
Work Teams

Applications and Effectiveness

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ABSTRACT: *This article uses an ecological approach to analyze factors in the effectiveness of work teams—small groups of interdependent individuals who share responsibility for outcomes for their organizations. Applications include advice and involvement, as in quality control circles and committees; production and service, as in assembly groups and sales teams; projects and development, as in engineering and research groups; and action and negotiation, as in sports teams and combat units. An analytic framework depicts team effectiveness as interdependent with organizational context, boundaries, and team development. Key context factors include (a) organizational culture, (b) technology and task design, (c) mission clarity, (d) autonomy, (e) rewards, (f) performance feedback, (g) training/consultation, and (h) physical environment. Team boundaries may mediate the impact of organizational context on team development. Current research leaves unanswered questions but suggests that effectiveness depends on organizational context and boundaries as much as on internal processes. Issues are raised for research and practice.*

The terms *work team* and *work group* appear often in today's discussions of organizations. Some experts claim that to be effective modern firms need to use small teams for an increasing variety of jobs. For instance, in an article subtitled "The Team as Hero," Reich (1987) wrote,

If we are to compete in today's world, we must begin to celebrate collective entrepreneurship, endeavors in which the whole of the effort is greater than the sum of individual contributions. We need to honor our teams more, our aggressive leaders and maverick geniuses less. (p. 78)

Work teams occupy a pivotal role in what has been described as a management transformation (Walton, 1985), paradigm shift (Ketchum, 1984), and corporate renaissance (Kanter, 1983). In this management revolution, Peters (1988) advised that organizations use "multi-function teams for all development activities" (p. 210) and "organize every function into ten- to thirty-person, largely self-managing teams" (p. 296). Tornatzky (1986) pointed to new technologies that allow small work groups to take responsibility for whole products. Hackman (1986) predicted that, "organizations in the future will rely heavily on member self-management" (p. 90). Building blocks of such organizations are self-regulating work teams. But

far from being revolutionary, work groups are traditional; "the problem before us is not to invent more tools, but to use the ones we have" (Kanter, 1983, p. 64).

In this article, we explore applications of work teams and propose an analytic framework for team effectiveness. Work teams are defined as interdependent collections of individuals who share responsibility for specific outcomes for their organizations. In what follows, we first identify applications of work teams and then offer a framework for analyzing team effectiveness. Its facets make up topics of subsequent sections: organizational context, boundaries, and team development. We close with issues for research and practice.

Applications of Work Teams

Two watershed events called attention to the benefits of applying work teams beyond sports and military settings: the Hawthorne studies (Homans, 1950) and European experiments with autonomous work groups (Kelly, 1982). Enthusiasm has alternated with disenchantment (Bramel & Friend, 1987), but the 1980s have brought a resurgence of interest.

Unfortunately, we have little evidence on how widely work teams are used or whether their use is expanding. Pasmore, Francis, Haldeman, and Shani (1982) reported that introduction of autonomous work groups was the most common intervention in 134 experiments in manufacturing firms. Production teams number among four broad categories of work team applications: (a) advice and involvement, (b) production and service, (c) projects and development, and (d) action and negotiation.

Advice and Involvement

Decision-making committees traditional in management now are expanding to first-line employees. Quality control (QC) circles and employee involvement groups have been common in the 1980s, often as vehicles for employee participation (Cole, 1982). Perhaps several hundred thousand U.S. employees belong to QC circles (Ledford, Lawler, & Mohrman, 1988), usually first-line manufacturing employees who meet to identify opportunities for improvement. Some make and carry out proposals, but most have restricted scopes of activity and little working time, perhaps a few hours each month (Thompson, 1982). Employee involvement groups operate similarly, exploring ways to improve customer service (Peterfreund, 1982).

QC circles and employee involvement groups at times may have been implemented poorly (Shea, 1986), but they have been used extensively in some companies (Banas, 1988).

Production and Service

Teams use technology to generate products or services, as in assembly, maintenance, construction, mining, commercial airlines, sales, and others. These usually consist of first-line employees working together full-time, sometimes over protracted periods, with freedom to decide their division of labor. For example, at Volvo in Kalmar, Sweden, teams of 15 to 20 employees assemble and install components in an unfinished automobile chassis conveyed by motorized carriers (Katz & Kahn, 1978). They elect their own leaders and divide their tasks, but have output quotas. Such teams have been called autonomous (Cummings, 1978), self-managing (Hackman, 1986), or self-regulating (Pearce & Ravlin, 1987) and have been used in factories at Sherwin-Williams (Poza & Markus, 1980), General Foods (Walton, 1977), and Saab (Katz & Kahn, 1978).

Projects and Development

Groups of white-collar professionals such as researchers, engineers, designers, and programmers often collaborate on assigned or original projects. Their cycles of work may be longer than in production and service, and outputs may be complex and unique. They may have a mandate of innovation more than implementation, broad autonomy, and an extended team life span. An example is a team of engineers, programmers, and other specialists who design, program, and test prototype computers (Kidder, 1981). However, their performance may be difficult to assess because the value of their one-of-a-kind outputs, like studies and patents, may only be apparent long after the work is finished.

Action and Negotiation

Sports teams, military combat units, flight crews, surgery teams, musical groups, and others are highly skilled specialist teams cooperating in brief performance events that require improvisation in unpredictable circumstances. They often have elaborate, specialized roles for members. Their missions usually call for outcomes such as negotiating a contract or winning a competition, as in military units (Dyer, 1984) or in executing a safe flight, as in flight crews (Foushee, 1984).

Other applications do not easily fit the types mentioned so far. Examples include some management teams (Bushe, 1987), transition teams for corporate mergers, and start-up teams. However, differences among appli-

cations can perhaps best be addressed through an analytic framework.

Framework for Analysis

Figure 1 depicts work team effectiveness as dynamically interrelated with organizational context, boundaries, and team development. It incorporates an ecological perspective (Sundstrom & Altman, 1989) and the premise that work teams can best be understood in relation to external surroundings and internal processes. The main facets—organizational context, boundaries, and team development—reflect current research, theory, and applied literature on work teams.

Organizational Context

Relevant features of the organization external to the work team, such as reward systems and training resources, comprise its context. Since the late 1970s, the external factors seen as relevant to group operation have grown from a few selected “inputs” to a long list of factors discovered in practice (Ketchum, 1984) and research (Pasmore et al., 1982). Models of work groups now incorporate many aspects of organizational context (Cummings, 1981; Gladstein, 1984; Hackman, 1987; Kolodny & Kiggundu, 1980; Pearce & Ravlin, 1987; Shea & Guzzo, 1987a, 1987b). Such factors can augment team effectiveness by providing resources needed for performance and continued viability as a work unit.

Boundaries

An ecological view depicts boundaries as both separating and linking work teams within their organizations (Alderfer, 1987; Friedlander, 1987). Yet group boundaries are difficult to describe concisely, because they subsume so many aspects of the relationship of group and organization. By *boundaries* we mean features that (a) differentiate a work unit from others (Cherns, 1976); (b) pose real or symbolic barriers to access or transfer of information, goods, or people (Katz & Kahn, 1978); or (c) serve as points of external exchange with other teams, customers, peers, competitors, or other entities (Friedlander, 1987).

Boundaries at least partly define how a group needs to operate within its context to be effective. If the boundary becomes too open or indistinct, the team risks becoming overwhelmed and losing its identity. If its boundary is too exclusive, the team might become isolated and lose touch with suppliers, managers, peers, or customers (Alderfer, 1987).

