

Process Feedback in Task Groups: An Application of Goal Setting

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An experiment was conducted to test the effects of interpersonal group process feedback on interpersonal behaviors and task performance in task groups. The form of process feedback was based on research findings about characteristics of task feedback that lead to effective goal setting. The feedback resulted in changes in dominance behaviors of individual members. No changes in friendly or emotionally expressive behaviors were found. Feedback had no effect on task performance. The results are discussed in terms of implications for the relationship between feedback and task performance and the stability of interpersonal behavior patterns.

In a review of the literature on feedback in task groups, Nadler (1979) reported that very few of these studies examined the effects of feedback on interpersonal behavior in task groups. Interpersonal behavior feedback has been studied largely in the context

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	<i>Task</i>	<i>Interpersonal</i>
<i>Content</i>	1. Formal Agenda, Goals	4. Who Is Doing What to Whom?
<i>Process</i>	2. How the Task Is Done	5. How Members Relate to Each Other, Communicate, etc.
<i>Structure</i>	3. Recurrent Processes— “Standard Operating Procedures”	6. Recurrent Interpersonal Relationships, Roles

FIGURE 1: Schein's Model of Process Consultation

of therapy and personal development groups (e.g., Jacobs, Gatz, & Trick, 1974; Stockton & Morran, 1981). If Nadler were to conduct a similar review today, more than 10 years later, he would still find virtually no work on interpersonal feedback in task groups. In contrast is the vast literature on task performance feedback in groups. This literature has covered a wide variety of topics ranging from sources of feedback (e.g., Greller & Herold, 1975) to individual versus group feedback (e.g., Conlon & Barr, 1989). One finding that emerges clearly from the performance feedback literature is that knowledge of results combined with setting challenging goals produces improvements in performance for both individuals and groups (Locke, Cartledge, & Koeppel, 1968; Locke, Chah, Harrison, & Lustgarten, 1989; Locke, Shaw, Saari, & Latham, 1981; Mento, Steel, & Karren, 1987). In this article, we bring together these two areas of feedback—interpersonal process and task performance. More specifically, we apply the goal-setting approach, taken from the task performance feedback literature, to interpersonal process feedback. This article presents the results of an empirical study in which we explored the potential of interpersonal behavior goal setting for groups.

We use Schein's (1987) model of process consultation, presented in Figure 1, to illustrate how this study fits into the literature on feedback in task groups. Each of the cells in Figure 1 illustrates feedback that is addressed toward the content, process, or structure of a group's task or interpersonal behaviors. We argue that most of the literature to date on group feedback has been in the task domain (Cells 1-3 in Schein's model). Our study focused on the interpersonal domain. Although, as Schein notes, there is overlap among the cells in the model, our focus was primarily on interpersonal process (Cell 5). Thus the feedback in this study was aimed toward interpersonal relationships in the groups studied.

REVIEW OF THE LITERATURE

Generally, the literature on process interventions (e.g., feedback) finds that these interventions increase group cohesiveness and member satisfaction but have no measurable effect on task performance. In fact, Kaplan (1979b) noted that there is a "conspicuous absence of evidence that process consultation enhances task performance" (p. 346). Very recently, Kernaghan and Cooke (1990) also noted that there is little empirical evidence to support the idea that "active intervention in group processes results in a real and measurable improvement in group performance" (p. 110). Although these writers acknowledge that much anecdotal evidence exists that process feedback affects performance, their arguments focus on the lack of rigorous empirical evidence. For instance, Lipshitz and Sherwood (1979), Kaplan (1979a), and Hackman and Kaplan (1974) all used paradigms in which the intervention was to foster an open discussion between group members about their group process. The groups in these studies worked on a human relations problem, were exposed to the intervention, and then worked on another problem. No differences were found in solution quality between groups that experienced the intervention and those that did not.

In a similar study, Woodman and Sherwood (1980) used a team development intervention. In this case, facilitators gathered data on interpersonal group process and gave this feedback to the groups. They conducted action-planning sessions with the groups for process improvements. Again, these researchers did not find any difference in performance between control and experimental groups. In none of the studies just discussed did the authors report whether they observed actual changes in process following their interventions. Furthermore, of these studies, only Hackman and Kaplan (1974) presented an explicit model relating interpersonal process to task performance.

A series of studies that used videotape to deliver feedback to task groups did find actual changes in specific behaviors following feedback (Walter, 1975; Walter & Miles, 1972; Weber, 1971). Walter's (1975) study is the most representative and comprehensive of these. In that study, he presented feedback to groups by having them view videotapes of their own previous sessions. For some groups he also presented a videotape of another group, modeling appropriate behaviors. Walter measured changes in behaviors of individual members such as agreeing, voting, and questioning while engaging in a brainstorming or judgmental problem-solving task. Contrary to his hypothesis, the combination of viewing a tape of their own group and a model group did not result in the most behavior change; viewing the model alone did. Walter measured task rather than interpersonal process, however. He also did not report actual performance data nor whether the subjects were told which specific behaviors or patterns were relevant as they viewed the videotapes.

Kernaghan and Cooke (1990) used one of the tasks in the current study and a similar design. They trained outside observers to analyze the behaviors of groups during their task performance and fed back these observations to the group members at the midway point of their discussion. Their feedback was separated into task and interpersonal aspects, and they manipulated which type of feedback groups received. The task they used required subjects to rank a list of management actions in a particular sequence.

The task process variables they measured were the degree to which the groups set goals and tested potential solutions. The interpersonal variables were the quality of communication and degree of support. These researchers reported no overall effects for either type of feedback, although task feedback tended to be effective for high-ability groups. These authors did not report whether they developed or communicated to the group members what the appropriate levels of these variables were nor did they report whether the subjects' behaviors actually changed following the feedback. These authors do suggest that a useful direction for future research would be allowing groups to develop action plans for responding to diagnostic feedback. We attempted to do this in the current study.

Kaplan (1979b) attributed the failure to observe a relationship between process interventions and task performance to two factors: experimental artifact and methodological problems. He suggested the artifact was due to sampling bias. That is, the groups that participate in most laboratory studies of process consultation do not have many process problems and therefore would not appear to be helped by interventions. The methodological problems, he argued, are that few lab studies both isolate process consultation as an independent variable and measure performance. Even the ones that have done this (e.g., Kaplan, 1979a; Lipshitz & Sherwood, 1979) still find no effects.

We suggest here that some other methodological considerations be added. As we saw from reviewing the above literature, no studies have done all of the following: (a) presented groups with measurable standards of interpersonal group process, (b) measured their process against the standards, (c) given them feedback about their actual process so that the groups could compare themselves against the standard and plan specific changes (goal setting), (d) measured actual changes in the process, and (e) measured changes in performance.

