Supervisory Span, Relational Coordination, and Flight Departure Performance: A Reassessment of Postbureaucracy Theory

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Abstract

There is a rich debate in organizational theory about the contribution of supervisors to group process and performance, and about the span of control needed to make that contribution. In this paper, I summarize the debate and develop competing hypotheses. These competing hypotheses are tested using multisite survey and archival measures, and interpreted using qualitative data from the same study. I find that small supervisory spans improve performance through their positive effects on group process. In particular, supervisors with smaller spans achieved higher levels of relational coordination among their direct reports. Qualitative data suggest that supervisors with smaller spans achieved these results through working with, and providing intensive coaching and feedback to their direct reports.
(*Supervision*; *Coordination*; *Group Process*; *Performance*)

Introduction

Postbureaucracy theorists argue that supervision is obsolete. The environment in which organizations operate is increasingly turbulent, and flat, team-based organizations with reduced layers of supervision are expected to react more quickly and effectively. The increased interdependence of work requires strong group process, and group process is likely to be stronger when supervisors are not in the way. The superior performance of flat, team-based organizations will lead them over time to replace their more hierarchical counterparts (e.g., Piore and Sabel 1984, Walton 1985, Zuboff 1988, Appelbaum and Batt 1994, Heckscher and Donnellon 1994).

Notwithstanding the popularity of this thesis, the prima facie evidence for it is weak. Data on the U.S. workforce show that managers and supervisors have consistently increased rather than decreased as a proportion of the workforce since the 1950s, and have continued to do in the 1980s and 1990s despite the downsizing and delayering reported in the business press (Gordon 1996). The increase in managers and supervisors as a percentage of the workforce has been accompanied by a narrowing of supervisory spans of control. The average supervisory span of control declined from 12 to 8.5 from 1980 to 1990, according to data from the National Organizations Survey (Handel 2000). These analyses are subject to debate over the use of broad occupational categories and the accuracy of the surveys. At a minimum, however, these findings hardly accord with the view that supervision is becoming increasingly irrelevant.

Moreover, the postbureaucracy theorists have not articulated a compelling theoretical rationale for their thesis. In particular, they have not justified their implicit rejection of a venerable strand of organizational theory that highlights the potentially positive contribution of supervisors to group process and performance, and that argues for the importance of narrow spans of control to facilitate that contribution.

In this paper, I develop competing hypotheses regarding spans of control from the organizational literature. Based on the postbureaucracy stream, I hypothesize that *broad* spans of control strengthen group process, in turn improving group performance. Based on the competing stream, I hypothesize that *narrow* spans of control strengthen group process, in turn improving group performance. These competing hypotheses are tested using multisite survey and archival measures, then interpreted using qualitative data from the same study. The context for this study is the flight departure process, whose key feature, for the purpose of this paper, is a high level of task interdependence. With high levels of task interdependence, performance is expected to benefit significantly from strong group process, conceived here as relational coordination among group members (Gittell 2001a).

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Theory

The Case for Broad Spans of Control

Postbureaucracy theorists acknowledge that supervisors can play a potentially important role in support of group process, but see this role as requiring broad rather than narrow spans of control (Hackman and Oldham 1980, Mowday et al. 1982, Walton 1985, Walton and Hackman 1986). According to Hackman and Oldham:

> When a group is first formed . . . it may be necessary to help members get off to a good start by inviting them to participate in some 'team-building' activities intended to establish the boundaries and identity of the group and to assist members in coming to grips with their shared authority for managing internal group processes. Then, as the group gains a sense of its identity and begins to develop its own ways of dealing with task and organizational issues, the manager or consultant can gradually withdraw from prominence in group activities (1980, p. 209).

The gradual reduction of supervisory involvement is argued to be a win/win proposition for group members and for the organization. Both individual needs for autonomy and organizational needs for performance can be met through the transfer of responsibilities and capabilities from supervisors to group members, reducing the number of supervisors and expanding their spans of control (Walton and Schlesinger 1979).

Postbureaucracy theorists argue that the evolving context of work—increasing interdependence of work, increasing demand for quality and customization, and shortening product life cycles—have all created the need for self-directed, committed workers. Such workers have correspondingly less need for supervision (Piore and Sabel 1984, Zuboff 1988). Broader supervisory spans of control are seen as a critical component of this team-based form of work organization (Womack et al. 1991, Doeringer et al. 1991, Appelbaum and Batt 1994, Ittner and MacDuffie 1994, Heckscher and Donnellon 1994, Cappelli 1996, Scott et al. 1996, Batt 1996, MacDuffie 1996, Appelbaum and Berg 1997, Smith 1997, Applegate 1998). Supervisors are still needed, and they should adopt a supportive style, but the workplace needs fewer of them. Broader spans of control will allow group members to focus more on their lateral relationships and less on their hierarchical relationships. Broader spans of control should therefore contribute to stronger group process.

Some empirical research lends support to this view. Wall et al. (1986) found that the elimination of supervisory positions was associated with improved productivity in a manufacturing setting. A meta-analysis concluded that work teams without supervisors performed better than work teams with supervisors (Beekun 1989).

In sum, both conceptual arguments and empirical evidence have suggested that broad spans of control may be beneficial for group process and performance.

HYPOTHESIS 1A. *Broad spans of control improve performance by strengthening group process.*

The Case for Narrow Spans of Control

In contrast to the postbureaucracy view, other organizational scholars have argued that effective leadership is both time consuming and relationship intensive, implying that it may require narrow spans of control. According to McGregor (1960, p. 76):

> Roles cannot be clarified, mutual agreement concerning the responsibilities of a subordinate's job cannot be reached in a few minutes, nor can appropriate targets be established without a good deal of discussion. It is far quicker to hand a subordinate a position description and to inform him of his objectives for the coming period.

Small spans of control increase the time a supervisor can work alongside of any given worker, and therefore provide greater opportunities for building shared goals and for providing coaching and feedback (Likert 1961, Tannenbaum 1968). According to Taylor (1911, p. 75):

> More than all other causes, the close, intimate cooperation, the constant personal contact between the two sides, will tend to diminish friction and discontent. It is difficult for two people whose interests are the same, and who work side by side in accomplishing the same object all day long to keep up a quarrel.

Consistent with these arguments, Porter and Lawler (1964) found that supervisors with small spans of control were more available for coaching and feedback. Managers with large spans were found to have less opportunity for interacting with individual subordinates and maintaining effective relationships with them (Ford 1981). They had less time to provide support, encouragement, and recognition to individual subordinates (Goodstadt and Kipnis 1970). Managers with large spans were more likely to handle problems with subordinates in a more formalized, impersonal manner, using warnings and punishments instead of coaching and feedback (Kipnis and Cosentino 1969, Kipnis and Lane 1962). As spans of control increase, managers have been found to make more autocratic decisions (Heller and Yukl 1969). Narrower spans of control have been found to allow more contact and more opportunities for communication between front-line and managerial employees (Porter and Lawler 1964, Blau 1968).

