as opposed to males. Some suggest that self-disclosure and feedback contribute to group performance indirectly, by aiding inter-member empathy (Anchor, 1979; Anderson, 1985 & 1978).

The empirical findings of Pelz and Andrews (1976) coupled with the longitudinal studies of Allen (1970) and Farris (1969) strongly support the contention that direct communications between project group members and other internal professional colleagues can enhance project effectiveness. However, contact with outside colleagues did not. On the other hand, Dewhirst, Arvey and Brown (1978) and Katz & Tushman (1981) reported direct communications with outside professionals as critical to research projects).

Thus for self-managing teams, member communications skills, task-focused self-disclosure, empathy, and both internal and external communications networks may well increase effectiveness.

Conflict Resolution

In any team situation, disagreement is likely to occur. For a team to become effective, then, it must deal with the emotional problems and the needs of its members and the interpersonal problems that arise (Alexander, 1985). But on the other hand team avoiding conflict at all costs would be ineffective (Wilemon & Thamhain, 1983). The

more groups uncover and deal with their differences, the higher the quality of their decisions (Hall and Watson, 1970).

Moreover, when overt conflict behaviour is present, it is important to discriminate between substantive conflict and affective conflict. Bell (1974) found substantive (content-related) conflict to be a constructive force in the consensus decision-making process, whereas affective (personalized) conflict was detrimental to the group.

Wall, Galanes, and Love (1987) conducted a study with the purpose of exploring the interrelationships of conflict, conflict management, member satisfaction and quality of outcome in small, task-oriented groups. Twenty-four groups comprising of 4-7 students were given an exercise to complete, and their interaction was audiotaped. The researchers detected a curvilinear relationship between conflict and solution quality. However, member satisfaction was negatively related to the number of conflict episodes, and individuals in groups experiencing no conflicts reported both greater overall satisfaction and lower quality outcomes.

The relationship between conflict and group outcomes is thus complex. Conflict up to a certain level appears to be a positive for performance, but any degree of conflict may be negative for member satisfaction.

Leadership

The team leader can play a key role in team outcomes. However, the leader must slowly transfer the responsibility for team development to all members, in order for groups to transform themselves into true teams (Bassin, 1988).

Alexander (1985) believes that the development and cohesion of a team occurs only when there is a feeling of shared leadership among team members. This means that all members must accept some responsibility for task functions - those things necessary to do the job - and maintenance functions - necessary to keep the group together and interacting effectively. Task functions include: initiating discussions or actions, clarifying issues and goals, summarising points, testing for consensus or agreement, and seeking or giving information. Maintenance functions include encouraging involvement and participation, sensing and expressing group feelings, harmonising and facilitating reconciliation of disagreements, setting standards for the group, and "gatekeeping" or bringing people into discussions. No one person can be expected to perform all these required leadership functions effectively all the time, and groups perform better when all members perform both task and maintenance functions.

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Barry (1991) proposed the distributed leadership model, which was derived from observations and interviews of fifteen self-managing teams over a three-year period. It proposes that leadership is a collection of roles and behaviours that can be split apart, shared, rotated, and used sequentially or concomitantly. This in turn means that at any one time multiple leaders can exist in a team, with each leader assuming complementary leadership role.

Also, gender has been found to be an important determinant of preferred leadership in team situations. For example, Chellandurai (1978) in a study of 160 physical education students found that males preferred coaches to be more autocratic yet more supportive than females. Similarly, Earle's (1981) study of 335 intercollegiate hockey players found that males preferred more training, more autocratic behaviour, more social support and less democratic behaviour from their coaches than did their female counterparts. Unfortunately however, these leader behaviours were not analyzed with respect to performance outcomes.

There is no question that leaders influence groups greatly and two general findings stand out. First, the group itself has an impact on outcomes that is significant and independent of leader behaviour. Second, the most effective leaders are those who help the group develop to the point at which members themselves are the primary source of help (Anderson, 1985). Counselman (1991) writes that leaderless groups have existed for decades in a number of different settings, including educational, military, and business organizations. Leaderless groups may offer certain advantages over leader-led groups, including equal opportunity for influence.