These steps describe the goal-setting paradigm (e.g., Klein, 1989; Locke et al., 1968) found in the literature on work motivation and task feedback. The research findings within this paradigm have been robust. Significant changes in task performance can occur when individuals or groups receive timely, specific results of their previous performance (feedback) and set goals for subsequent performance. Klein (1989) noted that if performance is measured relative to a standard, even if people are not given explicit goals for subsequent performance, they implicitly set them. We reasoned that if groups received standards of interpersonal process relevant to their task conditions they would set goals relative to those standards.

INTERPERSONAL BEHAVIOR GOAL SETTING

SYMLOG (Bales & Cohen, 1979) provided both the method for assessing interpersonal group process and the theory for developing the process standards used in this study. SYMLOG, an acronym for SYstematic Multiple Level Observation of Groups, is based on over 30 years of research on small groups by R. F. Bales and his colleagues (Bales, 1988). Interaction process analysis (IPA), the best known work of Bales, was

developed as a means of classifying behaviors during group meetings (Bales, 1950). SYMLOG builds on IPA but represents a unique theory of small group interaction.

An important foundation of SYMLOG is Lewinian field theory (Bales, 1985; Lewin, 1951). The behaviors of interacting group members are viewed as “forces” acting in a field. Within this field the group members influence and are influenced by these forces. Thus all behaviors are mutually contingent. From this perspective, individual members’ behavior must be considered within the context of the entire group. The implications for process feedback are that the feedback should be based on behavior of all group members and should be delivered to the group as a whole. SYMLOG’s ability to consider interpersonal behaviors holistically makes it well-suited to the current study.

At the heart of SYMLOG are three bipolar dimensions of interpersonal behavior: Dominance, Friendliness, and Emotional Expressiveness (referred to henceforth as “Expressiveness”). The Dominance dimension captures the amount of participation, talkativeness, leadership, and influence, at one pole, and submissiveness, quietness, and obedience, at the other. The Friendliness dimension is defined, at one pole, by group-orientedness, cooperation, loyalty and, at the other pole, by individualism, withdrawal, and antagonism. The Expressiveness dimension is captured, at one pole, by joking, nurturance and affection and, at the other, by emotional control, task-orientedness and attention to rules.

SYMLOG was intended to be used as a process feedback tool and has in fact been used as such for over 15 years in self-analytic groups (Bales & Cohen, 1979). According to Schneider and Becker-Beck (1988), SYMLOG provides “ideal instruments and methods for studying feedback in all its ramifications.” They state further that the “SYMLOG methods open the possibility *to define goals of behavior and to evaluate intended changes in line with these goals*” (p. 26, emphasis added). The system has been shown to be a valid assessment of leadership (Hogan, 1988) and team effectiveness (Fassheber & Terjung, 1988; Kelly & Duran, 1985; Stone, 1988). Thus we judged SYMLOG to be an ideal tool for providing process feedback in the manner consistent with feedback in the goal-setting and task performance tradition.

We based the group process standards used in this study on the three dimensions of interpersonal behavior. SYMLOG theory itself combined with other theories of task group effectiveness provided the guidance for the development of the standards. For each of the three dimensions of behavior, we developed a principle that had a whole-group focus. (The specific operationalization of the principles are discussed in the Method section.)

Dominance/Level of Participation

The standard we established was based on the principle that large differences between the most and least dominant people in groups would be detrimental to group process and to task performance. That is, to the extent that one or a few people dominate the group discussions and other members do not contribute, performance will not be as effective compared to groups in which participation is more evenly divided.

We based this principle on the notion that multiple perspectives and sources of expertise enhance group performance, especially for problem-solving and judgment tasks (Maier, 1970; McGrath, 1984). Inhibition to participate on the part of some group members is an example of "process losses" (Hackman & Morris, 1975; Steiner, 1972) that prevent groups from reaching their potential performance levels. SYMLOG theory suggests that the presence of a dominant subgroup is likely to lead to conflict within that subgroup and rebellion or withdrawal on the part of the nondominant members (Bales & Cohen, 1979).

Kelly and Duran's (1985) study present some SYMLOG data suggesting that equal participation is related to effective task performance. They used student groups whose task was to write a paper and make an oral presentation based on analysis of a business case. They reported that the groups receiving high grades on their projects were more equal on the SYMLOG Dominance dimension than were the groups that received low grades.

Friendliness/Group Orientedness

The principle we used for this dimension was that the behaviors should be primarily group oriented and friendly as opposed to individually oriented and unfriendly. Some unfriendly type behaviors such as devil's advocacy and challenging group decisions are useful for preventing problems such as groupthink (Janis, 1962), but even these behaviors should have the group welfare as their motivation. The majority of the individually oriented behaviors—ones that are autocratic, unfriendly, rebellious, or withdrawn—will eventually interfere with group performance, according to SYMLOG theory.

The Kelly and Duran (1985) study also presents some data to support these ideas. They found that the most effective groups (high grades) were generally clustered around the positive pole of the Friendliness dimension but that there was also some heterogeneity. They observed two patterns in ineffective groups. Some groups were clustered mostly in the Friendly direction, with little variance in group member behavior. Other ineffective groups showed a pattern of polarization, with usually two subgroups.

Emotional Expressivity

Our principle based on this dimension was that groups should have a reasonable balance of task-oriented and socioemotional behaviors, though task-oriented behavior should dominate. This principle is based on seminal work by Bales (1953, 1958) on the importance of equilibrium between task and socioemotional behaviors in groups. According to this line of research, the two basic functions that groups must carry out are task accomplishment and self-maintenance. Thus task behaviors, unbalanced by socioemotional or maintenance behaviors, will lead to group disintegration, whereas maintenance behaviors, unbalanced by task behaviors, will lead to ineffective performance.

Kelly and Duran (1985) noted that “diversity in [SYMLOG] scores, particularly on the [Expressiveness] dimension, appears to be related to successful performance” (p. 188). Their data suggested that lack of variance on this dimension was related to ineffective performance.

STUDY PROPOSITIONS

This study was exploratory, and thus we present propositions rather than formal hypotheses. In this study, we explored two broad issues. First, we explored the effect of applying a goal-setting paradigm to interpersonal process feedback in task groups. (As we showed in the literature reviewed here, there have been no studies demonstrating specific changes in interpersonal behaviors following a process intervention.) To do so, we measured patterns of interpersonal behaviors against a set of standards of “healthy” behaviors provided for goal setting, fed back these measurements to groups, and measured subsequent behavior patterns. We expected that groups would look at the gap (if one existed) between their actual patterns and the patterns prescribed by the standards and then set narrowing the gap as their goal. We tested the following propositions related to this first issue:

Proposition 1: Groups that receive feedback indicating that their patterns of interpersonal behavior do not meet a prescribed ideal will change their behavior so that it is closer to the ideal.