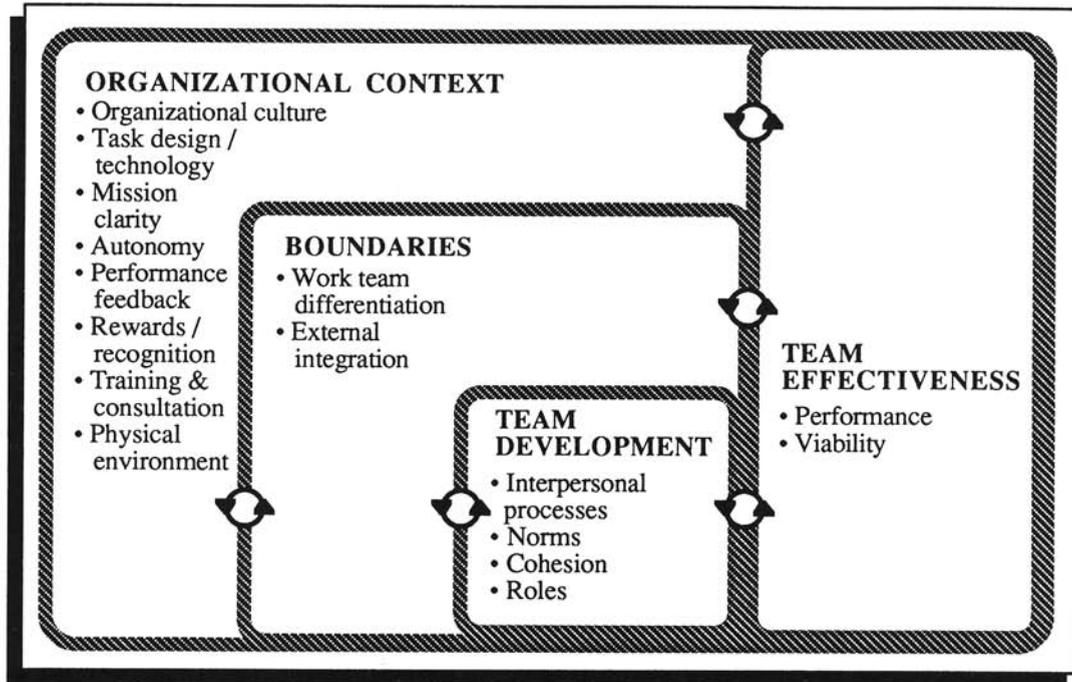
Team Development

This facet reflects the premise that over time, teams change and develop new ways of operating as they adapt to their contexts. Some features of team development, such as norms and roles, can be seen as structural. Yet it is difficult to identify aspects of groups stable enough to be called structure. We prefer to err by depicting groups as too dynamic rather than too static. Temporal patterns in group processes may be tied to effectiveness during

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Figure 1
Ecological Framework for Analyzing Work Team Effectiveness



even brief work sessions (Sundstrom, Bobrow, Fulton, Blair, & McClane, 1988). So we use the term *team development* to include what has been called group structure as well as interpersonal processes.

Team Effectiveness

Figure 1 shows effectiveness as consisting of performance and viability. This two-part definition agrees with some earlier approaches, but is more inclusive than those based only on output. Shea and Guzzo (1987b) defined group effectiveness as “production of designated products or services per specification” (p. 329). This overlooks the possibility that a team can “burn itself up” through unresolved conflict or divisive interaction, leaving members unwilling to continue working together (Hackman & Oldham, 1980, p. 169). We favor a broad definition that accounts for members’ satisfaction and the group’s future prospects as a work unit by incorporating *team viability*. At a minimum, this entails members’ satisfaction, participation, and willingness to continue working together. A more demanding definition might add cohesion, intermember coordination, mature communication and problem-solving, and clear norms and roles—all traditionally identified with team maturity. *Performance* means acceptability of output to customers within or outside the organization who receive team products, services, information, decisions, or performance events (such as presentations or competitions).

Effectiveness is defined globally to apply to a variety of work teams, consistent with current thinking (Good-

man, Ravlin, & Argote, 1986). However, Goodman (1986) argued for fine-grained criteria of effectiveness such as “quality, quantity, downtime, satisfaction, group stability over time” (p. 145). Perhaps global and fine-grained approaches can be merged by measuring specific, local criteria and combining them into general indexes for cross-team comparisons, as in the method pioneered by Pritchard, Jones, Roth, Stuebing, and Ekeberg (1988).

Interrelationships

The framework is deliberately vague about causal and temporal dynamics, reflecting the premise that team effectiveness is more a process than an end-state. We depart from McGrath’s (1964) “input-process-output” approach (e.g., Gladstein, 1984), which now is even questioned by former proponents. For instance, Hackman (1987) suggested that groups evaluate their collective performance as they work, and evaluations affect group processes, which influence subsequent performance. This can yield “self-reinforcing spirals of increasing effectiveness” after initial success—perhaps a “synergy bonus” (Hall & Watson, 1971). However, negatively reinforcing spirals of decreasing effectiveness can also create “process losses” (Steiner, 1972).

Adjacent facets of the framework are linked by circular symbols intended to show *reciprocal interdependence* (Thompson, 1967). For instance, one indicates that boundaries influence effectiveness, which alters the boundaries, which further influence effectiveness. Ambiguity about temporal dynamics begs the question of

developmental processes in work teams, which we address after discussing organizational context and boundaries in relation to team effectiveness.

Organizational Context and Work Team Effectiveness

Figure 1 lists eight aspects of organizational context distilled from several sources, including Cummings and Molloy's (1977) analysis of 16 experiments on autonomous work-groups. Present in more than half of the studies with favorable outcomes were six "action levers": autonomy; technical-physical features such as new equipment or facilities; task variety; information or feedback; pay or rewards; interpersonal interventions. Present in three or more successful experiments were: training; work-unit support, such as maintenance or technical help; and altered organizational structure as in widened span of supervisor control or fewer levels of authority. Other potentially important context features are mission clarity (Hardaker & Ward, 1987) and organizational culture (Cummings, 1981).

Organizational Culture

Culture in an organization refers to collective values and norms (Rousseau & Cooke, 1988). Those that favor innovation (Cummings, 1981) or incorporate shared expectations of success (Shea & Guzzo, 1987a) may especially foster team effectiveness. For instance, Peters and Waterman's (1982) "excellent" companies valued such things as superior quality and service, attention to detail, and support of innovation. Firms that report success in applying work teams have had similar cultures, often guided by philosophies of top managers (Galagan, 1986; Poza & Markus, 1980; Walton, 1977). But culture may be more a property of work units than a pervasive feature of whole organizations (James, James, & Ashe, in press).

Organizational culture probably figures most prominently in the effectiveness of work teams least clearly defined as work units. For example, new production teams may look to the wider culture for values and norms. In organizations moving toward self-management, values consistent with team autonomy may foster self-direction (Hackman, 1986). Failed quality circles may have experienced confusion about their purposes (Shea, 1986) and looked in vain for guidance from organizational culture.

Task Design and Technology

If the research literature on small groups agrees on one point, it is the importance of the task (McGrath, 1984), a major source of differences among work teams. For instance, committees spend large shares of their time in problem-solving meetings, whereas surgery teams spend much of their time together in carefully sequenced operations. Team tasks differ on broad categories of activity, such as generating solutions versus executing action plans (McGrath, 1984); technical versus interpersonal demands (Herold, 1978); difficulty (Shaw, 1981); number of desired outcomes and trade-offs among them (Campbell, 1988); intermember communications (Naylor & Dickenson,

1969); coordination requirements (Nieva, Fleishman, & Reick, 1978); task divisibility (Steiner, 1972); subtask demands (Roby & Lanzetta, 1958); and dependence of team outcomes on performance by all members (Steiner, 1972).

Task design and social organization depend to a degree on technology—and may even be largely determined by it. For example, coal mining changed with the advent of mechanized conveyors and coal cutters (Trist, Higgins, Murray, & Pollock, 1963). Earlier methods permitted miners to work independently, but new technology created specialized tasks that required miners to synchronize efforts in small teams. Some technologies allow team members to master all tasks; others carry tasks so complex that each member can master only one, as in musical groups and space shuttle crews. Here technology dictates a social organization of individual roles.

Optimal fit among task, technology, and social organization calls for "logical subdivision of the technical process into operating subunits of reasonable size that can become partially independent" (Ketchum, 1984, p. 247). Ideally, teams produce whole products (Cummings, 1981), and do tasks designed for significance, skill, and variety (Hackman & Oldham, 1980); responsibility for outcomes (Hackman, 1986); challenge (Cummings, 1981); member interdependence (Shea & Guzzo, 1987b); learning, and recognition (Pasmore et al., 1982). Technology can be crucial, as in mining and harvesting crews whose output depends on equipment design, maintenance, down-time, and other factors (Goodman, Devadas, & Hughson, 1988; Kolodny & Kiggundu, 1980).