Contingency theorists have argued that narrow spans of control are particularly effective for highly interdependent work processes. Supporting this argument, empirical studies have consistently found smaller spans of

control associated with more interdependent work (Udy 1959, Woodward 1965, Hickson et al. 1966, Hunt 1970, Blau 1972). Note, however, that the benefits of smaller spans of control do not seem to stem from the greater need for coordination by supervisors. Van de Ven et al. (1976) found no significant increase in supervisory coordinating activities associated with more interdependent work. Instead, they found that more highly interdependent work benefits more from an increase in coordination among group members themselves. So what could account for the apparent benefit of narrower spans?

This stream of work suggests an answer: As Woodward (1965) argued, narrow spans lead to a "more intimate and informal" relationship between supervisors and front-line workers, setting the context within which shared goals can be developed. Such relationships are particularly useful in the context of highly interdependent work where shared goals could make a difference for performance. Narrow spans of control are also important in highly interdependent work processes due to the difficulty of getting useful feedback from the work itself, compared to independent tasks in which feedback emerges from the work in a relatively straightforward way. Supervisors can play a role in helping workers to interpret the outcomes of their work.

Along the same lines, Galbraith (1977) argued that working with subordinates to solve problems would be particularly valuable when work is highly interdependent. Others found that consultative leadership (Jermier and Berkes 1979), leader behaviors that promote coordination (Lord and Rouzee 1979), and leader initiating structure (Fry et al. 1986) were particularly valuable in the presence of highly interdependent work. Though these studies did not address the span of control, their findings are consistent with the proposition that smaller spans of control are beneficial for group process and performance.

Several recent studies of groups in which members must work interdependently to achieve a task designated by the organization have reported that groups with greater managerial control performed better than those with greater autonomy from managers (Ancona 1990, Henderson and Lee 1992, Kim and Lee 1995, Eisenhardt and Tabrizi 1995). Again, these studies did not assess the span of control and they defined managerial control in varying ways. Their findings are nevertheless consistent with the proposition that smaller spans of control are beneficial for group process and thereby for performance.

These conceptual arguments and empirical studies together suggest an alternative hypothesis directly opposed to Hypothesis 1a:

HYPOTHESIS 1B. *Narrow spans of control improve performance by strengthening group process.*

Methods

My goal in this paper is to test Hypotheses 1a and 1b using quantitative data, then to interpret the results using qualitative data from the same study.

Setting for this Study

This study focuses on the task of preparing flights for departure, one of the core processes of an airline's operations. Repeated hundreds of times daily in dozens of locations, the success or failure of this process can make or break an airline's reputation for reliability. To prepare a flight for departure, a set of interdependent tasks are performed by a cross-functional group with 12 distinct functions: gate agents, ticketing agents, ramp agents, baggage handlers, cabin cleaners, caterers, fuelers, freight agents, operations agents, pilots, flight attendants, and mechanics; between the arrival of the plane at an airport and its departure for the next flight.

The key feature of the flight departure process that is relevant for this paper is its high level of task interdependence. Rather than simple handoffs from one function to another, tasks are often carried out in parallel, requiring group members to act with incomplete information from other related tasks while seeking frequent updates. This form of interdependence means that performance outcomes should benefit significantly from strong group process.

Sample

One of these cross-functional groups exists for each airline, in each airport in which that airline operates, e.g., American in Boston, American in Los Angeles, United in Boston, United in Los Angeles. The first group chosen for this phase of research was selected based on researcher access and geographical convenience. This group appeared to have weak coordination among the twelve functions involved in flight departures. Using theoretical sampling based on maximizing differences (Glaser and Strauss 1967, Eisenhardt 1989b), I chose a second group from another airline with a reputation for highly effective coordination among the 12 functions involved in flight departures. This reputation was assessed based on a round of interviews with the major U.S. airlines and a review of journalistic accounts of the industry during 1993. These two sites are identified as Group A1 and Group S1, respectively. Group A1 belongs to American Airlines and Group S1 belongs to Southwest Airlines.

I then chose one additional group from each of the original two airlines, and two groups each from two additional airlines (Continental Airlines and United Airlines), yielding a total of eight groups. The two additional

airlines were chosen through a process of theoretical sampling after conducting at least one interview at each of the nine major airlines, based on the expectation that coordination there would fall somewhere in between the extremes of the original two groups. One of the groups spun off a separate operation during the study period with its own employees and own performance outcomes, resulting in a ninth group (belonging to the United Shuttle). These nine groups were used to measure supervisory span of control, group process and performance, and to test the relationships among these constructs.

Data Collection

I went into the field initially to discover how formal organizational practices could affect the performance of airline operations. To understand the work that was being done, I attended meetings, shadowed group members in each functional function, and asked them to explain what they were doing and why. I became interested in documenting group process among group members, as well as the formal organizational practices that had been established by management. I observed and interviewed members of all functional groups involved in flight departures: gate and ticketing agents, ramp agents, baggage agents, cabin cleaners, caterers, fuelers, freight agents, operations agents, pilots, flight attendants, and mechanics.

I shadowed group members as they carried out their tasks related to flight departures and observed their interactions with each other. To better understand what I was observing, I interviewed them while they worked, asking them to explain what they were doing and why. I also interviewed them in their break rooms, asking them to explain things I had observed while shadowing them. I took notes recording my observations and their comments, and typed them up within a week of each visit. In typing up my notes, related observations were brought to mind and were recorded along with those captured in the original notes. I sought to understand the nature of group process among group members, and the role of supervisors in supporting or undermining this group process. I conducted 28 interviews and eight days of observations in the first site, and 20 interviews and five days of observations in the second site.

Supervisory Span

I measured supervisory span on a monthly basis as the number of full-time equivalent front-line employees per supervisor, across the five core station functions—gate, ticketing, ramp, baggage, and operations. These calculations were made based on monthly staffing records produced by each site for the purpose of reporting to headquarters.

In addition to supervisors, several sites had front-line employees who were designated as "lead agents." Lead agents were responsible for helping supervisors to direct the operation, but they were not responsible for providing discipline, coaching or feedback to front-line employees. Based on their status as nonmanagerial front-line employees, lead agents are counted as front-line employees rather than supervisors in my computation of the supervisory span of control.