Proposition 1a: Groups that receive no feedback—or receive feedback indicating that their patterns of interpersonal behavior meet a prescribed ideal—will either not change behavior or change behavior in random directions.

The second broad issue we explored is the relationship between interpersonal process and group task performance. Another shortcoming in the literature on process feedback has been the lack of models relating interpersonal process to feedback. Clearly, such models will depend on the nature of the task (Hirokawa, 1990). In this study, we based feedback on a model of process and performance that is specific to the task conditions we set.

The task conditions are leaderless small groups; consensus decision making, and tasks that are timed, require input and discussion from all members, and are characterized by ambiguity. To be effective under these conditions, groups must allow all members to participate and to exhibit cooperation and task orientation. We tested the following propositions:

Proposition 2: Quality of group task performance will be positively related to the degree of equality of participation.

Proposition 3: Quality of group task performance will be positively related to the degree of group-oriented behavior.

Proposition 4: Quality of group task performance will be related to task/socioemotional behavior in a curvilinear way; that is, groups that exhibit either extreme task-oriented behavior or extreme emotional behavior will not perform as well as groups that exhibit moderate levels of behaviors on this dimension.

METHOD

Procedure

In the study, 34 groups of 3-6 students each (mode = 4 students) were randomly assigned to one of two experimental conditions: *feedback* (16 groups) or *no-feedback* (18 groups). In all, 151 students (93 males, 58 females) participated. All groups were mixed gender. The sessions were led by the authors, instructors of organizational behavior classes the students were taking in the business and engineering schools of a large university. The instructors did not necessarily lead the sessions in which their own students participated. All groups worked on two tasks and were instructed to use consensus decision making. We explained that consensus decision making did not mean that every member had to agree 100% with the group's answer but that every member should feel that his or her position was heard and he or she was willing to go along with the group's decision. All students had some previous exposure to consensus decision making in their organizational behavior courses. Figure 2 presents the agendas for the two experimental conditions.

During task performance, teams of observers made systematic ratings of each group member's interpersonal behavior. At the end of the first task period, all group members completed a questionnaire assessing their attitudes toward the group and its performance. They then received feedback on their task performance on the ranking task (i.e., "task feedback").

The experimenter also presented to groups in the *feedback* condition "process feedback," that is, the results of the observers' ratings of group process, and a set of norms against which to compare their results. A detailed description of the approach to process feedback is presented in a later section. Following the feedback, the groups were given 10 minutes to discuss their process feedback and determine how they as a group could improve during the second task. Groups in the *no-feedback* condition received only the task performance feedback and had an unstructured discussion of their own choosing during the discussion period. They were told that the experimenters needed this time to set up for the next segment of the experiment. Observers in both conditions were given a break during this period so that they would not know which groups received feedback.

All groups then worked on the second task and the observers again made ratings of the group members' behavior. Following this, the group members completed another questionnaire, similar to the one described above. In total, the sessions lasted 2 hours and 40 minutes. A detailed time breakdown is shown in Figure 2.

TIME ALLOTTED (in minutes)	Experimental Condition	
	FEEDBACK	NO-FEEDBACK
5	Welcome and General Instructions	
30	Project Planning Task	
5	Questionnaires	
10	Project Planning Performance Feedback	
10	BREAK	
10	Observers' Results and Behavioral Norms	Unstructured Discussion (15 minutes)
10	Discussion of Feedback	
50	In-Basket Task	
5	Questionnaires	
25	Final Feedback and Debrief	

FIGURE 2: Experiment Agenda

Participants

Previous researchers have criticized the small-group literature for overreliance on ad hoc laboratory groups, and have advocated using groups that have a life before and after an experiment (Gallupe, DeSanctis, & Dickson, 1988; Hackman & Morris, 1975). The groups who participated in this study were engaged in team projects for their classes. The groups were formed at the beginning of the semester and remained intact until the semester ended. The experiment itself was unrelated to any of their class work, requirements, or evaluation. The experimental sessions began 5 weeks after the students formed their groups and ran until 2 weeks before the semester ended. Thus the experiment ran over a period of 7 weeks.

There was clearly a lot of variation across groups. Groups that participated in the experiment early in the semester were undoubtedly less far along in their group development than were groups that participated later in the semester, engineering majors were different from business majors, and MBAs differed in work experience and maturity from undergraduate business majors. In one sense, this heterogeneity was helpful, as it increased the generalizability of the results. However, it could contaminate the results if there were differences in composition between the experimental and control groups. Fortunately, the experimental and control groups did not differ systematically in timing or student major or level. Moreover, because we

measured change in outcomes from the first to the second task, initial differences that may have existed between experimental and control groups would not affect the results we report here (Liker, Duncan, & Augustyniak, 1985). This analysis approach is discussed more fully in the Results section.

Group Tasks

Two different tasks were used in the study: a ranking task and an in-basket task. In both, the groups were instructed to make decisions based on group consensus. We chose tasks of different types for two reasons. First, we wished to avoid learning effects that we suspected might dilute any process feedback efforts. Second, we were particularly interested in promoting a rich data base of group process behaviors in the second task so there would be variance in the group process measures. The in-basket task asked respondents to respond to some controversial items that, in fact, promoted discussion by the group. We were concerned that the redundancy of a second ranking task would have stifled discussion and debate.

The first task, a project planning situation (Lafferty, 1988), required the subjects to arrange a list of 20 management activities in correct sequence for planning, organizing, implementing, and controlling a hypothetical project. Examples of these activities are (a) review current project situation and (b) decide on a basic course of action. This task is comparable to other item-ranking tasks such as the NASA Moon Survival problem (Hall & Watson, 1970). According to McGrath's (1984) classification scheme, this project planning task is an intellectual task, one that involves solving a problem with a correct answer. The correct answers, provided by the company that developed the task, were based on judgments of experts in project planning. The performance measure was computed as the absolute difference between the group's ranking of each item and that item's rank as given by experts. The differences were summed for the total score. Lower numbers indicate better performance.