For work teams who repeatedly do the same work-cycle (which often happens in manufacturing), task difficulty may depend on predictability of inputs (Cummings, 1981) or outcomes (Campbell, 1988). Work teams faced with unpredictable inputs or uncertain outcomes may perform best in contexts that foster decentralized communication (Tushman, 1979) and flexible internal coordination (Argote, 1982; Susman, 1970).

Mission Clarity

Team effectiveness may depend on having a clearly defined mission or purpose within the organization (Shea & Guzzo, 1987b). It may entail expectations regarding output, quality, timing, and pacing—and perhaps expectations for anticipating and designing new procedures as the task changes (Hackman, 1986). Communication of a team's mission throughout the organization especially may help teams whose work is closely linked to or synchronized with that of other work units (e.g., Galagan, 1986; Pearce & Ravlin, 1987).

Autonomy

Central to work team design and management, autonomy is usually described by reference to three categories: (a) *Semi-autonomous* groups are supervisor-led (Cherry, 1982); (b) *self-regulating* or self-managing groups elect their leaders and control their division of labor (Pearce & Ravlin, 1987); and (c) *self-designing* teams have au-

thority over their definitions as work units and external relations (Hackman, 1987).

Team autonomy depends on the role of leader (Hackman & Walton, 1986) and on how authority is distributed. A team can have a manager, administrator, leader, supervisor, facilitator, director, coordinator, spokesperson, or chairperson—or several of these. Division of leadership among manager(s) and members may vary with team longevity and maturity. Manz and Sims (1987) recommended that managers foster self-management by acting as “un-leaders.” Eventually a team may develop its own leadership capabilities if given a progressively less prominent leader role (Glickman et al., 1987).

Performance Feedback

Practitioners agree that team effectiveness depends on accurate, timely feedback on performance (Ketchum, 1984; Kolodny & Kiggundu, 1980) despite limited research evidence (Dyer, 1984). Koch's (1979) study of sewing machine operator groups found increased product quality but decreased satisfaction after the introduction of specific goals with systematic feedback. Nadler, Cammann, and Mirvis (1980) had mixed success with a feedback system in retail banks in which performance was not tied to work-unit rewards. Pritchard et al. (1988) used goal-setting and feedback (with team incentives) to bring about improved performance and satisfaction in aviation maintenance teams.

Performance feedback requires dependable measurement systems. These are probably most feasible in teams with repetitive, quantifiable output and short cycles of work, such as coal mining crews and assembly teams. Feedback may be more difficult in teams with longer cycles of work and/or one-of-a-kind outputs, such as project and development teams.

Rewards and Recognition

Team performance may hinge on desirable consequences to individual members contingent on the whole team's performance—or *outcome interdependence*. Outcomes can include public recognition and praise for team successes, team celebrations, or individual rewards such as preferred work assignments, desirable schedules, or money. Shea and Guzzo (1987b) tested the effects of cash performance incentives on retail sales teams. Contrary to prediction, rewards did not bring increases in team sales, but members' evaluations of customer service rose and the organization showed higher sales overall. In contrast, Pritchard et al. (1988) did find increased performance (and satisfaction) in aviation maintenance units after introducing a group incentive plan based on time off.

Training and Consultation

Traditional among prescriptions for work team effectiveness are training and consultation on team tasks and interpersonal processes. But apart from a few case studies we know little about the appropriate content or design of team training programs (Dyer, 1984). Key interpersonal

skills may include “un-leadership” (Manz & Sims, 1987). An approach to technical skills in production groups, often called “cross-training,” provides training and incentives for learning new skills in teams whose members can rotate jobs (Poza & Markus, 1980).

Physical Environment

Inter-member communication and cohesion may depend on the extent to which informal, face-to-face interaction is fostered by proximity of work-stations and gathering places (Sundstrom, 1986; see also Stone & Luchetti, 1985). Territories can reinforce group boundaries (Miller, 1959) and foster or inhibit external exchange. When tasks call for external coordination, exchange can be aided by reception and conference rooms. In cases in which group processes are easily disrupted, effectiveness may be aided by enclosed group working areas. So, physical environments are central to group boundaries (Sundstrom & Altman, 1989).

Boundaries and Work Team Effectiveness

The framework in Figure 1 suggests that group boundaries mediate between organizational context and team development and are tied to effectiveness. By defining the relation of a work team and its organization, boundaries also help define what constitutes effectiveness for the team in its particular context (Sundstrom & Altman, 1989). Besides doing its task, a work team has to satisfy requirements of the larger system and maintain enough independence to perform specialized functions (Berrien, 1983). So one key aspect of the group-organization boundary is *integration* into the larger system through coordination and synchronization with suppliers, managers, peers, and customers. When a team's mission requires a high degree of external integration or linkage, effectiveness depends on the pace and timing of exchanges with other work units, as in a production team that gets materials from the preceding team and provides the next operation with materials for its work. When one team falls behind, the whole system suffers (Kolodny & Dresner, 1986). In cases in which team performance depends less on timing and synchronization with counterpart work units, effectiveness may be more a function of internal group processes.

A second key aspect of group-organization boundaries is *differentiation* (Lawrence & Lorsch, 1969), or the degree of specialization, independence, and autonomy of a work team in relation to other work units. Differentiation of a work team in an organization can occur when the mission requires special expertise or facilities, or isolation from contamination and interference, as in a surgery team. Team effectiveness can hinge on the ability to isolate certain activities from outside interference, such as sensitive operations, problem-solving meetings, or practice sessions. A team can be differentiated from other work units through exclusive membership, extended working time or team life span, or exclusive access to physical facilities such as surgery suites or product testing laboratories.

Table 1
Applications of Work Teams: Differentiation, External Integration, Work-Cycles, and Outputs

Applications and examples	Work-team differentiation	External integration	Work cycles	Typical outputs
Advice/involvement Committees Review panels, boards Quality control circles Employee involvement groups Advisory councils	Low differentiation: Inclusive or representative membership; Often short group life span and/or limited working time.	Low integration: Often few demands for synchronization with other work-units; external exchange can be minimal; work-cycle may not be repeated.	Work-cycles can be brief or long; one cycle can be team life span.	Decisions Selections Suggestions Proposals Recommendations
Production/service Assembly teams Manufacturing crews Mining teams Flight attendant crews Data processing groups Maintenance crews	Low differentiation: Variable membership requirements; sometimes high turnover; variable team life span; often special facilities.	High integration: Externally paced work usually synchronized with suppliers and customers inside and outside the organization.	Work-cycles typically repeated or continuous process; cycles often briefer than team life span.	Food, chemicals Components Assemblies Retail sales Customer service Equipment repairs
Project/development Research groups Planning teams Architect teams Engineering teams Development teams Task forces	High differentiation: Members usually expert specialists; task may require specialized facilities; Sometimes extended team life span.	Low integration: Often internally paced project with deadline; little synchronization inside organization; task can require much external communication.	Work-cycles typically differ for each new project; one cycle can be team life span.	Plans, designs Investigations Presentations Prototypes Reports, findings
Action/negotiation Sports teams Entertainment groups Expeditions Negotiating teams Surgery teams Cockpit crews	High differentiation: Exclusive membership of expert specialists; specialized training and performance facilities; Sometimes extended team life span.	High integration: Performance events closely synchronized with counterparts & support units inside the organization.	Brief performance events, often repeated under new conditions, requiring extended training and/or preparation.	Combat missions Expeditions Contracts, lawsuits Concerts Surgical operations Competitions

Demands for external integration and differentiation inherent in the relationship of a team and the surrounding organization can be seen as partly specifying what constitutes team effectiveness. A taxonomy by Sundstrom and Altman (1989) uses integration and differentiation to identify four types of work groups whose boundaries create different demands for effectiveness, shown in Table 1. The types correspond with the four applications of work teams mentioned earlier: (a) advice and involvement groups; (b) production and service teams; (c) project and development teams; and (d) action and negotiation teams. An example of a team low on both external integration and differentiation—an advice and involvement group—is a quality control circle. Differentiation is minimal in that membership is often broadly representative, working time is limited, and the group may have only a temporary meeting room. External integration is also minimal: Within broad limits a QC circle can proceed at its own

pace with few requirements for synchronization with other work units. Its work may call for external communication, but the task imposes few constraints on timing or turn-around. In contrast, the organizational context of action and negotiation teams often demands both external differentiation and integration, which dictate conditions for team effectiveness. For example, a cockpit crew consists of qualified experts who work in specialized, limited-access facilities (their cockpits), and performance depends on their ability to work without distraction or interference. They carry out complex performance events (flights) that call for activities closely synchronized with those of other work units (ground crew, cabin crew, control tower, and other cockpit crews). High levels of external differentiation and integration may make such teams sensitive to particular features of organizational context, such as training and technology, which in turn might enter into team development.