Relational Coordination

To test the impact of supervisory span on group process and performance, this study used a measure of group process called *relational coordination* (Gittell 2000a). Relational coordination is coordination—the management of task interdependencies—carried out in the context of relationships with other group members. Relational coordination includes a communication component, reflecting the frequency and timeliness of communication among group members. In addition, it includes a relational component, reflecting the strength of problem-solving, helping, mutual respect, shared goals, and shared knowledge among group members involved in the same work process.

Most of the underlying dimensions of relational coordination have precursors in the organizational literature, though some have been relatively neglected. Frequency of communication has received the most attention (e.g., Van de Ven et al. 1976, Katz and Tushman 1979, Ancona and Caldwell 1992). Timeliness of communication has been far less commonly considered, though it was the focus of a recent study (Waller 1999). Helping relationships have been explored by Seers (1989) and Seers et al. (1995) as an element of team member exchange, and more recently by Westphal (1999). Problem-solving has been relatively neglected as a dimension of group process, though it has been explored from the perspective of social networks (Stevenson and Gilly 1993, Rubinstein 2000). Mutual respect has been introduced as a dimension of group process in the context of research and development (Rubenstein et al. 1971) and jazz performance (Eisenberg 1990). Shared knowledge has begun to be elaborated in the form of thought worlds (Dougherty 1992), group mind (Wegner et al. 1985) and collective mind (Weick and Roberts 1993). Shared goals, despite their apparent relevance to coordination, continue to be relatively neglected as a dimension of group process. Though some have demonstrated the effects of *giving* groups shared performance goals (McGrath 1984, Saavedra et al. 1993), the perceived presence of shared goals has rarely if ever been included as a dimension of group process.

Similar to Thompson's (1967) concept of mutual adjustment, relational coordination is expected to have the

greatest effect on group performance when tasks are highly interdependent, uncertain (Van de Ven et al. 1976), or time constrained (Adler 1995). Unlike the concept of mutual adjustment, relational coordination takes explicit account of the role of relationships in achieving coordination. The concept of relational coordination has been used in two studies of highly interdependent work.[1]

Within each of the nine selected groups, I surveyed group members from five core functions—ticket agents, gate agents, baggage handlers, ramp agents, and operations agents. Ideally, group members from all 12 functions involved in flight departures would have been surveyed, but these five were chosen for their relative accessibility. Respondents were asked to answer the questions with respect to each of the 12 functions involved in flight departures, including the functions that were not surveyed—pilots, flight attendants, freight agents, mechanics, cabin cleaners, caterers, and fuelers—so there were 84 (7×12) separate questions in the survey. See Appendix A for a description of the survey instrument.

Questions were asked to elicit respondents' perceptions of typical patterns rather than specific incidents, consistent with Freeman et al. (1987). The questions did not ask for retrospective reports; rather, they asked respondents to describe current working conditions. The focus on current working conditions was expected to ameliorate the well-known problem of retrospective response error. In addition, except for frequency of communication which was thought to be less value laden, I phrased all questions so as to ask the respondent to comment on the communication and relations displayed by other group members toward him or her, rather than asking the respondent for self-reports of his or her communication and relations with other group members. This approach was taken to ameliorate the problem of socially desirable responses to survey questions (Rosenthal and Rosnow 1991). For example, respondents might overreport the extent to which they share the goals of other group members in order to give a socially appropriate response, but may exhibit more variation in their assessments of the extent to which other group members share their goals.

For each group, I administered the survey on-site on a single day to group members working the morning shift. All surveys were conducted on weekdays between Tuesday and Thursday, primarily to increase the number of surveys completed because passenger loads were typically lighter on these three days. Respondents typically required 20 minutes to complete the survey. Four hundred surveys were administered with a response rate of 89 percent, yielding 354 surveys.

Constructing Measures of Relational Coordination. All items were recoded so that a high value corresponded to high frequency, timeliness, and so on, while a low value corresponded to low frequency, timeliness, and so on. Each survey response was weighted in accordance with the relative size of the respondent's function within his or her group to prevent the responses from being biased toward the functions that responded in greater proportion.

I calculated the strength of the interactions between each individual respondent and each of the 12 functions he or she was asked about, on each dimension of relational coordination. This resulted, for example, in a score for the frequency of communication between each gate agent and the mechanic function, between each gate agent and the flight attendant function, and so on for each of the 12 functions. Similarly, I calculated the scores for the frequency of communication between each ticket agent and each of the other functions, as well as between each ramp agent, baggage handler, operations agent, and each of the other functions. Each dimension of relational coordination was measured as the percent of connections within the group that were reported to be strong (i.e., 4 or 5 on a 5-point scale).

I dropped the scores for the frequency of communication between each respondent and his or her own function because the interdependencies relevant for coordination exist primarily between functions rather than within functions. This process resulted in a total of 77 scores for each respondent—seven questions regarding each of the other 11 functions.

Cronbach's alpha for the seven dimensions of relational coordination was found to be 0.842, suggesting a reasonably high level of construct validity (Nunnally 1978). Using one-way analysis of variance, I found significant cross-airline differences in relational coordination ($p < 0.001$). Jointly testing the significance of cross-organization and cross-group differences, I found significant cross-group differences in relational coordination ($p < 0.001$). These results suggested that relational coordination could be treated meaningfully as a group-level construct.

Group Performance

Following recommendations by Goodman et al. (1987), I chose group performance measures that were particularly relevant for the flight departure task. Performance measures for this study therefore included quality as well as efficiency measures. By capturing both dimensions of performance, these measures reflect two relevant perspectives—the customer's and the organization's. A flight departure is successful from the customer's point of view if no unnecessary hassles are involved and if the

on-time arrival of both the customer and his or her baggage are achieved. A departure is successful from the airline's point of view if these quality outcomes are achieved without excessive staffing or excessive gate time for the airplane.

This study uses three measures of quality performance: customer complaints, baggage handling and late arrivals. These measures are the same as those reported monthly by the U.S. Department of Transportation at the airline level. These measures were also used in an earlier industry study in which a model of flight departure performance was proposed and tested (Gittell 1995). On-time arrivals are used instead of on-time departures for two reasons. First, on-time arrivals are a more relevant measure of quality performance than on-time departures (customers care more about arriving on time than about departing on time). Second, the focus on on-time arrivals captures an important contribution that pilots can make in coordinating the departure process: e.g., they can agree to wait for late passengers, cargo, bags, etc., or not; based on their informed judgement about whether they can make up the time in the air.

In addition, this study uses two measures of efficiency performance: gate time per departure and staff time per passenger. It is obvious why staff time is a costly resource. Gate time is a costly resource because it represents time that an aircraft is occupying valuable gate space and not earning revenue. Long gate times reduce the return on both the aircraft and the gate. Based on additional passenger revenues alone, a five-minute reduction in gate time was estimated to result in an average annual savings of $1.6 billion, or $4,700 per employee, for the ten major U.S. airlines over a one-year period (Gittell 1995).