The second task was an in-basket simulation called "Tampa Pump and Valve" (Whetten & Cameron, 1984). McGrath (1984) would classify it as a decision-making task, one that involves deciding issues with no right answer. The groups were asked to take the role of a manager, with limited time and no assistance, facing an in-basket full of correspondence. There were nine items in the in-basket used in this study. The groups' task was to decide on an action for each item. They were required to write down the actions, including any letters or memos they may have decided to write. Although there were no specific correct answers, we did provide suggested actions from an experienced manager at the end of the task period. A scoring protocol was developed for the in-basket task based on six indexes:

1. Completeness of arranging meetings
2. Completeness of written responses
3. Degree of delegation to subordinates
4. Degree to which other people were affected by response
5. Spelling and grammar errors
6. Awareness of underlying company problems.

TABLE 1
Initial Interrater Reliability on In-Basket Scales

<i>Scale</i>	<i>Weighted κ</i>	<i>95% Confidence Interval</i>	<i>Percentage Agreement</i>
Arranging Meetings	.344	.254 < κ < .434	69
Writing Letters	.503	.437 < κ < .569	45
Delegation	.619	.454 < κ < .784	67
Spelling and Grammar	.409	.263 < κ < .555	74
People Affected	.397	.208 < κ < .585	86
Awareness of Problems	.061	-.199 < κ < .320	38

Two graduate students in business who were blind to the purposes and design of the experiment scored the in-basket responses. The two judges made ratings on each scale for each of the nine pieces of correspondence in each group's set of responses.¹ The scores for the responses on each scale to the individual pieces of correspondence were summed to yield total scores for each scale for each group.

Completeness of arranging meetings and writing letters/memos, number of errors, and degree of awareness of general problems were measured on ordinal scales. Degree of delegation was measured by counting instances where the subjects (a) instructed subordinates to seek further information, (b) gave subordinates specific instructions to handle something, or (c) instructed subordinates to use their own judgment in handling something. We measured the degree to which the subjects' responses affected other people in the hypothetical company by counting instances of (a) seeking information from people other than subordinates, (b) arranging to meet with other people, or (c) instructing other people to meet among themselves.

In our calculations of interrater reliability, we treated these scales as nominal. Following the advice of Bullock and Tubbs (1987),² we computed and report both Cohen's κ (Cohen, 1960, 1968) and percentage agreement. Cohen's κ is the "proportion of agreement after agreement which can be attributed to chance has been removed" (Cohen, 1968, p. 214). Weighted κ is a way to give partial credit for judgments that are not exactly the same but which the researcher judges to be not complete disagreements (Cohen, 1968). We report weighted κ here.

However, κ may not be an appropriate reliability index when there is not enough variance in judgment or where the number of judgment categories are few. Because "there are no clear guidelines in the literature on what constitutes 'too little variance' or 'too few categories' for properly using kappa" (Bullock & Tubbs, 1987, p. 198), we report both weighted κ and percentage agreement. Table 1 presents these measures for each of our scales, along with the 95% confidence interval for each κ .

One of the authors, blind to the identity of the responses, resolved the differences in the initial coding between the two judges after discussion with them together. The majority of the discrepancies involved disagreement over whether the subjects had made a response for an item. Subjects' output included not only their responses to each in-basket item but also notes to themselves. One of the judges always discounted the subjects' notes to themselves, whereas the other judge always included the notes.

These discrepancies were resolved in favor of the latter strategy. Other discrepancies were due to inaccuracies such as overlooking spelling errors. These were resolved simply by double-checking the subjects' output and recording the correct value.

Unlike the project planning task, the in-basket scales do not clearly represent better or worse performance. In-basket simulation tasks are most commonly used as a managerial skills assessment tool (Brass & Oldham, 1976; Gill, 1979; Meyer, 1970). The scoring protocols are typically designed to reflect the specific skills that may be sought by a particular organization or for a particular position. A high score on "delegation," for example, might be desirable for some positions but not for others. Despite the fact that scores on the in-basket scales are not inherently good or bad, one could expect these measures to be affected by the process feedback. For example, if the dominance range in a group is reduced—thereby increasing the number of people providing input—one might expect more complete responses, fewer spelling errors, and more awareness of underlying problems.

Satisfaction Measures

Eight items, measured on 5-point Likert-type scales, assessed satisfaction during both task periods with the group's task effort and social relations. These measures were combined into one scale, and the reliability measured by Cronbach's alpha was .82 for the first task period and .88 for the second.

Experimental Setting and Equipment

The experimental sessions were held in a computer-supported conference room owned by Electronic Data Systems (Horton, Elwart-Keys, & Kass, 1989). The conference room was connected to an observation gallery by a one-way mirror and was equipped with hidden cameras and microphones. All the experimental sessions were videotaped with the consent and knowledge of the subjects. The observation room was equipped with Apple® Macintosh II® computers, used to record the behavioral observations.

Observation Methods

Three-person teams used SYMLOG to code the behaviors of each group member during the group meetings. For each behavior that observers coded, they were trained to ask three questions to decide the appropriate SYMLOG code: "Is it [the behavior] dominant, submissive or neither?"; "Is it group-oriented, individualistic, or neither?" and "Is it task-oriented, socioemotional, or neither?"³ The answers to these questions resulted in ratings of each coded behavior on each of the three SYMLOG dimensions. The codes for each group member were aggregated for the entire session, across the observers, using the methods described by Bales and Cohen (1979). The result was a score on each of the three dimensions for each group member.

In all, 11 people with backgrounds either in management, social science, or health science served as observers. One was familiar with SYMLOG prior to this study. All observers received 20 hours of training and practice in SYMLOG prior to the

experiment. Observers were assigned to three-person teams for each experimental session, and membership on these teams rotated. Due to scheduling logistics it was not possible to assign observers to teams or to experimental sessions randomly, but the final schedule did not result in any observers being assigned disproportionately to any experimental condition.

A computer interface that accepts the SYMLOG codes directly on-line was designed by staff members of Electronic Data Systems (Horton et al., 1989). Using a mouse, observers can point to the appropriate icons shown on a computer screen representing an actor, recipient(s) of the action, and the description of the behavior and then record the information in a disk file. The software automatically records the time of each observation. Observers can record as many as six or seven codes per minute using this software, as compared to three or four using paper and pencil. Data can be analyzed and fed back to group members within minutes. Recording speed was especially important for this study because the sooner the feedback follows the behavior, the more effective it will be (Ammons, 1956).

The standard method of SYMLOG act-by-act scoring does not require that judges rate every single behavior nor that they all rate exactly the same sample of behaviors. Thus the standard computations of interrater reliability are based on the summary of ratings that each rater gives to each meeting participant on each of the three dimensions. Bales and Cohen (1979) state, "We can consider a score to be quite reliable if all of the raters agree on the rank ordering of the numbers and also on the relative distance between the numbers" (p. 486).