External Integration: Coordination With Suppliers, Managers, Peers, Staff, and Customers

External integration represents the way a team fits into the larger organization, or the external demands inherent in its boundary. A team's work can be seen as a process of receiving materials or information from suppliers; transforming or adding value in cooperation with managers, peers, and staff; and delivering output to team customers. (A team's customer can be inside the organization, like a packaging and shipping department in a factory.) The need for coordination with external agents is related to a team's work-cycle. As shown in Table 1, teams with high levels of external integration (whose relationships with their organizations require close external synchronization) may tend to repeat their work cycles. For example, production teams generate the same or similar outputs over and over again. Teams with less external synchronization may tend toward single cycles of work that extend over long periods, yielding one-of-a-kind outputs. In some project teams, the work cycle equals the team life span; when the project is finished the team disbands. Such work units are more "loosely coupled" with counterparts than production teams (Weick, 1982). Teams facing demands for both external integration and differentiation tend to have two kinds of work cycles: brief, repeated performance events that require synchronization with support staff or competitors, and longer cycles of independent preparation. For maximum effectiveness, boundaries may need to be managed differently during the two types of work cycles.

External Differentiation: Definition as a Work Unit

A work team is differentiated from its organizational context to the extent that it comprises an identifiable collection of people working in a specific place, over the same time period, on a unique task. Besides the task, aspects of differentiation important to effectiveness are membership, temporal scope, and territory. Together these features help define the team boundary (what distinguishes it from other work units).

1. Membership: Composition, turnover, and size.

Basic to the definition of a work team is the identity of individuals treated as members by both group and organization. Research has traditionally asked what mix of individual traits, in what size group, yields greatest effectiveness. The following question is less often asked: Who decides the composition and size of a work team? Especially in organizations developing a participative style of management, the question is inevitable. An answer that might apply in some circumstances is to give members a substantial role in deciding team composition (Smith, 1981), at least from among qualified individuals. An early study of construction crews whose members chose their own team-mates did find them more productive than other crews (Van Zelst, 1952). Recently, Tziner and Vardi (1982) demonstrated a technique for using mutual preferences to form teams.

A second, seldom-asked question concerns turnover

among members. In groups that meet only once or twice, like some problem-solving groups, turnover may be inconsequential. In longer lived groups, particularly those comprised of skilled specialists, the loss or gain of a member might require substantial adjustment by the group; at the least, socialization of new members is necessary (Moreland & Levine, 1988). Relevant research is scarce, but Dyer (1984) described a study of bomber crews in the Korean conflict in which crew performance was inversely related to personnel changes.

Group composition has seldom been studied in actual work teams, despite evidence of its importance. For instance, one study found that in military tank crews composed of soldiers with uniformly high ability, performance far exceeded what was expected from individuals' abilities (Tziner & Eden, 1985). Crews with uniformly low ability fell far short of expectations based on individual ability. In other words, these crews showed a "synergy" effect due to composition.

Among different types of groups in Table 1, links of composition with team effectiveness may hinge on different issues. In advice/involvement groups, such as committees and advisory boards, performance may depend on heterogeneity of task-related abilities or specialties, as suggested by research on group problem solving (Goodman et al., 1986). But such groups often have short life spans and limited time to work, so members' social skills could help determine how much talent is applied to the problem (Hackman, 1987). Among resources for assessing interpersonal skills a method called SYMLOG may offer promise (Bales, Cohen, & Williamson, 1979) as a vehicle for selecting potential team members with behavior profiles associated with team effectiveness.

In other types of teams with longer life spans, effectiveness may be related more to personal compatibility among members—especially when groups work for long periods in confined quarters. A taxonomy of personality traits relevant to team composition is outlined by Driskell, Hogan, and Salas (1988). Research on airliner flight crews supports selection of teams for personal compatibility (Foushee, 1984).

As for team size, current literature yields a consistent guideline: the smallest possible number of people who can do the task (Hackman, 1987). In the laboratory, group performance declines with the addition of extra members beyond the required minimum (Nieva et al., 1978). This could reflect added difficulty of coordinating more members (Steiner, 1972) or "social loafing" in larger groups (Latane, Williams, & Harkins, 1979). Laboratory research also suggests that increasing group size brings lower cohesion (McGrath, 1984). Similar findings emerge in two studies of work teams (Gladstein, 1984; O'Reilly & Roberts, 1977).

2. Temporal scope: Team life span and working time.

The longer a work team exists and the more time its members spend cooperating, the greater its temporal scope (McGrath, 1984) and differentiation as a work-unit (Sundstrom & Altman, 1989). Effectiveness may improve over time (Heinen & Jacobson, 1976), but eventually may

decline (Shonk & Shonk, 1988). For example, a study of research and development groups found that team longevity associated with isolation from key information sources was important to technical performance (Katz, 1982). Little is known about temporal aspects of group functioning (McGrath & Kelly, 1986).

3. *Team territories.* Practitioners emphasize the importance to a work team of having its own "turf" (Ketchum, 1981). Even teams who need no special facilities may rely on their physical environments for identity and management of external relations. Especially in teams whose missions demand both external integration and differentiation, territories may aid effectiveness (Sundstrom & Altman, 1989).

Team Development and Effectiveness

Figure 1 lists four developmental features: interpersonal processes, norms, cohesion, and roles. These can be seen as aspects of developmental sequences in teams and as foci of efforts to aid team development and process interventions.

Developmental Sequences

Some theories suggest that groups develop through a series of phases culminating in effective performance. Perhaps best known is Tuckman's (1965) model: "forming, storming, norming, performing," and later, "adjourning" (Tuckman & Jensen, 1977). The model is supported by studies of training and laboratory groups (Heinen & Jacobson, 1976; Moreland & Levine, 1988) that may not necessarily generalize to work teams.

Gersick's (1988) "punctuated equilibrium" model suggests that groups exhibit long stable periods interspersed with relatively brief, revolutionary changes. Unlike Tuckman's model, it assumes that development depends on external relations. This model comes out of observations of eight project groups, each responsible for a specific product, with an external reporting relationship and a deadline. Initial periods of inertia lasted half of the allotted time, followed by *midpoint transitions*: They "dropped old patterns, re-engaged with outside supervisors, adopted new perspectives on their work, and made dramatic progress" (Gersick, 1988, p. 16). Transitions occurred halfway through the calendars, regardless of group life span (7 days to 6 months). Stable phases followed. Seven of eight finished on time, though effectiveness varied; thus the model seems to describe relatively effective project teams.

A recent model by Glickman et al. (1987) builds on both Tuckman's and Gersick's models. Support for it comes from 13 U.S. Navy gunnery teams studied during training, which showed a progression from "teamwork," or intermember coordination, to "taskwork." However, whether teams follow a fixed developmental sequence or show different temporal patterns in varied organizational contexts remains a question for future research. Considering the variety of relationships between work teams and organizational contexts, it seems unlikely that a single sequence can describe the development of all kinds of

teams. Perhaps, as suggested by McGrath, Futoran, and Kelly (1986), each team has to deal with certain developmental issues, but the order of precedence depends on the circumstances.