These variables were formed into an equally-weighted index of performance with a Cronbach's alpha of 0.806. All components of the index were reverse-signed to indicate that better performance was a function of shorter gate times, fewer staff per passenger, fewer customer complaints, fewer late arrivals, and fewer lost bags.

Control Variables

Five control variables were measured, including number of flights per month, average length of flight, number of passengers per flight, tons of cargo per flight, and percent of passengers connecting. These variables were chosen based on advice from industry experts at MIT's Flight Transportation Lab, and were constructed from archival data provided by station managers. Longer flights, more passengers per flight, more tons of cargo per flight, and more passengers connecting are all expected to increase the gate time and staff time involved in preparing for departure, except that more passengers per flight should decrease staffing per passenger due to scale economies. These same factors are expected to increase the likelihood of customer complaints, late arrivals, and lost bags. These four variables were included in a model of flight departure performance developed and tested in Gittell (1995). Number of flights per month was introduced here as an additional control variable to capture the potential effects of operational scale.

For testing the effects of supervisory span on group process, the scale of the operations (number of flights per month) was included as a control variable due to the expectation that larger-scale operations might reduce contact among group members. The functional identity of the respondent was also included as a control variable due to expected differences between functions.

Analyses

See Table 1 for descriptive analyses and correlations for all variables.

Note that the measures used for testing the relationship between supervision, group process, and performance are based on different independent data sources: staffing reports to determine supervisory spans, group member surveys to measure group process, and performance reports to measure performance. Due to these different data sources, the analyses reported here avoid common methods bias.

Note also that three of the control variables believed to affect flight departure performance—average length of flight, number of passengers per flight, and tons of cargo per flight—are highly correlated in this sample ($r > 0.80$), suggesting that they are not independent of each other. For the purpose of further analysis, these three variables are therefore included in a single equally weighted index with a Cronbach's alpha of 0.962.

Finally, note that the data for all performance measures and control variables were collected monthly throughout a 12-month study period and are therefore available at the group/month-level of analysis. This allows the performance models to be tested at a more detailed level of analysis: group performance in a given month. The use of group/months is critical for taking account of the effect of the control variables—average flight length, passengers per flight, cargo per flight, percent of passengers connecting, and flights per month—on group performance outcomes. The analysis makes the simplifying assumption that relational coordination among group members does not vary substantially over the period of analysis, though ideally we would want to conduct the employee survey each month of the study period to be sure. What does change, however, due to changes in destinations,

Table 1 Descriptive Data and Correlations*

	Obs	Mean (SD)	P-value	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. Sup Span	99	19.5 (11.3)	0.000	—																		
2. Freq Comm	352	0.32 (0.23)	0.005	−0.51	—																	
3. Timely Comm	350	0.40 (0.26)	0.000	−0.50	0.73*	—																
4. Problem Solv	348	0.46 (0.31)	0.000	−0.40	.44	0.57+	—															
5. Helping	345	0.35 (0.27)	0.005	−0.40	.54	0.77*	0.93**	—														
6. Mutual Resp	351	0.48 (0.30)	0.000	−0.55	0.54	0.64+	0.90**	0.91**	—													
7. Shared Goals	348	0.51 (0.37)	0.000	−0.69*	0.74*	0.66+	0.86**	0.86**	0.91**	—												
8. Shared Know	352	0.34 (0.24)	0.000	−0.74*	0.78*	0.86**	0.71*	0.83**	0.87**	0.91**	—											
9. Rel Coord	339	0.41 (0.20)	0.000	−0.61+	0.72*	0.79**	0.90**	0.94**	0.95**	0.96**	0.94**	—										
10. Gate Time	99	50.7 (22.1)	0.000	0.74*	−0.61+	−0.66+	−0.59+	−0.70*	−0.70*	−0.82**	−0.82**	−0.79*	—									
11. Staff Time	99	77.0 (32.4)	0.000	0.74*	−0.64+	−0.65+	0.70*	−0.78*	−0.81**	−0.92**	−0.88**	−0.87**	0.88**	—								
12. Complaints	99	24.7 (18.9)	0.000	0.90**	−0.74*	−0.62+	−0.59+	−0.62+	−0.76*	−0.89**	−0.90**	−0.82**	0.74**	0.82**	—							
13. Late Arrivals	99	21.0 (8.0)	0.001	0.01	−0.40	−0.01	−0.53	−0.39	−0.50	−0.54	−0.29	−0.46	0.00	0.24	0.22	—						
14. Lost Baggage	99	5.4 (1.6)	0.000	0.27	−0.72*	−0.63+	−0.20	−0.14	−0.31	−0.42	−0.32	−0.32	0.42+	0.39+	0.50**	—						
15. Performance	99	0.0 (1.0)	0.000	−0.75*	0.81**	0.68*	0.66+	0.73*	0.78*	0.94**	0.91**	0.88**	−0.79**	−0.89**	−0.84**	−0.52**	−0.71**	—				
16. Flights/ Month	99	1883 (886)	0.000	−0.60+	0.21	0.02	−0.10	−0.09	0.07	0.25	0.28	0.11	−0.38	−0.46*	−0.39	−0.14	0.12	0.33**	—			
17. Flight Length	99	971 (608)	0.000	0.67*	−0.47	−0.65+	−0.59+	−0.68*	−0.69*	−0.73*	−0.76*	−0.74*	0.95**	0.80**	0.66**	−0.07	0.24	−0.69**	−0.31	—		
18. Passengers/Flt	99	93.8 (24.0)	0.000	0.63*	−0.35	−0.53	−0.42	−0.47	−0.44	−0.54	−0.55	−0.53	0.81**	0.54+	0.43	−0.26+	0.10	−0.43**	−0.27	0.89**	—	
19. % Connect	99	6.8 (9.6)	0.000	−0.38	0.02	0.00	−0.20	−0.25	−0.31	−0.05	−0.06	−0.15	−0.32+	−0.18	−0.09	0.16	0.18	0.07	0.56**	−0.35*	−.55**	—
20. Cargo/ Flight	99	2.4 (2.2)	0.000	0.67*	−0.47	−0.64+	−0.64*	−0.72*	−0.67*	−0.76*	−0.73*	−0.75*	0.94**	0.83**	0.65*	−0.10	0.32*	−0.70**	−0.26	0.93*	0.85**	−0.36**

*($^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$) $N = 99$ group/months for correlations among performance measures and control variables. $N = 9$ groups for all other correlations.

demand, seasons, and other operational factors, are flight length, passengers per flight, cargo per flight, percent of passengers connecting, and flights per month. These control variables are readily measured based on archival data maintained by airlines, and must be included to account for their effects on performance.