In summary, the role of leadership in self-managing teams is a complex one. On the one hand, most researchers conclude leadership is important, with most recommending a more developmental and facilitating role for the leader. Others believe the team members themselves should be responsible for all the roles and behaviours of leadership, and that under conditions of high motivation and skills, leaders are not necessary.

Stages of Group Development

There have been two main streams of research and theory about group development. The first stream deals with group dynamics, the other with phases of group problem solving. In 1965, Tuckman synthesized the first stream in a model of group development that is frequently cited today. The sequence, theoretically the same for every group, consists of forming, storming, norming, and performing. Tuckman and Jensen's (1977) update left this model in place, except for the addition of a final stage, adjourning. More recent models have kept essentially the same pattern.

The second stream concerns phases in group problem solving, or decision development. Researchers have typically worked with groups with short life-spans, usually minutes or hours, and studied them in a laboratory as they performed a limited task. Studies have focused on discovering the sequences of activities through which groups empirically reach solutions. The classic study in this tradition is Bales and Strodbeck's (1951) unitary sequence model of three phases in groups' movement toward goals: orientation, evaluation, and control.

Though they differ somewhat in the particulars, Poole criticized that "for thirty years, researchers on group development have conducted the same study with minor alterations" (1983b: 341) and have viewed group development as an inevitable progression. But research by Fisher (1970) and by Scheidel and Crowell (1964) suggested that group discussion proceeds in iterative cycles, not linear order. Poole (1983a & 1983b) raised a serious challenge to these models by demonstrating that there are many possible sequences through which decisions can develop in groups, not just one. Furthermore, researchers (Hare, 1976; Poole, 1983b) point out that they offer snapshots of groups at different points in their life-spans but say little about the mechanisms of change, what triggers it, or how long a group will remain in any one stage. Second, they treat groups as closed systems (Goodstein & Davico, 1979) and ignore the interplay between groups' development and environmental contingencies, such as groups' assignments, resources, and requirements for success (Gladstein, 1984) and communications with their environments (Katz, 1982; Katz & Tushman, 1981).

Another view is offered by Gersick (1988), who revealed that the timing of group work was highly predictable. The groups studied did not proceed through a universal series of stages. Rather, two phases of the group's calendar time were crucial - the first meeting and the midpoint of the group's allotted time. The findings suggest that the groups' progress was triggered by members' awareness of time and deadlines rather than by the completion of an absolute amount of work in a specific developmental stage.

In short, team performance may be influenced by the stage of development reached by the group and by how near the team is to its deadline for completion of the task. Groups just forming or near the beginning of a task are expected to perform less adequately than those at later stages of development.

Resultant Benefits of Teams

The benefits derived from teams or small groups as described in the literature may be summarized into three key areas: performance improvements, decision quality, and benefits to individuals.

Performance Benefits

Most studies about the performance benefits of self-managing teams are case studies, and most reports to date have been favourable. For example, Versteeg (1990) stated that the introduction of self managing work teams at Northern Telecom sites resulted in record productivity gains. Bassin (1988) described the benefits of inter-functional teams at General Foods as including: more sharing and integration of skills and resources; more member stimulation, energy and endurance; more emotional support among team members; better performance, more innovation; more ideas for problem solving; more commitment and ownership by members around team goals; more sustained effort at team directed goals; more team member satisfaction, higher motivation and more fun; greater confidence and ability to achieve more.

An intensive case study of the transition to teams at Alcan's Sheet Division in Australia (Dunphy & Berggren, 1992) concluded that among the many resulting benefits were increased quality, plant utilization and on-time delivery, waste and inventory reduction, lower injuries and absenteeism, and an increased acceptance of change on the part of the workforce. In addition, Musselwhite and Moran (1990) described the benefits of work teams in large organizations as including improved productivity, better quality products and service, higher employee morale and more responsive organization structures. Similarly, in service industries, Hoerr (1988) described the benefits of work teams realized by a large insurance company as a 20% increase in productivity and a reduction in case-processing time by as much as 75%.

Satisfaction and Benefits to Individuals

Groups structured to promote compatibility may enhance members' wellbeing and satisfaction. Colarelli and Boos (1992) in a longitudinal field study of 258 subjects working in three person groups examined whether sociometric or ability based group composition methods had different effects on group outcomes. This study suggested that sociometric approaches may be useful for predicting whether potential team members will communicate and work well together and whether or not they will benefit from team membership.