Aspects of Team Development

Longitudinal theories suggest that groups develop norms, cohesion, and roles.

1. *Norms.* Since the Hawthorne studies (Roethlisberger & Dickson, 1939) linked performance with group norms, their importance for work groups has been obvious, but elusive. Practitioners (e.g., Bassin, 1988) recommended that effective teams have norms and rules of behavior agreed on by all members. Hackman (1987) identified norms about performance as a desirable design feature of groups and implied that they can be externally influenced. Foushee (1984) reported some success in altering norms in flight crews through videotaped flight simulations and feedback about interpersonal styles. But other research suggests that work groups develop unique norms, even at odds with their organization (e.g., Richards & Dobyms, 1957). Organizational culture may provide a vehicle for external influence over group norms. "Charters" drafted by team members and managers around team mission and organizational goals may incorporate both imposed and developed norms.

2. *Cohesion.* This crucial ingredient of team viability has been found to be correlated with communication and conformity to group norms (McGrath, 1984). Besides small group size, conditions found favorable to cohesion include similar attitudes (Terborg, Castore, & DeNinno, 1976) and physical proximity of workspaces (Sundstrom, 1986). Context factors likely to foster cohesion include external pressure (Glickman et al., 1987) and rewards for team performance (Shea & Guzzo, 1987a).

The link of cohesion with performance may depend on group norms. Stogdill (1972) examined 34 work groups and found cohesion positively correlated with performance in 12, inversely correlated in 11, and unrelated in the remaining groups. Cohesion apparently amplified norms favoring both high and low production. During routine operations, Goodman (1986) found that group cohesion was unrelated to production, but in uncertain working conditions cohesive groups were more productive.

The seemingly optimal combination of cohesion and a norm of high performance may not always be ideal. Janis (1971) claimed that cohesive groups under pressure can make poor decisions through *groupthink*, a complex process in which groups exhibit a variety of dysfunctional decision making "symptoms" such as disregarding new information to protect an apparent consensus. This may occur in autonomous groups (Liebowitz & De Meuse, 1982; Manz & Sims, 1982), especially high-ranking teams who make decisions with little outside help. Examples are task forces, committees, and some project teams. When group tasks require external synchronization, peer work units may check tendencies toward groupthink. But

the potential for groupthink bolsters Manz and Sims's (1982) recommendation for training in group decision making.

3. *Roles.* Roles are sufficiently basic to work groups to be considered one of their defining features (Alderfer, 1987). However, even in teams with a high degree of specialization, members may rotate roles if possible (Susman, 1970).

For the much-studied role of leader, past research has identified two leadership functions—task and interpersonal (McGrath, 1984). But in light of a trend toward self-management, leadership may be increasingly expected of team members (Manz & Sims, 1987). It may be more equally shared by members as their team develops over time. Consistent with this idea, Schriesheim (1980) found that in utility crews with low cohesion, leaders' initiation of structure was correlated with role clarity, satisfaction, and self-rated performance. In cohesive groups the same criteria were correlated instead with leader consideration.

Team Development Intervention Studies

In efforts designed to improve team functioning called *team development* (Beckhard, 1969) or *team-building* (Dyer, 1977), consultants meet with groups to diagnose interpersonal processes and facilitate development of the team. Their interventions reflect several decades of research and practice (Hall & Williams, 1970) and vary depending on the combination of consultant, team, and organization (Liebowitz & De Meuse, 1982). At least four types of team interventions can be identified (e.g., Beer, 1980), as follows:

1. *Interpersonal processes.* This intervention involves candid discussion of relationships and conflicts among team members, often directed toward resolving "hidden agendas." This approach assumes that teams operate best with mutual trust and open communication; it attempts to build group cohesion (Kaplan, 1979).

2. *Goal-setting.* This approach involves clarifying the team's general goals and specific objectives, sometimes by defining subtasks and establishing timetables. Often combined with performance measurement and feedback, this type of intervention has a record of successful application in organizations (Locke, Shaw, Saari, & Latham, 1982).

3. *Role definition.* This intervention entails clarifying individual role expectations, group norms, and shared responsibility of team members (Bennis, 1966).

4. *Problem-solving.* In this approach, task-related processes are clarified within the group, such as identifying problems, causes, and solutions; choosing solutions; and developing and implementing action plans (Buller & Bell, 1986).

Intervention studies often report improved communication, cohesion, or other signs of viability (De Meuse & Liebowitz, 1981; Kaplan, 1979; Woodman & Sherwood, 1980a). The few that measure performance tend to report mixed results and are sometimes flawed by a lack of control groups. Woodman and Sherwood

(1980b) concluded that findings from goal-setting interventions are more interpretable than others, leading them to place greater confidence in goal setting.

We examined empirical research on team development interventions published since 1980 in selected journals.¹ Table 2 shows the 13 studies we found, with type of team, intervention (interpersonal, goal setting, role definition, and problem solving), and results classified under headings of performance or team viability. Most studies used multiple approaches to team development, often combining an interpersonal approach with others. Most research designs had control groups, yielding results more interpretable than in earlier reviews. Teams include advisory groups, production and service teams, project groups, and action teams, a broad mix that could reflect an expanding use of work groups. The table may overrepresent successful team development interventions, as failures are probably less likely to be published.

Interventions had mixed success, as in prior studies. Performance improved in 4 out of 9 cases in which it was measured. Aspects of viability improved in 8 out of 10 studies using interpersonal approaches, although some studies found adverse effects. Overall, Table 2 suggests that *in some circumstances* team development interventions may have enhanced work group effectiveness.

An ecological perspective suggests a reason why team development interventions do not always succeed: they usually focus only on internal team processes. This strategy might be more effective if coupled with a focus on external relations.

Issues for Research and Practice

Current literature leaves many unanswered questions on work teams. But we see a handful of issues that deserve particular attention in future research and practice.

Organizational Contexts and Differences Among Work Teams

An ecological view calls attention to the variety of relationships between work teams and their larger organizations. Such differences call into question our long-standing assumptions that the small group represents a single entity and that one model can fit all groups. Unfortunately, current research evidence gives little basis for testing these assumptions. Indeed, if the psychology of small groups dealt with a kind of animal, we could not be sure whether it was one or several species, what habitats it occupied, or what distinguished its subspecies. Work

¹ This review covers research published after the reviews by De Meuse and Liebowitz (1981) and Woodman and Sherwood (1980a) through the end of 1988. Research-oriented journals included in our review were *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Group and Organization Studies*, *Human Relations*, *Journal of Applied Behavioral Science*, *Journal of Applied Psychology*, *Journal of Occupational Psychology*, *Organizational Behavior and Human Decision Processes*, and *Personnel Psychology*. Practitioner-oriented journals included in our review were *California Management Review*, *Harvard Business Review*, *Personnel*, *Personnel Administrator*, *Personnel Journal*, and *Training and Development Journal*.