Random-effects regression analysis was therefore used to adjust coefficients and standard errors for the multilevel nature of the data. To test the relationship between relational coordination and group performance, group/month is the unit of analysis, with group as the random effect. To test the relationship between the supervisory span and relational coordination, the group member is the unit of analysis, with group as the random effect. Random-effects models, also known as mixed, hierarchical linear, or multilevel models, are an extension of fixed-effects models and are well known in the statistical literature (Hausman 1978, Bryk and Raudenbusch 1992). Regression coefficients, standard errors, and the overall R squared for random-effects models reflect statistical associations as measured both within and across groups.

Findings

Table 2 reports the results of regressing supervisory span on group performance, controlling for the index of average flight length, number of passengers per flight, and tons of cargo per flight, and separately for percent of passengers connecting and flights per month. Broad supervisory spans are significantly associated with lower levels of group performance ($p < 0.05$), while narrow supervisory spans are associated with higher levels of group performance.

Table 2 Effects of Supervisory Span and Relational Coordination on Group Performance*

	Group Performance		
	1.	2.	3.
Supervisory Span	−0.61		−0.11
	(0.017)		(0.689)
Relational Coordination		0.98	0.98
		(0.000)	(0.002)
Flight Length, Passengers	0.17	0.46	0.56
and Cargo	(0.470)	(0.063)	(0.031)
% Connections	−0.46	−0.00	−0.03
	(0.042)	(0.999)	(0.904)
Flights/Month	0.44	0.46	0.48
	(0.001)	(0.000)	(0.000)
Overall R Squared	0.32	0.48	0.45

*All models are random-effects linear regressions with group (n = 9) as the random effect and group/month (n = 99) as the unit of analysis. Standardized regression coefficients are shown.

These results are consistent with Hypothesis 1b. However, Hypothesis 1b was more explicit—that narrow supervisory spans support group performance *by strengthening group process*. This is an argument regarding mediation. Consistent with Baron and Kenny's (1986) recommendations for testing mediation, I used three sets of equations to test for mediation: (1) the effect of supervisory spans on performance, (2) the combined effects of supervisory spans and relational coordination on performance, and (3) the effect of supervisory spans on relational coordination. To show mediation, all of these effects must be significant, but the significance of the association between supervisory spans and performance must be eliminated or reduced by adding relational coordination to the model.

Table 2 reports the results of regressing relational coordination on group performance, controlling for the index of average flight length, number of passengers per flight, and tons of cargo per flight, and separately for percent of passengers connecting and flights per month. Relational coordination is associated with significantly better group performance ($p < 0.01$). Once relational coordination is added to the model along with supervisory span, supervisory span is no longer significantly associated with group performance, while relational coordination continues to significantly improve group performance ($p < 0.01$).

Finally, Table 3 reports the results of regressing supervisory span of control on each dimension of relational coordination, controlling for the functional identity of the respondent and the number of flights per month. Broad spans are associated with significantly weaker relational coordination among group members ($p < 0.01$). Broad supervisory spans of control are associated with less timely communication ($p < 0.01$) among group members and with lower levels of problem solving ($p < 0.01$), helping ($p < 0.05$), shared goals ($p < 0.01$), shared knowledge ($p < 0.01$), and mutual respect ($p < 0.05$) among group members.

Analysis of variance results reported above indicate that significant group-level differences in relational coordination remain after accounting for differences between airlines. This suggests that analyses can be conducted at the group level of analysis, as I have done here. But it is also interesting to evaluate this model taking into account organization-level differences. When the model is evaluated using the four airlines rather than the nine groups as the random effect, the results are substantially the same. The coefficients are about 30% smaller, and the p-values are also smaller by at least one level of magnitude.

Table 3 Effects of Supervisory Span on Relational Coordination Among Group Members*

	Relational Coord	Frequent Comm.	Timely Comm.	Problem Solving	Helping	Shared Goals	Shared Knowledge	Mutual Respect
Supervisory Span	−0.37	−0.04	−0.15	−0.31	−0.12	−0.32	−0.30	−0.23
	(0.000)	(0.534)	(0.014)	(0.001)	(0.046)	(0.000)	(0.003)	(0.030)
Gate Agent	0.33	0.34	0.27	0.08	0.24	0.18	0.20	0.12
	(0.000)	(0.000)	(0.000)	(0.225)	(0.000)	(0.005)	(0.001)	(0.058)
Baggage Handler	0.11	0.11	0.008	0.02	0.03	0.15	0.26	0.07
	(0.042)	(0.053)	(0.009)	(0.770)	(0.637)	(0.014)	(0.000)	(0.235)
Operations Agent	0.43	0.50	0.39	0.07	0.34	0.21	0.18	0.24
	(0.000)	(0.000)	(0.000)	(0.235)	(0.000)	(0.011)	(0.001)	(0.000)
Ramp Agent	0.34	0.43	0.32	0.03	0.10	0.19	0.40	0.17
	(0.000)	(0.000)	(0.000)	(0.651)	(0.117)	(0.003)	(0.000)	(0.009)
Flights/Month	−0.31	−0.09	−0.18	−0.29	−0.20	−0.12	−0.14	−0.17
	(0.001)	(0.142)	(0.003)	(0.002)	(0.001)	(0.053)	(0.170)	(0.103)
Overall R Squared	0.26	0.22	0.17	0.08	0.13	0.11	0.16	0.09

*All models are random-effects linear regressions with group (n = 9) as the random effect and group members (n = 348) as the unit of analysis. Ticket agent is the omitted function. Standardized regression coefficients are shown.

In other words, the organizationwide effects of supervision on group process and performance are smaller but more reliably measured than the group-level effects.

The above relationships can be graphed using group-level means (n = 9). Consistent with the findings reported above, we see a negative relationship between the span of control and relational coordination (Figure 1), and a positive relationship between relational coordination and performance (Figure 2).

Together, these results suggest that broad supervisory spans of control *reduce* objectively measured group performance *through* their negative effect on group process. In other words, group process mediates the negative effects of broad spans of control on performance. These results therefore support Hypothesis 1b and provide counterevidence to Hypothesis 1a. Furthermore, these effects cannot be explained by reference to group size. All groups in this study have multiple supervisors, and supervisory spans are unrelated to the size of the group (r = 0.27, p = 0.488).