Following Bales and Cohen, interrater reliability was determined separately for each of the three SYMLOG dimensions by the r intraclass from Observer \times Group Member ANOVAS. One ANOVA per task period and per dimension was computed—six ANOVAs in all—for each group. Average reliability across the groups was calculated for each dimension by converting each r intraclass to Fisher's z , computing the mean, then reconvertng to r . The Spearman-Brown formula was then applied to these means to obtain the effective reliability (R) of the coders' scores (Rosenthal & Rosnow, 1984). The effective reliability scores for each dimension were as follows: Dominance, $R = .79$; Friendliness, $R = .79$; and Expressiveness, $R = .87$. Bales and Cohen advise that the level of acceptable reliability be set at .80, and thus we judge our coders' data to be reliable. The appendix presents the individual r intraclass for all of the groups.

Feedback

The feedback was based on the three general norms of group process described in the introduction: Equality of participation, Group orientedness, and Task versus socio-emotional balance. We operationalized these three principles as the number of points between the scores of the most extreme group members on each dimension.

For example, in a 5-person group with members Pat, Ann, Joe, Tom, and Jay (all pseudonyms), their final scores on the dominant-submissive dimension, after aggregating across the entire meeting and the team of observers, might be 10, 7, -2, -1, and

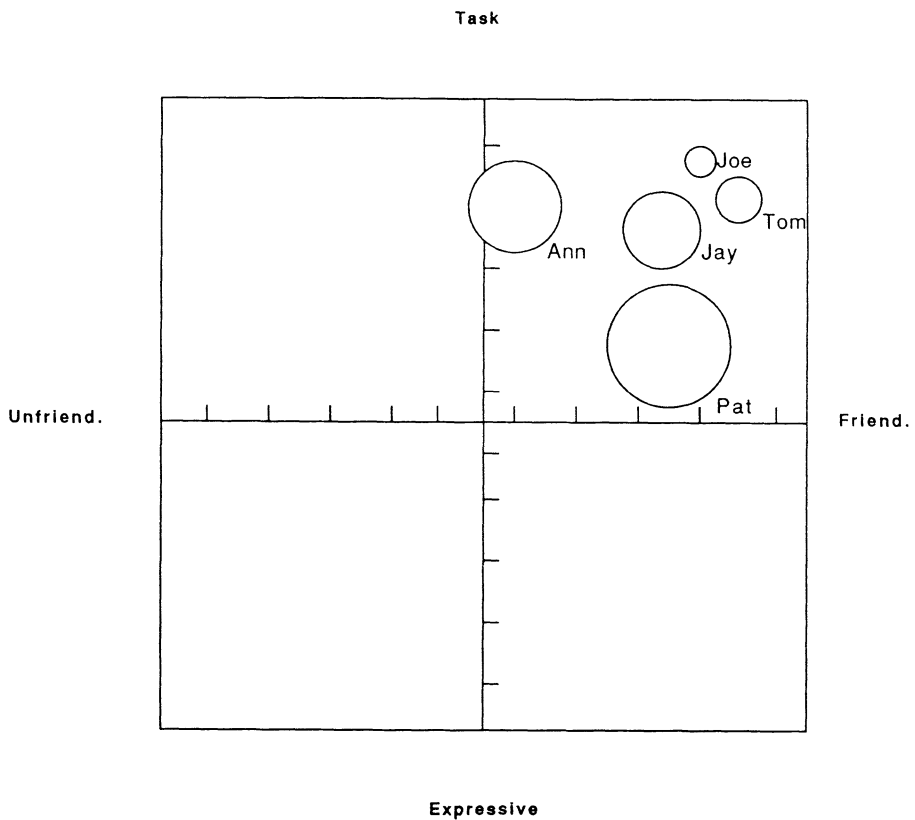


FIGURE 3: Sample SYMLOG Diagram

4, respectively (see Figure 3). (In SYMLOG convention, negative numbers denote behavior that is toward the submissive pole of this dimension.) The most extreme members in this group are Pat, who, with a score of 10, is the most dominant member, and Joe, who, with a score of -2 , is the most submissive member. The difference between their scores is 12 points. The same procedure applies to the other two dimensions.

Feedback Presentation

The aggregate scores of the observers were presented to the groups in the form of a diagram projected onto a large screen. Each group member's scores on the three dimensions were plotted onto the diagram, on which the horizontal axis represented the group-oriented dimension and the vertical axis represented the task-emotional dimension. Each group member's "point" was surrounded by a circle, the size of which corresponded to the dominance dimension. Figure 3 presents a sample diagram. In the group represented in the figure, Pat has a score of 10 on the Dominance dimension, 11 on the Friendliness dimension, and 4 on the Expressiveness dimension.

As the experimenter presented each feedback group its diagram, he or she explained the three dimensions of behavior and how to read the diagram. The explanations, read from a standard script,⁴ were very simple and included many examples illustrating the behaviors. The experimenter pointed out the locations of each member on the diagram and the ranges between the most extreme members on the dimensions. These ranges were then compared with the ideal ranges for each dimension. To enhance the credibility of the feedback, the experimenter explained that the SYMLOG technique was based on over 30 years of research. The subjects were able to understand the dimensions, the diagrams, and the ranges within a few minutes. After the feedback was presented, the experimenter asked the groups to discuss the feedback among themselves for 10 minutes. The groups in the no-feedback condition had an unstructured, unguided discussion during this period. The experimenter emphasized to each feedback group that if the group wanted to make changes in its process, it was the responsibility of the entire group, not just one or two members, to do so.

According to goal-setting theory, people are motivated by specific, attainable goals and timely feedback on their performance (Locke et al., 1968). Typical feedback sessions using SYMLOG prior to this study provided rather general discussions about the results. Typically, as well, there was a time lapse of several days between the time the observations were made and the feedback was provided—the time needed to enter all of the observational data and analyze the results. To enable the feedback to lead to *specific* goals, we provided the groups with “ideal ranges,” that is, standards for comparison. By showing students the gap between their group’s behavior and “ideal” group profiles we were suggesting rather specific goals for behavior change. The feedback also showed whose behavior needed to change the most—for example, who the most and least dominant members were. To help make the goals *attainable*, we described the dimensions—and thus desired behaviors—in concrete terms. Nonetheless, as we will see, the prescriptions for one of the dimensions, task-emotional balance, were seen as unattainable by many of the groups and were therefore rejected. Finally, we were able to make the feedback *timely* because of the computerized observation technology that produced measures and diagrams within minutes of the completion of the ranking task.