Table 2
Thirteen Intervention Studies of Team Development, 1980–1988

Study	Teams	Interventions	Performance	Viability
Morrison & Sturges (1980)	Top management team in state government	Interpersonal, role definition	—	Increased communication collaboration, role clarity.
Porras & Wilkins (1980)	Cafeteria food service teams	Interpersonal, problem-solving	Little change in costs, output, or profit.	Decreased job satisfaction, commitment.
Woodman & Sherwood (1980a)	Student project groups	Problem-solving, goal-setting	No effect on grades.	Better problem solving, participation; no change in satisfaction.
Boss & McConkie (1981)	Government employee groups	Interpersonal	—	Better communication and goal-setting immediately after intervention. More turnover, grievances. Poorer climate.
Paul & Gross (1981)	City maintenance crews	Problem-solving, role definition	Increased service efficiency; no change in customer satisfaction.	Higher job satisfaction. No change in absences, turnover. Faster resolution of employee grievances.
Boss (1983)	(not reported)	Interpersonal, role definition	Higher ratings of group effectiveness.	Increased participation, involvement, trust.
Hughes, Rosenbach & Clover (1983)	Air Force cadet teams	Interpersonal, role definition, goal-setting	Higher ratings of group performance.	Higher cohesiveness, group satisfaction, trust. No change in goal commitment, job clarity.
Eden (1985)	Army combat units	Interpersonal, role definition, goal-setting	No change in team performance ratings.	No change in satisfaction, communication, peer relations, coordination.
Buller & Bell (1986)	Mining crews	Problem-solving	Little change in quality or quantity of ore mined.	Better work techniques, communication.
Eden (1986)	Army combat units	Interpersonal, role definition, goal-setting	No change in ratings of combat readiness.	Improved teamwork, conflict handling, planning. No change in cohesion, involvement, support, job clarity.
Miller & Phillip (1986)	Engineering project groups	Interpersonal, problem-solving	Project completed \$30 million under budget.	Enhanced cooperation, trust, communication, morale.
Mitchell (1986)	Student project groups	Interpersonal	—	Better interpersonal relations.
Margerison, Davies & McCann (1987)	Airliner cockpit crews	Interpersonal, problem-solving	—	Better communication, interpersonal relations.

teams very well could represent several different types of social units that share superficial similarities. This might account for the persistent difficulty in arriving at generalizations about small groups. For researchers, an obvious next step is to study the *demographics of work groups*, or the prevalence of various applications of work teams and their organizational contexts. Another is to study specific applications of work teams in depth, through longitudinal case studies (e.g., Hackman, 1989).

Differences among work teams pose an immediate, practical challenge for management. Some teams, such as those in production and service, tend to be synchronized with counterpart work units and customers. So management of external relations might be more critical to their effectiveness than internal team dynamics. Others, such as project teams, have missions calling for creativity and innovation. They may need special help in applying group processes to their resources. Team managers need to be sensitive to such differences when making decisions on such issues as team training and consultation, physical environments, performance measurement and feedback systems, reward systems, and other contextual features.

Organizational Context of Work Team Effectiveness

Practitioners and theorists agree fairly well on features of organizational context that foster team effectiveness, but these remain to be studied. Near the top of our agenda for empirical research is an assessment of the role of specific context factors in work team effectiveness, such as organizational culture, technology and task design, mission clarity, autonomy, rewards, performance feedback, training and consultation, and physical environment. This list of contextual factors could be a practical checklist for managers of work teams. However, the challenge is to create an optimal mix of context features for each particular group. One context factor could make the difference, as in a project team whose members need to develop a mission statement before they can even start working.

Boundaries and Their Management

Team development practitioners have long emphasized the importance of group boundaries (e.g., Alderfer, 1987). Up to now, boundaries have had little role in a small group research literature dominated by laboratory studies. Yet in an organizational context, boundaries may be critical to work team effectiveness. An ecological approach suggests that the group boundary needs continual management to ensure that it becomes neither too sharply delineated nor too permeable, so that the team neither becomes isolated nor loses its identity. At the same time, boundary management calls for maintenance of conditions that promote needed external synchronization and coordination. The physical environment may figure prominently in boundary management (Sundstrom & Altman, 1989). However, practitioners can hope for little guidance from current research evidence. It remains for researchers to study the processes through which work teams maintain external integration and differentiation needed for effectiveness.

Team Development

As lamented in 1966 by McGrath and Altman, longitudinal processes in work groups are still poorly understood. Pending basic, empirical studies of temporal sequences in actual, intact work teams, we can only speculate how predictors of effectiveness relate to team development. Future research needs to examine work teams in their natural contexts at multiple points in time, to look for developmental stages analogous to infancy, adolescence, maturity, and old age. Lacking such research, our theories can only continue to generalize from the laboratory or use "black boxes" to describe team development. Fortunately, some researchers are now using innovative methods to study developmental processes in teams, such as the qualitative approach by Gersick (1988), the case study approach by Hackman (1989), and the quantitative methods by Glickman and colleagues (1987). However, practitioners may have to wait a while longer for a compelling model of team development that can serve as a guide for managing and facilitating work teams. Evidence for such a model could grow out of action research in which work groups are systematically monitored over time, perhaps in conjunction with team development interventions. A trend toward applying work teams could provide many real-world research opportunities, for instance in companies reorganizing around work teams after a merger or an acquisition.

Team Effectiveness: Definition and Measurement

Of course, progress in studying and managing work teams depends on having a well-accepted, measurable criterion of effectiveness. Although many experts agree that effectiveness includes more than performance, the "more" remains an issue. A convincing empirical basis for defining and measuring what we have labeled *team viability* may point to certain, specific interpersonal skills requisite to effective team membership. These skills, in turn, could be used in the selection and the training of team members.

As for performance, measurement has traditionally relied on specific criteria such as tons of coal extracted by mining teams, sales revenues produced by sales teams, and manager ratings of project teams. Such specific, local criteria allow cross-team comparisons only if converted into dependable, global indexes. The innovative method of Pritchard and colleagues (1988) sets a valuable precedent by merging specific indicators into an index of percentage of maximum capability.

In conclusion, an ecological view emphasizes the role of organizational context, boundaries, and team development in work team effectiveness. Our selective review of current literature points to features of organizational context and aspects of group-organization boundaries likely to make them salient. Researchers and practitioners need to look beyond a group's internal processes to the prescriptions for effectiveness inherent in the relationship between the work team and the organization.