Figure 1 Supervisory Span and Group Process (Group Means)

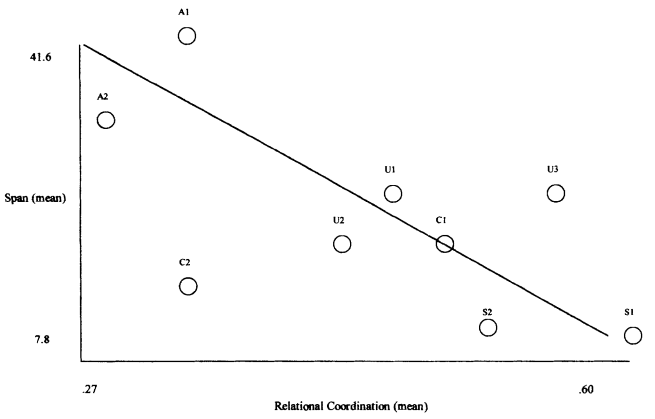
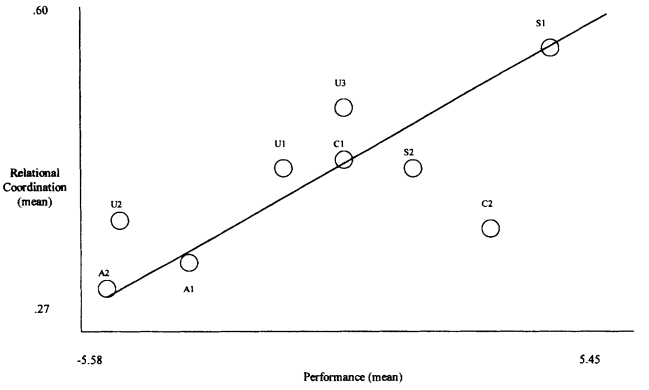


Figure 2 Group Process and Performance[5] (Group Means)



Mean group performance is adjusted for differences in flights per month, flight length, passengers per flight, percent of passengers connecting and tons of cargo per flight.

These results do not explain, however, *why* broad spans of control weaken rather than strengthen group process among group members. How does the span of control affect the way supervisors interact with groups?

Exploring the Qualitative Data

The qualitative data collected in this study further explicate the processes giving rise to the quantitative results

presented above. Field observations from the initial two groups are summarized here to illustrate two contrasting approaches to supervision.

Group A1

In Group A1, the supervisory span of control had been increased over the decade preceding this study as part of a companywide effort to create a leaner, flatter organization with greater employee empowerment. Because of their large spans of control, 33.8 group members per supervisor, supervisors had little time to carry out supportive functions. Instead of building shared goals with group members, working side by side with them and providing them with coaching and feedback, supervisors spent their limited time communicating performance standards to group members and measuring performance. One typical comment from the front-line was that supervisors "only care about delays. Otherwise the little report card won't look good that week" (gate agent). The concern with delays, however, did not appear to be reflected in supervisory efforts to analyze and engage in problem solving. Instead, the focus was on allocating blame for the delay to the function responsible for causing it, so as to comply with reporting requirements from headquarters, and to pressure group members to improve performance. The reliance on performance measurement allowed for a largely hands-off relationship between supervisors and group members, consistent with the broad spans of control in this group.

To the limited extent that supervisors could focus on individual group members, their approach tended to focus on monitoring compliance with directives. According to one supervisor, "we only have time to focus on the bad apples," rather than providing coaching and feedback on the work process itself.

To assist supervisors, nonmanagement "lead agents" were appointed from the front-line employee groups to help carry out supervisory functions. Their job was to help supervisors direct the operations, but they were not responsible for providing discipline, leadership, coaching, or feedback to front-line employees. Because leads were clearly nonmanagement, and did not see themselves as management representatives, they were not well-positioned to align group member goals with those of the organization.

Supervisors themselves had little opportunity to bridge the management/nonmanagement divide or to participate in front-line work. They had few opportunities to observe the work process directly and to provide coaching and feedback to group members. They had little contact with any given group member, and little opportunity to build the relationships and know-how that would allow them to play a facilitative role. In sum, supervision in Group A1 was primarily arms-length in the sense that supervisory interactions with group members were quite limited, and tended to be replaced by the use of arms-length performance measures.

Group S1

In Group S1, the supervisory span of control was much narrower than in Group A1; each supervisor was responsible for only 8.7 group members. In addition, the job of the supervisor was observed to go beyond Group A1's focus on measuring performance and disciplining the "bad apples." Supervisors had managerial authority but also performed the work of group members. "Management will always pitch in at crunch time," said a ramp supervisor. "Whatever it takes to get the plane out." Supervisors were observed to take part in front-line work on a regular basis, even highly physical work like baggage handling, and to wear the clothing appropriate to that work.

"A supervisor fills in spots when people are on breaks, or when we are short on a zone," said another supervisor. "We make sure all the gates are manned (sic) and that everything is running smoothly, working in a timely manner. When agents see the supervisor working consistently, they give more in a crunch. Also, you get their respect by working with them." Working side by side with group members appeared to be conducive to building shared goals with them, and to developing the legitimacy and knowledge to provide effective coaching and feedback.[2]

Group S1 supervisors were also observed to spend more time than their counterparts in Group A1 providing coaching and feedback to group members. Coaching and feedback to group members took the form of problem solving and advising, rather than assessing compliance with performance objectives. "If there's a delay, supervisors find out why it happened," said the station manager. "We get ideas on how to do it better next time. If you've got that kind of relationship then they're not going to be afraid. Say there was a 10-minute delay because freight was excessive. If we're screaming we won't know why it was late." The ramp manager confirmed this approach.

> We work real hard to remove that barrier so that agents can come in and talk to a supervisor or manager. There's an open-door policy so when employees have a problem, they know we can work on it together. It's a totally different environment here. We sit and listen. When that person walks away, he'll have self-esteem. I learned this when I came to work the ramp [here]. Even when you did something wrong, they'll ask what happened. You know you screwed up. They'll tell you what you can do so it doesn't happen again. You walk away so upbeat that you work even harder.

There was some supervisory monitoring, but the supervisory role was not focused on discipline. "If there is a problem like one person taking a three-hour lunch," said one supervisor, "they take care of that themselves for the most part. Peer pressure works well." Instead, supervisors told me that the people who reported to them were their internal customers and that their job was to help them do their jobs better. One supervisor described her job.

> We are accountable for what the agents do. It is very difficult sometimes, because it's such a family-oriented company. You might feel like a sister to one of the agents, then you have to bring discipline. You have to step back and put the friendship aside and say, I don't agree with what you just did. But the agents are our customers. We are here to help them do their jobs.

In sum, supervision in Group S1 was hands-on and primarily supportive in nature. It was not arms-length supervision—interactions were intense and performance measures were not used as a substitute for these interactions.