Development of the Process Standards

The ideals derived from the principles presented in the introduction were operationalized with specific numbers. These numbers came from general guidelines in SYMLOG about distances between group members on the diagrams and from the authors’ experience with analyzing many groups with SYMLOG (see Polley, Hare, & Stone, 1988).

SYMLOG theory suggests that, generally speaking, ideal distances between group members should be equivalent to one quadrant, or less, of a SYMLOG diagram. “The idea is that, from the point of view of the perceiving and evaluating rater, two images . . . located within the same quadrant . . . will be at the same end of each of the two dimensions” (Bales & Cohen, 1979, p. 43). Thus we based the ideals on the SYMLOG quadrant size, which uses 18-point scales. We established the following ideal ranges for the three dimensions:

TABLE 2
Number of Groups Showing Behaviors Ranges Within the Standards^a

	<i>Feedback</i> (n = 16)	<i>No-Feedback</i> (n = 18)
Dominance	2	2
Friendliness	13	10
Expressiveness	2	3

a. Based on behavior before the feedback period.

Dominance/Level of Participation: Group discussions should not be dominated by one or two people. There should not be more than an 8-point difference between the most dominant and the most submissive group members.

We gave the subjects the following examples of this behavior, excerpted from the standard script: "Behaviors such as talking often, rapidly or loudly, taking initiative . . . actively showing support and encouragement . . . would be considered dominant. Sitting quietly, appearing withdrawn . . . are examples of nondominant behavior."

Group-oriented: Most behaviors should be group-oriented. There should not be more than a 9-point difference between the most group-oriented and the most individualistic members.

Descriptions of these behaviors, excerpted from the standard script, are as follows: "Behaving in a friendly way, making sure people are included and participating, are group-oriented behaviors. Interrupting people, disagreeing forcefully, acting resentful are examples of individualistic behaviors."

Task versus Socioemotional Balance: In task groups, most behaviors should be task-oriented, but there should be some socioemotional behaviors. There should be at least a 9-point difference and not more than an 18-point difference between the most task-oriented and the most emotionally expressive members.

Descriptions of these behaviors, excerpted from the standard script, are as follows: "Task behaviors are focused on getting the group's job done, such as giving suggestions, gathering or clarifying information. Socioemotional behaviors are . . . showing support . . . or celebrating group achievements."

RESULTS

Before examining the results pertaining to the study propositions, we checked for differences between groups based on educational level and subject area. First, all group types (i.e., engineering vs. business, graduate vs. undergraduate) were distributed equally in the two conditions. We conducted one-way ANOVAs to check for differ-

TABLE 3
Mean Change in Group Behavior Range,
by Feedback Condition and SYMLOG Dimension^a

	<i>Feedback</i> (n = 16)	<i>No-Feedback</i> (n = 18)	t
Dominance	-6.87 (8.33) ^b	-4.28 (8.61)	0.89
Friendliness	-0.69 (5.86)	0.72 (6.20)	0.68
Expressiveness	-0.19 (3.06)	0.29 (4.69)	0.34

a. Change was measured by subtracting the first task period range from the second task period range.

b. Standard deviations are in parentheses.

ences between the groups on the SYMLOG process variables, task performance, and satisfaction and found only one significant difference: Graduate business students decreased their friendliness range (Time 1-Time 2) significantly more than did the other types of groups. Because this difference was equivalent across conditions, it did not affect our comparisons of feedback to no-feedback groups.

Table 2 shows the number of groups in both feedback conditions whose behavior ranges at the end of the first task period were within the prescribed limits. Thus, of the 16 groups that would receive feedback, *only 2* showed Dominance ranges and Expressiveness ranges that were *within* the prescribed ranges. Although Expressiveness ranges could be outside the limits by being either too wide or too narrow, no groups in this sample showed ranges that were too wide, and the behaviors were clustered on the non-Expressiveness end of the dimension. For the Friendliness dimension, on the other hand, only 3 of the groups that would receive feedback showed behavior ranges that were *outside* the prescribed limits.

Based on Propositions 1 and 1a, we expected that, relative to the no-feedback groups, the feedback groups during the second task period would, on average, decrease their Dominance range, increase their Expressiveness range, and not change their Friendliness range.

Effects of Feedback on Group Process

Table 3 presents the mean change in group SYMLOG behavior range for each dimension by feedback condition. The change was computed by subtracting the behavior range during the first task period from the behavior range during the second task period. The difference between the feedback and no-feedback groups was tested by *t* tests.

The advantage of the measures of change is that they control for any average differences in the experimental and treatment groups prior to the process feedback. We should alert the reader that change scores are known to have higher error variances

than either of the components of the change score (Cronbach & Furby, 1970), which could be a problem, particularly with small sample sizes. Some methodologists have suggested using regression equations with the Time 2 measure as the dependent variable and the Time 1 measure as a control variable (Kessler & Greenberg, 1981). Liker et al. (1985) demonstrate that this only creates the illusion of resolving the measurement issue and, in fact, introduces bias into parameter estimates. Moreover, they demonstrate that simple comparisons of change scores provide consistent estimates of true change.

In any case, in our analysis we found that the results are the same whether we use change scores or simply compare Time 2 measures between the experimental and treatment groups for the Friendliness and Expressiveness dimensions. However, there was a difference in the Dominance dimension. The significance level of the difference in dominance across the experimental and treatment groups goes down when we use change scores because there were already differences in dominance ranges across groups prior to the process feedback.

The direction of the means for the Dominance dimension suggests that the feedback groups did decrease their range relative to the no-feedback groups during the second task period. This trend, however, failed to reach statistical significance. The difference between the two feedback conditions on the Friendliness dimension was small and nonsignificant, as expected. Contrary to expectations, the difference between the feedback conditions on the Expressiveness dimension was also small and nonsignificant.

Despite the failure to find significant differences between the feedback groups on the Dominance and Expressiveness dimensions, analysis of the subjects' discussions of their feedback suggested that they did in fact plan to change at least their Dominance range. The plans targeted the behavior of the most and least dominant group members, as illustrated by the following excerpts from some of the discussions:

Do you want to tone it down a little for the sake of what we're doing here? [Addressed to the most dominant group member]

Does that mean I should shut up? [Spoken by most dominant group member]

I'll just mellow out and you talk more. [Most dominant group member speaking to least dominant group member]

We thus decided to compare the behavior change of the most and least dominant individuals in the feedback groups to that of the most and least dominant individuals in the no-feedback groups. We computed the mean amount of change in dominance points (first task period subtracted from second task period) for the most and least dominant group members in both feedback conditions and analyzed the difference between the feedback conditions with *t* tests. Table 4 presents these means and the *t*-test results. As expected, the most dominant individuals in the feedback groups reduced their dominant behavior significantly more than did the most dominant individuals in the no-feedback groups, $t(30) = 1.75$, $p < .05$, $d = 0.64$, one-tailed. In the case of the least dominant individuals, the amount of behavior change was in the predicted direction but did not reach statistical significance.