REFERENCES

- Alderfer, C. P. (1987). An intergroup perspective on group dynamics. In J. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 190-222). Englewood Cliffs, NJ: Prentice-Hall.
- Argote, L. (1982). Input uncertainty and organizational coordination in hospital emergency units. *Administrative Science Quarterly*, 27, 420-434.
- Bales, R. F., Cohen, S. P., & Williamson, S. A. (1979). *SYMLOG*. New York: Holt, Rinehart & Winston.
- Banas, P. (1988). Employee involvement: A sustained labor/management initiative at Ford Motor Company. In J. P. Campbell & R. J. Campbell (Eds.), *Productivity in organizations* (pp. 388-416). San Francisco: Jossey-Bass.
- Bassin, M. (1988). Teamwork at General Foods: New and improved. *Personnel Journal*, 67(5), 62-70.
- Beckhard, R. (1969). *Organization development: Strategies and models*. Reading, MA: Addison-Wesley.
- Beer, M. (1980). *Organization change and development: A systems view*. Santa Monica, CA: Goodyear.
- Bennis, W. (1966). *Changing organizations*. New York: McGraw-Hill.
- Berrien, F. K. (1983). A general systems approach to organizations. In M. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 41-62). New York: Wiley.
- Boss, R. W. (1983). Team building and the problems of regression: The personal management interview as an intervention. *Journal of Applied Behavioral Science*, 19, 67-83.
- Boss, R. W., & McConkie, M. L. (1981). The destructive impact of a positive team-building intervention. *Group and Organization Studies*, 6, 45-56.
- Bramel, D., & Friend, R. (1987). The work group and its vicissitudes in social and industrial psychology. *Journal of Applied Behavioral Science*, 23, 233-253.
- Buller, P. F., & Bell, C. H., Jr. (1986). Effects of team building and goal setting on productivity: A field experiment. *Academy of Management Journal*, 29, 305-328.
- Bushe, G. R. (1987). Temporary or permanent middle-management groups? Correlates with attitudes in QWL change projects. *Group and Organization Studies*, 12, 23-37.
- Campbell, D. J. (1988). Task complexity: A review and analysis. *Academy of Management Review*, 13(1), 40-52.
- Cherns, A. (1976). The principles of sociotechnical design. *Human Relations*, 29, 783-792.
- Cherry, R. L. (1982). The development of General Motors' team-based plants. In R. Zager & M. P. Rosow (Eds.), *The innovative organization* (pp. 21-43). New York: Pergamon.
- Cole, R. E. (1982). Diffusion of participatory work structures in Japan, Sweden, and the United States. In P. S. Goodman & Associates (Eds.), *Change in organizations* (pp. 166-225). San Francisco: Jossey-Bass.
- Cummings, T. G. (1978). Self-regulating work groups: A socio-technical synthesis. *Academy of Management Review*, 3, 624-634.
- Cummings, T. G. (1981). Designing effective work-groups. In P. C. Nystrom & W. Starbuck (Eds.), *Handbook of organizational design* (Vol. 2, pp. 250-271). Oxford: Oxford University Press.
- Cummings, T. G., & Molloy, E. S. (1977). *Improving productivity and the quality of work life*. New York: Praeger.
- De Meuse, K. P., & Liebowitz, S. J. (1981). An empirical analysis of team-building research. *Group & Organization Studies*, 6, 357-378.
- Driskell, J. E., Hogan, R., & Salas, E. (1988). Personality and group performance. *Review of Personality and Social Psychology*, 14, 91-112.
- Dyer, J. L. (1984). Team research and team training: A state-of-the-art review. In F. A. Muckler (Ed.), *Human factors review: 1984* (pp. 285-323). Santa Monica, CA: Human Factors Society.
- Dyer, W. G. (1977). *Team building*. Reading, MA: Addison-Wesley.
- Eden, D. (1985). Team development: A true field experiment at three levels of rigor. *Journal of Applied Psychology*, 70, 94-100.
- Eden, D. (1986). Team development: Quasi-experimental confirmation among combat companies. *Group and Organization Studies*, 11, 133-146.
- Foushee, H. C. (1984). Dyads and triads at 35,000 feet: Factors affecting group process and aircrew performance. *American Psychologist*, 39, 885-893.
- Friedlander, F. (1987). The ecology of work groups. In J. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 301-314). Englewood Cliffs, NJ: Prentice-Hall.
- Galagan, P. (1986). Work teams that work. *Training and Development Journal*, 11, 33-35.
- Gersick, C. J. G. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31, 9-41.
- Gladstein, D. L. (1984). Groups in context: A model of task group effectiveness. *Administrative Science Quarterly*, 29, 499-517.
- Glickman, A. S., Zimmer, S., Montero, R. C., Guerette, P. J., Campbell, W. J., Morgan, B., & Salas, E. (1987). *The evolution of teamwork skills: An empirical assessment with implications for training* (Tech. Report 87-016). Orlando, FL: Office of Naval Research, Human Factors Division.
- Goodman, P. S. (1986). Impact of task and technology on group performance. In P. S. Goodman and Associates (Eds.), *Designing effective work groups* (pp. 120-167). San Francisco: Jossey-Bass.
- Goodman, P. S., Devadas, R., & Hughson, T. L. G. (1988). Groups and productivity: Analyzing the effectiveness of self-managing teams. In J. P. Campbell & R. J. Campbell (Eds.), *Productivity in organizations* (pp. 295-327). San Francisco: Jossey-Bass.
- Goodman, P. S., Ravlin, E. C., & Argote, L. (1986). Current thinking about groups: Setting the stage for new ideas. In P. S. Goodman & Associates (Eds.), *Designing effective work groups* (pp. 1-33). San Francisco: Jossey-Bass.
- Hackman, J. R. (1986). The psychology of self-management in organizations. In M. S. Pallak & R. Perloff (Eds.), *Psychology and work* (pp. 89-136). Washington DC: American Psychological Association.
- Hackman, J. R. (1987). The design of work teams. In J. Lorsch (Ed.), *Handbook of organizational behavior* (pp. 315-342). New York: Prentice-Hall.
- Hackman, J. R. (1989). *Groups that work (and those that don't)*. San Francisco: Jossey-Bass.
- Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Hackman, J. R., & Walton, R. E. (1986). Leading groups in organizations. In P. S. Goodman & Associates (Eds.), *Designing effective work groups* (pp. 72-119). San Francisco: Jossey-Bass.
- Hall, J. S., & Watson, W. (1971). The effects of a normative intervention on group decision-making performance. *Human Relations*, 23, 299-317.
- Hall, J. S., & Williams, M. S. (1970). Group dynamics training and improved decision making. *Journal of Applied Behavioral Science*, 6, 39-68.
- Hardaker, M., & Ward, B. K. (1987). Getting things done: How to make a team work. *Harvard Business Review*, 65, 112-119.
- Heinen, J. S., & Jacobson, E. J. (1976). A model of task group development in complex organizations and a strategy of implementation. *Academy of Management Review*, 1, 98-111.
- Herold, D. M. (1978). Improving the performance effectiveness of groups through a task-contingent selection of intervention strategies. *Academy of Management Review*, 4, 315-325.
- Homans, G. C. (1950). *The human group*. New York: Harcourt, Brace & World.
- Hughes, R. L., Rosenbach, W. E., & Clover, W. H. (1983). Team development in an intact, ongoing work group: A quasi-field experiment. *Group & Organization Studies*, 8, 161-186.
- James, L. R., James, L. A., & Ashe, D. K. (in press). The meaning of organizations: An essay. In B. Schneider (Ed.), *Frontiers in industrial and organizational psychology*. Greenwich, CT: JAI Press.
- Janis, I. L. (1971). *Victims of groupthink*. Boston: Houghton Mifflin.
- Kanter, R. M. (1983). *The change masters*. New York: Simon & Schuster.
- Kaplan, R. E. (1979). The conspicuous absence of evidence that process consultation enhances task performance. *Journal of Applied Behavioral Science*, 15, 346-360.
- Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations* (2nd ed.). New York: Wiley.