The Benefits of Smaller Spans

Together these two case studies suggest a reason why small spans of control were positively associated with stronger group process and superior group performance in the statistical analysis reported earlier. The primary feature that distinguished supervision across these two groups was the nature of interactions between supervisors and group members. Interaction between supervisors and group members ranged from infrequent and arms-length in Group A1 to frequent and intensive in Group S1. These differences were consistent with supervisory spans of control. Supervisors with narrow spans of control engaged in more frequent and intensive interaction with group members, while supervisors with broad spans of control engaged in less frequent, arms-length interaction with group members.

Narrow spans of control created the opportunity for more intensive supervisory coaching and feedback to group members, because of the greater availability of supervisory time. Supervisors with narrower spans of control also had greater opportunities for working side-by-side with the group members they were responsible for supervising. Working together appeared to reduce informational and social distance between supervisors and the supervised, and, as anticipated by Likert (1961) and Tannenbaum (1968), to support the creation of shared goals. Shared goals, in turn, made group members more receptive to supervisory coaching and feedback, and reduced the role of supervisory monitoring even further as group members began to monitor each other. With fewer social and informational boundaries between themselves and group members, supervisors were then able to perform their coaching and feedback functions more effectively.

But in groups with broad spans of control, a different story emerged. In these groups, supervision had been reduced to economize on staffing and to increase participation by front-line employees. Supervisors had arms-length relationships with group members, and played a largely bureaucratic role, relying on impersonal rules to allocate responsibility for late departures and other errors. Their role was primarily to monitor compliance with performance targets set by headquarters, and with basic rules of behavior such as being on duty at the scheduled times.

Postbureaucracy theorists might suspect that reductions in supervision in Group A1 had been too recent to allow supervisors to adapt fully to their new role, and to allow front-line employees to adapt to the lack of supervisory support. Yet Group A1 had experienced gradual reductions in supervision, along with the rest of the organization, over the previous decade under the leadership of a CEO who was determined to increase participation and accountability of front-line employees. One would expect that a decade should be sufficient time to enable supervisors and front-line workers to adjust to their new, more autonomous roles.[3]

I propose that the coaching and feedback functions of supervisors are especially valuable in the highly interdependent task environment explored by this study because interdependence increases the difficulty of seeing the causal link between one's actions and their results. Woodward (1965) highlighted the difficulty of getting useful feedback from highly interdependent work processes and suggested that the role of supervisors would be greater as a result. Hackman and Oldham (1980) advocated designing interdependent work in such a way as to allow feedback to the group responsible for its performance. A key criterion for the effective design of group work is that "the group as a whole receives trustworthy information, preferably from doing the work itself, about the adequacy of group performance" (p. 172). When work is designed so that clear feedback can be achieved from the work itself, they argued, the need for supervision is reduced, except as a transitional necessity. But this solution, I argue, does not fully account for the problem of interpreting a group's joint performance outcomes to inform the actions of individual members of the group. An analogy is the interpretation and analysis needed to translate a basketball team's score into information that helps individual team members understand how they are affecting team performance and what they could do to improve their contributions. In their coaching function, supervisors are a potential vehicle for providing this feedback, in real time, to group members.

Lessons from the Outliers

There are clearly other factors at work in this story. The outlier in the lower-left corner of Figure 1 (Group C2) suggests that although narrow spans tend to *encourage* supervisors to play a facilitative role with respect to group process, they do not require it. In Group C2, spans were relatively small, and supervisors had more intense, less arms-length interactions with group members relative to supervisors of Group A1. But unlike supervisors of Group S2, supervisors were observed to focus more on pressuring group members and blaming other functions than on providing coaching and feedback to group members. An interview with the station manager of Group C2 suggested the possibility that pressures from headquarters encouraged the focus on pressure and blame.

> Upper management wants to have a tracking system [but] we have to find a better tracking system. If you have a lot of code 31's (maintenance delays), and then the maintenance guy is gone, you know it is punitive. That is the bottom line. You come in front of a tribunal. Headquarters doesn't have time to look at the details. They just see code 10's and then passenger services has a lot of explaining to do . . . It's a punitive system but if you're a good station manager, you buffer it, don't allow it to cascade down to the front-line employees.

Despite stated attempts to buffer, this punitive approach to performance measurement appeared to encourage front-line supervisors to achieve performance through more expedient means than through building group process.

Figure 2 shows that Group C2 is also an outlier with respect to group process and performance. For the sample as a whole, strong group process is related to high performance but this group achieved high performance despite relatively weak group process. Unlike Group A1, supervisors of Group C2 were sufficiently numerous to have real effects on performance, but they had their effect through more direct means than strengthening group process.

The second outlier on Figure 1 is equally instructive. The outlier in the upper-right portion of the diagram (Group U3) suggests that although broad spans of control appear to discourage the development of strong group process, they do not prevent it, at least in the short run. Group U3, an operation of the United Shuttle, began as a new venture during the study period, with a great deal of enthusiasm about cross-functional teamwork and with supports for group process such as cross-functional accountability for delays and selection of employees based on team orientation. The Shuttle was also designed with a philosophy of minimal supervision. Consistent with the broad spans, front-line employees reported in interviews that supervisors were "never available" when needed. Still, group process was very strong in Group U3, at least as measured after four months of operation. Figure 2 suggests, however, that the strong group process achieved in Group U3 was associated with somewhat less than the expected performance outcomes.

Together, these outliers and the stories behind them suggest two important caveats to the broad findings reported in this paper. Though supervisors with small spans typically improve performance by strengthening group process among their direct reports—particularly by increasing problem solving, helping, shared goals, shared knowledge, and mutual respect among group members—supervisors can also use small spans of control to achieve performance in more negative ways. Conversely, groups with broad spans can achieve strong group process *without* much supervisory input, at least in the short run, with the help of supporting practices like performance measures that focus on cross-functional accountability, and the selection of group members for team orientation.

The overall pattern of my findings is therefore consistent with Adler and Borys's (1996) two-dimensional typology of high versus low degree of bureaucratization—here captured by supervisory span—and enabling versus coercive type of control—here reflected in the contrast between facilitative and coercive supervision. My quantitative findings suggest that, overall, large spans are not conducive to high performance in this setting. My qualitative findings further suggest that it is the combination of small spans and facilitative supervision that offers the greatest long-term promise. Based on the cases just discussed, it is difficult to see how high performance can be sustained if it is achieved through small spans accompanied by supervisory pressure and blaming. And, for very different reasons, it is also difficult to see how high performance can be sustained if, notwithstanding a more facilitative style of supervision, large spans deprive teams of the support they need to sustain strong group process. Both conjectures, of course, remain to be tested.