Anderson (1985), however, asserted that it is a myth that everyone benefits from group experience. Groups can, and do harm members psychologically, especially those with unrealistic expectations. Preventative measures require that member expectations are realistic, clarified and mutual. Furthermore, helping groups to develop peer-oriented norms that prohibit manipulation and dominance and discourage withdrawal and indifference may well be needed to protect members against negative outcomes.

In short, members may benefit or not from belonging to a self-managing team. It may be important to the success of these teams to determine who benefits and under which conditions.

Decision Quality Benefits

Groups commonly show increments in quality of decisions and problem solving over individuals. Group decision is clearly preferable to individual decision making when more information is needed than an individual possesses and a greater number of approaches to problem solving is needed (Maier, 1978), and the situation is unique, novel, ambiguous, or complex (Robbins, 1980). Group consensual decision making is deemed superior to other decision processes when a problem is being solved that does not have one clear "right" answer (Holloman & Hendrick, 1972). For example, Watson, Michaelson, and Sharp (1991) found evidence overwhelmingly in favour of group decision making across time on an experimental task. Group scores exceeded best member scores 98% of the time.

But decision making is only one aspect of problem solving. One of the most common tasks for groups in organizations is generating ideas, and much research has investigated whether groups produce more and better ideas than individuals, especially that to do with brainstorming. Research on brainstorming consists of two distinct streams. The first assesses the effectiveness of the original brainstorming technique, and the second tests a variety of newer methods of idea generation. The consensus from this first stream of research is that brainstorming groups do not outperform unstructured or nominal groups. The second stream of research focuses on the development and testing of new techniques for idea generation. Although some studies have shown that these structured techniques can improve idea generation, most have found that nominal groups outperform interacting groups, that structured idea generation techniques provide little advantage over unstructured interaction, and that large groups do not generate more ideas than small groups (e.g. Diehl & Stroebe, 1987; Jablin & Seibold, 1978; Lamm & Trommsdorff, 1973). The two reasons identified are production blocking and evaluation apprehension. Production blocking occurs when individuals cannot express their ideas because someone else is talking. Evaluation apprehension occurs when individuals withhold their ideas out of concern that others may not approve of them. In addition to production blocking and evaluation apprehension, other inhibitors, such as social loafing (Latane, Williams, & Harkins, 1979), may be likely present in brainstorming group interaction. Moreover, the magnitude of inhibitors may grow as group size increases (Steiner, 1972).

Gallupe, Dennis, Cooper, Valacich, Bastianutti and Nunamaker (1992) conducted two concurrent experiments with groups of varying size; there were 2-, 4-, and 6-person groups in one and 6- and 12- person groups in the other. They compared the number and quality of unique ideas generated by groups of each size using electronic and non-electronic verbal brainstorming. The larger groups in both experiments generated more unique ideas and more high-quality ideas, and members were more satisfied when they used electronic brainstorming than when they used verbal brainstorming. There were fewer differences between the two techniques for the smaller groups in each experiment. They interpreted these results as showing that electronic brainstorming reduces the effects of production blocking and evaluation apprehension on group performance, particularly for large groups.

In an effective team most decisions are reached by a kind of consensus in which it is clear that everybody is in general agreement and willing to go along. However, there is a tendency for individuals who oppose the action to keep their opposition private and thus let an apparent consensus mask real disagreement. When groups become too cohesive, they may fall prey to "groupthink" (Janis, 1972). The issue of conflict avoidance (lack of critical thinking) is evident and central to groupthink dynamics. However, in shortened versions offered by Janis and others, the key variable becomes interpreted as cohesiveness. It appears that the dangers of groupthink in decision-making are ever present in long-standing, cohesive groups (Posner-Weber, 1987; Courtright, 1978; Flowers, 1977). Such groups fit the description of self-managing work teams.

In summary, the research on decision quality outcomes of group processes is fairly elaborate, but not much has been applied to self-managing teams and their tasks.

Conclusion

There are many important issues to resolve in order to ensure that teams are designed and managed well to achieve organizational and individual benefits. Most researchers have concentrated on the context variables, others on the group interaction variables or the outcome variables. It is important for researchers to integrate these areas and attempt to analyze all three types of variables together.

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