- Katz, R. (1982). The effects of group longevity on project communication and performance. *Administrative Science Quarterly*, 27, 81-104.
- Kelly, J. (1982). *Scientific management, job redesign, and work performance*. London: Academic Press.
- Ketchum, L. (1981). How to start and sustain a work redesign program. *National Productivity Review*, 1, 75-86.
- Ketchum, L. (1984). How redesigned plants really work. *National Productivity Review*, 3, 246-254.
- Kidder, T. (1981). *The soul of a new machine*. New York: Avon Books.
- Koch, J. L. (1979). Effects of goal specificity and performance feedback to work groups on peer leadership, performance, and attitudes. *Human Relations*, 33, 819-840.
- Kolodny, H. F., & Dresner, B. (1986). Linking arrangements and new work designs. *Organizational Dynamics*, 14(3), 33-51.
- Kolodny, H. F., & Kiggundu, M. N. (1980). Towards the development of a sociotechnical systems model in woodlands mechanical harvesting. *Human Relations*, 33, 623-645.
- Latane, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, 37, 822-832.
- Lawrence, P. R., & Lorsch, J. W. (1969). *Developing organizations: Diagnosis and action*. Reading, MA: Addison-Wesley.
- 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* (pp. 255-294). San Francisco: Jossey-Bass.
- Liebowitz, S. J., & De Meuse, K. P. (1982). The application of team building. *Human Relations*, 35, 1-18.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1982). Goal setting and task performance: 1969-1980. *Psychological Bulletin*, 90, 125-152.
- Manz, C. C., & Sims, H. P. (1982). The potential for "groupthink" in autonomous work groups. *Human Relations*, 35, 773-784.
- Manz, C. C., & Sims, H. P. (1987). Leading workers to lead themselves: The external leadership of self-managing work teams. *Administrative Science Quarterly*, 32, 106-128.
- Margerison, C., Davies, R., & McCann, D. (1987). High-flying management development. *Training and Development Journal*, 41, 38-41.
- McGrath, J. E. (1964). *Social psychology: A brief introduction*. New York: Holt, Rinehart & Winston.
- McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall.
- McGrath, J. E., & Altman, I. (1966). *Small group research: A synthesis and critique of the field*. New York: Holt, Rinehart & Winston.
- McGrath, J. E., Futoran, G. C., & Kelly, J. R. (1986). *Complex temporal patterning in interaction and task performance: A report of progress in a program of research on the social psychology of time* (Technical Report No. 86-1). Urbana-Champaign: University of Illinois, Psychology Department.
- McGrath, J. E., & Kelly, J. R. (1986). *Time and human interaction: Toward a social psychology of time*. New York: Guilford Press.
- Miller, B. W., & Phillip, R. C. (1986). Team building on a deadline. *Training and Development Journal*, 40, 54-57.
- Miller, E. J. (1959). Technology, territory, and time: The internal differentiation of complex production systems. *Human Relations*, 12, 245-272.
- Mitchell, R. (1986). Team building by disclosure of internal frames of reference. *Journal of Applied Behavioral Science*, 22, 15-28.
- Moreland, R. L., & Levine, J. M. (1988). Group dynamics over time: Development and socialization in small groups. In J. E. McGrath (Ed.), *The social psychology of time* (pp. 151-181). Beverly Hills, CA: Sage.
- Morrison, P., & Sturges, J. (1980). Evaluation of organization development in a large state government organization. *Group and Organization Studies*, 5, 48-64.
- Nadler, D. A., Cammann, C., & Mirvis, P. H. (1980). Developing a feedback system for work units: A field experiment in structural change. *Journal of Applied Behavioral Science*, 16, 41-62.
- Naylor, J. C., & Dickenson, T. L. (1969). Task structure, work structure, and team performance. *Journal of Applied Psychology*, 53, 167-177.
- Nieva, V. F., Fleishman, E. A., & Rieck, A. (1978). *Team dimensions: Their identity, their measurement, and their relationships* (Technical report, Contract No. DAHC19-78-C-0001). Washington DC: Advanced Research Resources Organizations.
- O'Reilly, C. A., & Roberts, K. H. (1977). Task group structure, communication, and effectiveness in three organizations. *Journal of Applied Psychology*, 62, 674-681.
- Pasmore, W., Francis, C., Haldeman, J., & Shani, A. (1982). Sociotechnical systems: A North American reflection on empirical studies of the seventies. *Human Relations*, 35, 1179-1204.
- Paul, C. F., & Gross, A. C. (1981). Increasing productivity and morale in a municipality: Effects of organization development. *Journal of Applied Behavioral Science*, 17, 59-78.
- Pearce, J. A., & Ravlin, E. C. (1987). The design and activation of self-regulating work groups. *Human Relations*, 40, 751-782.
- Peterfreund, S. (1982). "Face-to-face" at Pacific Northwest Bell. In R. Zager & M. P. Rosow (Eds.), *The innovative organization* (pp. 21-43). New York: Pergamon.
- Peters, T. J. (1988). *Thriving on chaos*. New York: Knopf.
- Peters, T. J., & Waterman, R. H. (1982). *In search of excellence*. New York: Warner.
- Porras, J. I., & Wilkins, A. (1980). Organization development in a large system: An empirical assessment. *Journal of Applied Behavioral Science*, 16, 506-534.
- Poza, E. J., & Marcus, M. L. (1980). Success story: The team approach to work-restructuring. *Organizational Dynamics*, 8, 3-25.
- Pritchard, R. D., Jones, S., Roth, P., Stuebing, K., & Ekeberg, S. (1988). Effects of group feedback, goal setting, and incentives on organizational productivity. *Journal of Applied Psychology*, 73(2), 337-358.
- Reich, R. B. (1987). Entrepreneurship reconsidered: The team as hero. *Harvard Business Review*, 65(3), 77-83.
- Richards, C. B., & Dobyns, H. F. (1957). Topography and culture: The case of the changing cage. *Human Organization*, 16, 16-20.
- Roby, T. B., & Lanzetta, J. T. (1958). Considerations in the analysis of group tasks. *Psychological Bulletin*, 55(2), 88-101.
- Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker*. Cambridge, MA: Harvard University Press.
- Rousseau, D. M., & Cooke, R. A. (1988, August). *Cultures of high reliability: Behavioral norms aboard a U.S. aircraft carrier*. Paper presented at the meeting of the Academy of Management, Anaheim, CA.
- Schriesheim, J. F. (1980). The social context of leader-subordinate relations. *Journal of Applied Psychology*, 65, 183-194.
- Shaw, M. E. (1981). *Group dynamics* (3rd ed.). New York: McGraw-Hill.
- Shea, G. P. (1986). Quality circles: The danger of bottled change. *Sloan Management Review*, 27, 33-46.
- Shea, G. P., & Guzzo, R. A. (1987a). Group effectiveness: What really matters? *Sloan Management Review*, 3, 25-31.
- Shea, G. P., & Guzzo, R. A. (1987b). Groups as human resources. In K. M. Rowland & G. R. Ferris (Eds.), *Research in personnel and human resources management* (Vol. 5, pp. 323-356). Greenwich, CT: JAI Press.
- Shonk, W., & Shonk, J. H. (1988). What business teams can learn from athletic teams. *Personnel*, 65, 76-80.
- Smith, R. (1981). Let your employees choose their co-workers. *Society for Advancement of Management Advanced Management Journal*, 46, 27-36.
- Steiner, I. D. (1972). *Group process and productivity*. New York: Academic Press.
- Stogdill, R. M. (1972). Group productivity, drive, and cohesiveness. *Organizational Behavior and Human Performance*, 8, 26-43.
- Stone, P., & Luchetti, R. (1985). Your office is where you are. *Harvard Business Review*, 63(2), 102-117.
- Sundstrom, E. (1986). *Work places*. New York: Cambridge University Press.
- Sundstrom, E., & Altman, I. (1989). Physical environments and work-group effectiveness. In L. L. Cummings & B. Staw (Eds.), *Research in organizational behavior* (Vol. 11, pp. 175-209). Greenwich, CT: JAI Press.
- Sundstrom, E., Bobrow, W., Fulton, K., Blair, L. Y., & McClane, W. E. (1988, June). *Interpersonal processes in small group performance*.

- Paper presented at the 11th International Conference on Groups, Networks, and Organizations, Nags Head, NC.
- Susman, G. I. (1970). The impact of automation on work group autonomy and task specialization. *Human Relations, 23*, 567-577.
- Terborg, J. R., Castore, C., & DeNinno, J. A. (1976). A longitudinal field investigation of the impact of group composition on group performance and cohesion. *Journal of Personality and Social Psychology, 34*, 782-790.
- Thompson, J. D. (1967). *Organizations in action*. New York: McGraw-Hill.
- Thompson, P. C. (1982). Quality circles at Martin Marietta Corporation, Denver Aerospace/Michoud Division. In R. Zager & M. Rosow (Eds.), *The innovative organization* (pp. 3-20). New York: Pergamon.
- Tornatzky, L. G. (1986). Technological change and the structure of work. In M. S. Pallak & R. Perloff (Eds.), *Psychology and work* (pp. 89-136). Washington, DC: American Psychological Association.
- Trist, E. L., Higgins, G. W., Murray, H., & Pollock, A. B. (1963). *Organizational choice*. London: Tavistock Publications.
- Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin, 63*, 384-389.
- Tuckman, B. W., & Jensen, M. (1977). Stages of small-group development revisited. *Group & Organization Studies, 2*, 419-427.
- Tushman, M. L. (1979). Impacts of perceived environmental variability on patterns of work related communication. *Academy of Management Journal, 23*, 482-500.
- Tziner, A., & Eden, D. (1985). Effects of crew composition on crew performance: Does the whole equal the sum of the parts? *Journal of Applied Psychology, 70*, 85-93.
- Tziner, A., & Vardi, Y. (1982). Effects of command style and group cohesiveness on the performance effectiveness of self-selected tank crews. *Journal of Applied Psychology, 67*, 769-775.
- Van Zelst, R. H. (1952). Sociometrically selected work teams increase production. *Personnel Psychology, 5*, 175-185.
- Walton, R. E. (1977). Work innovation at Topeka: After six years. *Journal of Applied Behavioral Science, 13*, 422-433.
- Walton, R. E. (1985). From control to commitment in the workplace. *Harvard Business Review, 63*(2), 76-84.
- Weick, K. (1982). Management of organizational change among loosely coupled elements. In P. S. Goodman & Associates (Eds.), *Change in organizations* (pp. 375-408). San Francisco: Jossey-Bass.
- Woodman, R. W., & Sherwood, J. J. (1980a). Effects of team development intervention: A field experiment. *Journal of Applied Behavioral Science, 16*, 211-227.
- Woodman, R. W., & Sherwood, J. J. (1980b). The role of team development in organizational effectiveness: A critical review. *Psychological Bulletin, 88*, 166-186.