TABLE 4
Mean Behavior Change for Most and
Least Dominant Individual Group Members^a

	<i>Feedback</i> (<i>n</i> = 16)	<i>No-Feedback</i> ^b (<i>n</i> = 18)	<i>t</i>	<i>d</i>
Most dominant individuals	-4.94 (5.04)	-2.06 (4.20)	-1.75*	0.64
Least dominant individuals	5.81 (4.81)	4.00 (4.59)	1.09	0.40

a. Change was measured by subtracting first task period score from second task period score.

b. Due to technical difficulties, the individual-level data for 2 groups in the no-feedback condition were lost.

* $p < .05$, one-tailed.

Regarding the Expressiveness dimension, the subjects did not plan to increase their range and, in fact, explicitly rejected the feedback. As illustrated by the following comments, they felt that the nature of the task and the experimental environment made it impossible for them to behave more expressively:

It's . . . because we're here. . . . This is a task-oriented atmosphere.

We would have been spread more . . . if there had been more time.

Do we want to actually keep this in mind during the next task? [Response:] That would be hard.

Some attributed the difficulty to personal characteristics:

We're engineers. We're not supposed to be emotional.

Being task-oriented is characteristic of MBAs.

Effects of Feedback on Outcomes

The effect of feedback and the behavior range ideals on task performance and member satisfaction was also examined. The means of the in-basket and satisfaction scales appear in Table 5. The t tests revealed no significant differences between feedback and no-feedback groups on any of the in-basket scale scores or satisfaction measures. We computed correlations between SYMLOG group behavior ranges and the in-basket and satisfaction scores to see if any relationship existed between ideal behavior ranges and these outcome measures. None of the correlations was significant.

DISCUSSION

These results lend only partial support to Propositions 1 and 1a and none for Propositions 2 through 4. With respect to dominance behavior, before the feedback

TABLE 5
Mean In-Basket and Satisfaction Scale Scores^a

	<i>Feedback</i> (n = 16)	<i>No-Feedback</i> (n = 18)
In-Basket Scale		
Arrange Meetings ^b	16.06 (3.06) ^c	16.75 (3.63)
Writing Letters ^b	35.94 (12.07)	36.87 (9.01)
Delegation ^b	6.31 (2.91)	6.56 (2.53)
Communication ^d	5.00 (1.59)	4.19 (1.22)
Lack of Errors ^b	28.31 (6.42)	29.19 (7.13)
Satisfaction ^e	29.07 (4.12)	30.69 (4.40)

a. Satisfaction scale scores are within-group aggregates.

b. Scores range from 4 to 36.

c. Standard deviations are in parentheses.

d. Represents number of people addressed in correspondence.

e. Scores range from 8 to 40.

period most groups showed ranges between the most and least dominant members that were too wide according to the standards set for this study. The change in group dominance range following feedback did not statistically differ between the feedback and no-feedback groups, although the most dominant individual members in feedback groups did decrease their dominance significantly more than did the most dominant individual members in the no-feedback groups. As Kaplan (1979b) suggested, the groups in this study did not have many process problems that could be addressed by our intervention. Because only a few groups showed Friendliness ranges outside the prescribed limits before the feedback period, for example, there was no reason to expect significant changes following the feedback, and no differences were found. Contrary to the study hypothesis, there were no changes in Expressiveness behavior following feedback, even though before feedback most groups showed behavior ranges on this dimension that were outside the prescribed limits. Similar to previous research, the present study found no relationship between the process feedback and subsequent task performance, and contrary to previous research, it failed to find an effect of feedback on group member satisfaction.

The difference between the findings for the Dominance and Expressiveness dimensions raises important questions for future research. The small but measurable changes in dominant behavior point to the potential usefulness of the goal-setting approach to process feedback. People were able to set goals and to modify behavior accordingly. Even the null findings on the Expressiveness dimension are quite consistent with goal-setting and expectancy theory predictions. If goals are perceived as unrealistic,

they will have a demotivating effect. That is precisely what happened in this study. Under the task constraints presented, the subjects did not see how it would be possible to exhibit less task-oriented behavior, and they did not try to.

Although one could argue that a 10-minute discussion period was insufficient time to plan changes in behavior, the subjects in this study did not appear constrained by this limit. In the discussions of the feedback, many groups took only a few minutes to decide their "strategy" for change. In most cases, they quickly saw that they were "OK" in the Friendliness range, that they could do nothing about the Expressiveness range in this situation, and that certain people should alter their rates of participation. They then spent the rest of the time discussing unrelated topics.

In developing the behavior range norms for the Expressiveness dimension, we used as the model the authors' past experience with SYMLOG in self-analytic groups, where a wide range of emotional expression is the norm. Although we did make adjustments for the task-oriented nature of the study, we suspect we missed the mark in setting this norm. An obvious question, then, is, what is the appropriate balance of task versus socioemotional behavior in task-oriented groups during the execution of a task under time pressure? A broader and more interesting question is, what are the implications of our findings for the general meaning of task versus socioemotional balance in task groups?

Perhaps striving for a balance is inappropriate or even detrimental for short-lived groups or for single sessions, or perhaps the appropriate range is indeed very narrow and movement between the two poles of the dimension is quick. It could also be that the appropriate balance can only be struck over the long term. In fact, a number of the groups treated the feedback on this dimension as something important for them to consider for the future of their group but not something they could address during the experiment. Still another possibility is that the task versus socioemotional dimension is really not a single dimension at all but, rather, two nonindependent dimensions (Polley, 1986).

Another reason for the difference in findings between the Dominance and Expressiveness dimensions could be that the subjects found dominant behaviors an easier target than expressive behaviors. Intuitively, it appears easier to decide that Pat should talk more and Chris should talk less than to decide what someone would have to do to behave more expressively. The study does not have any direct evidence of this, however. For example, no subjects stated specifically that they did not know what to do to change their group Expressiveness range. In designing future research or intervention based on a goal-setting approach, the specificity of target behaviors should nevertheless be considered.

Another intriguing finding was the difference in impact of feedback on the most dominant and least dominant group members. It appears that the feedback "worked" on dominant people and not on the nondominant ones. Least dominant members in groups that received feedback did not increase their dominant behavior significantly more than did the least dominant members in groups that did not receive feedback. Perhaps the most dominant members were also more invested in the task than were the least dominant members and therefore were more motivated to change their behavior in accord with the process feedback.