Conclusion

Organizations have experimented with broader supervisory spans, but there is little evidence that the overall aggregate trend has been in this direction. This paper suggests one possible reason. Analysis of this sample of flight departure groups suggests that broad spans reduce performance through their negative effects on group process, conceived here as relational coordination among group members. Qualitative data suggest that broad spans may undermine relational coordination among group members by preventing supervisors from engaging in coaching and feedback, and by instead encouraging them to rely on

arms-length performance measures. Narrow spans allow supervisors to carry out coaching and feedback, better supporting relational coordination and, as a result, achieving higher levels of group performance.

In organizations whose work processes are highly interdependent, feedback may be critical to determine which actions contribute to the success or failure of the effort. Effective feedback under these conditions requires more than collecting data on performance and evaluating it at arms-length—it requires close observation and an intimate knowledge of the work process. Effective performance under these conditions also requires strong group process, or relational coordination, among group members. The qualitative data presented here suggest that giving feedback, building shared goals, and working side by side with those one is responsible for supervising may be facilitated by small supervisory spans. Outliers suggest some countervailing considerations. Small spans can also serve as the opportunity for a more directive style of supervision, which in at least one case appears to have boosted performance by means other than high levels of relational coordination among members of the departure team. And larger spans, in a start-up group with a set of practices supportive of teamwork, were compatible in one case with high levels of relational coordination.

Taken as a whole, however, the findings presented in this paper run counter to the postbureaucracy stream in organizational theory, which has underplayed the leadership and developmental role of front-line management, and which has therefore predicted that supervision would wither away in lean, empowered organizations. The analysis presented here suggests that organizations introducing teamwork should not necessarily reduce supervision. I suggest that it may be supervisors' role in coaching, feedback, and building shared goals rather than their unwillingness to give up power which accounts for the failure of organizations to expand supervisory spans between 1980 and 1990 as they were expected to do.

This study has several limitations. Supervisory spans are expected to affect relational coordination among group members by influencing leader behaviors, yet that link is explored only qualitatively in this study. Measures of leader behaviors have been developed by others, and should be used to test more rigorously the path through which supervisory spans affect group process. As reported above, other studies have found that larger spans are associated with autocratic (e.g., Goodstadt and Kipnis 1970) or arms-length (e.g., Ford 1981) supervision, consistent with the qualitative data presented here. Perhaps the dimensions of leader behavior—coaching and feedback—that appear to mediate between supervisory spans and relational coordination can be measured using the well-established typology of leader consideration and leader initiating structure. Both leader consideration and initiating structure capture key features of the coaching and feedback role of supervisors.[4]

However, leader consideration focuses more on personal than on task-oriented interactions between leader and subordinates. In addition, some have argued that the concept of leader initiating structure has suffered from the inclusion of both constructive and autocratic leader behaviors (Schriesheim et al. 1976). A follow-up study should assess whether *coaching and feedback related to the work process itself* constitutes a distinct dimension of leader behavior, and whether this dimension indeed mediates between supervisory spans and relational coordination as suggested here by qualitative data.

Secondly, narrow supervisory spans were shown here to be associated with higher levels of relational coordination among group members. But I have presented no direct test of how supervisory spans affect the job satisfaction of group members, and whether group members who work under narrow spans experience less autonomy than members who work under broad supervisory spans. It is possible that smaller spans improve relational coordination among group members while undermining job satisfaction. Other studies have shown, however, that smaller spans are broadly associated with less autocratic leadership (e.g., Goodstadt and Kipnis 1970), which in turn has been found to be associated with greater job satisfaction (e.g., Shaw 1955).

A final limitation of this study, for the purpose of testing postbureaucracy theory, is that the flight departure process does not represent archetypical postbureaucratic "knowledge work." The process has important physical components, and some of the tasks involved are relatively low skill, such as cabin cleaning and fueling. Still, it has some of the essential characteristics of such work due to the highly interdependent nature of the work process and the cognitive complexity involved in coordinating highly interdependent tasks. The flight departure case serves to remind us that the features of potential interest to postbureaucracy theory are not present only in archetypical knowledge work.

The strength of this study is that it shows significant negative effects of broad supervisory spans on objectively measured group performance, mediated through negative effects on group process. Findings from this study suggest that efforts to expand supervisory spans may be misguided in settings where group process is essential for performance. If group process is increasingly important for achieving performance, and if leaders are expected to support group process, then organizations should invest

in smaller spans to help them do their jobs more effectively. Smaller supervisory spans can support group process rather than undermine it.

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Appendix A. Relational Coordination Survey

Each question lists the 12 functional areas involved in the flight departure process and asks the respondent to answer the following about each of them:

1. How often do you communicate with people in these groups? (1 = constantly, 5 = never)
2. Do the people in these groups communicate with you in a timely way? (1 = usually, 5 = never)
3. If there's a problem with a flight, do people in these groups work with you to solve the problem or do they try to avoid getting blamed? (1 = try to solve the problem, 5 = try to avoid blame)
4. How much respect do you get from people in these groups? (1 = a lot, 5 = not much)
5. How much help do you get from people in these groups? (1 = a lot, 5 = not much)
6. How much do people in these groups know about your job? (1 = a lot, 5 = not much)
7. Do the people in these groups have the same work goals as you? (1 = same goals, 5 = not at all)

Endnotes

[1]This paper is part of a larger body of work that explores the concept of relational coordination. Gittell (2001a) develops the concept of relational coordination from qualitative data and provides evidence of its effect on flight departure performance. Gittell et al. (2000) shows evidence for performance effects of relational coordination in the patient care setting. Gittell (2000a) identifies supervisory spans as one of eight organizational practices that influence relational coordination among group members, though the analyses are primarily suggestive. Gittell (2000b) illustrates through case studies the dual role of performance measurement and supervision in achieving coordination. Gittell (2001b) shows that uncertainty increases the performance effects of relational coordination, while reducing the effectiveness of alternative forms of coordination.

[2]Cross-site differences in supervisory participation in front-line work did not appear to be associated with the extent of unionization. Among the most unionized sites, some had high levels of supervisory participation in front-line work, while others had very little.

[3]Interestingly, the airline in the study which had most dramatically reduced supervision over the previous decade began at the end of this study period to increase supervision once again, with the goal of narrowing spans of control from over 30 front-line employees per supervisor, to 12. There were no public pronouncements about this increase in supervision, however, unlike those that had accompanied the reduction of supervision at the same airline a decade earlier.

[4]Initiating structure is the extent to which the leader defines his or her role and lets subordinates know what is expected. Consideration is the extent to which leaders consider subordinates' well-being, status, comfort, and contributions (Stogdill 1974, Ford 1981).

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