Two forces appear to be operating in this finding. First is a regression toward the mean phenomenon. In the case of both the most dominant and the least dominant group members, the direction of movement was toward the middle of the dominance scale. For most dominant members, however, feedback had an effect above this general trend, whereas for the least dominant members it did not. The second force, therefore, appears to be a constraint on the degree of behavior change that nondominant people can make compared to dominant people, at least within the kind of time frames used in this study. It appears to be easier for dominant individuals to decrease their dominance than it is for nondominant individuals to increase it. In fact, in the current study, only 38% ($n = 6$) of individuals in feedback groups who were the most dominant members before receiving feedback remained the most dominant after the feedback, whereas 63% ($n = 10$) of individuals who were the least dominant members before feedback remained the least dominant after the feedback.

An implication of this finding for using a goal-setting approach to group process interventions is that goals must be set to take into account constraints of personality or social norms. Some individuals may simply not be very dominant or may work under norms of low participation. If achievable standards for participation are to be set, they need to take into account the needs of the group as well as the ability of the group to meet them.

This study was consistent with past research in that it failed to find a relationship between process feedback and performance. Although the behavior changes seen were small and the process standards were exploratory, the strength and potential contribution of this study lie in its demonstration that specific interpersonal behaviors can be manipulated using goal-setting techniques. The size of the changes are most likely associated with specific experimental characteristics. By targeting and manipulating specific group process variables, as was done here, the relationships between process and performance can be studied in a more systematic way than has been done in previous research.

We do not rule out the possibility that process interventions in fact do not affect task performance. However, the bulk of the evidence of past research suggests that interventions do affect satisfaction and cohesion. Hackman (1987) has argued that the extent to which group membership contributes to individual members' growth and well-being is one criterion of effectiveness. Quality of task performance is another, independent, criterion. Thus even if the real state of the world is no relationship between process interventions and task performance, there is evidence that interventions have a positive impact on other outcomes.

We would expect the effectiveness of goal setting on interpersonal behaviors in groups to be greater, given more experienced groups. Small doses of immediate process feedback affected behavior of the most dominant individuals in the groups for up to 1 hour after the feedback. Because these, albeit small, effects were demonstrated in leaderless groups of students with little or no training in group facilitation, it could be predicted that interpersonal behavior goal setting might be of great use in groups with well-trained members and facilitators.

Furthermore, future research should examine the effects of goal-setting process interventions using tasks with real-world consequences for performance. Although our groups were involved in graded group projects outside the experimental situation, and although participants were paid, the experimental tasks were simulations with no lasting consequences for the group. The tasks, therefore, may have been more or less motivating for different participants and groups. We would expect that groups that are motivated to improve their performance because of meaningful consequences would be especially receptive to process intervention.

The other side of the story of behavior change witnessed in this study is the stability of the interpersonal behaviors examined. Despite the fact that there was a major change in the task between the two periods, there was consistency of SYMLOG scores across sessions, especially for dominance. If we look at individual scores on the three SYMLOG dimensions across tasks, we find correlations of .71 ($p < .001$) for Dominance, .34 ($p < .01$) for Friendliness, and .41 ($p < .001$) for Expressiveness. It appears from this study that even when groups specifically target behaviors for change in the upcoming hour they have some difficulty changing their behavior. This was most evident among the least dominant members in the feedback groups who appeared unable to become more dominant.

The study of stability and change in personality has a long history in psychology (Costa & McCrae, 1980; Kenrick & Funder, 1988; Mischel, 1984). We know much less about the factors that influence persistence and change in interpersonal behavior patterns within task groups. What forms of feedback are most effective in fostering change? What is the appropriate timing and frequency of behavioral feedback for altering interpersonal behavior in task groups? What specific dimensions of group behavior are associated with specific group outcomes? What patterns of interpersonal behavior are most resistant to process interventions, and how does this relate to individual personality tendencies? Clearly, more research is needed to begin to unravel the mysteries of process feedback in task groups.

APPENDIX
SYMLOG Scale Reliability (r intraclass)

Group	Dominance		Friendliness		Expressiveness	
	Project Planning	In-Basket	Project Planning	In-Basket	Project Planning	In-Basket
1	.767	.325	-3.25	.225	.373	.669
2	.927	.842	-.200	.798	.956	.610
3	.806	.841	.698	.727	.611	.851
4	.761	.883	.629	.865	.170	-.285
5	.932	.879	-7.236	.901	.792	— ^a
6	.908	.949	.906	.208	.675	.555
7	.949	.836	.880	.718	.888	.581
8	.350	.877	-.004	.767	-4.654	.858
9	.918	.901	-1.347	-.473	.890	.803
10	—	—	—	—	—	—
11	-4.263	.547	-.945	-.566	-4.284	.775
12	.975	.968	.800	.811	-3.157	-5.96
13	.976	.868	-.286	.465	.903	.547
14	-3.855	-.212	.507	-.607	.643	.521
15	.603	.902	-1.458	-3.49	.163	.905
16	.949	.944	-2.58	.821	.661	.713
17	.888	.704	.841	.137	.633	.241
18	.777	.573	.111	.890	-7.864	.075
19	.964	.874	.166	.433	.819	.729
20	.922	.911	.648	.658	.895	.927
21	.632	.872	.801	.579	.768	.706
22	.886	.947	.734	.728	.350	.875
23	.852	.854	.576	.574	.679	.677
24	.854	.845	.567	.569	.669	.664
25	.827	.778	.256	.443	.900	.619
26	.755	—	.663	—	.776	—
27	.891	.915	-.036	-.194	.672	.927
28	.858	.877	.606	.619	.396	.789
29	.809	.943	.618	-.990	.942	.689
30	.513	.897	.296	.752	.808	.878
31	.879	.884	-.773	.615	.797	.848
32	.888	.849	.623	-.538	.543	.766
33	.842	.783	.686	.754	.462	.918
34	.527	.907	.539	.133	.577	.813

a. Data missing due to technical problems.

NOTES

1. Due to technical problems, the in-basket responses for 2 groups in the no-feedback condition were lost.
2. We are grateful to an anonymous reviewer for bringing this work to our attention.
3. The task versus socioemotional dimension is not as clear-cut as the other two, as emotional behaviors are sometimes in service of the task—for example, someone who enthusiastically encourages the group to stick to the schedule. In this study, we used the convention that emotional behaviors, directly related to working on the task, would be coded as task-oriented.
4. The scripts are available from the first author.

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