Teams and Tasks: A Temporal Framework for the Effects of Interpersonal Interventions on Team Performance

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Abstract
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Keywords
group dynamics, team performance, work groups, organizational behavior

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Teams and Tasks: A Temporal Framework
For The Effects of Interpersonal Interventions on Team Performance

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February 7, 2002

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Teams and Tasks: A Temporal Framework
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Abstract

Researchers have studied interpersonal interventions as a means of increasing the performance of work teams. However, for short-term teams working on contrived tasks of short duration - a combination common in research studies - interpersonal interventions do not seem to affect team performance as much as task interventions. Yet, for short-term teams working on real tasks of longer duration and for ongoing teams, the effects of interpersonal interventions on team performance are more positive. This paper presents a temporal framework of teams and tasks that predicts the expectation of benefit which in turn mediates the effectiveness of interpersonal interventions on team performance.

Brian, BJ

“From the 20 people interviewed seven were finally selected to work with the team. Interestingly 70 percent of the people interviewed had the right technical skills, but over half failed on the soft interpersonal skill set.”

(Girling and McManus, 1998. p. 16)

The team in this case was a rapid application development (RAD) software design team. The skills that potential team members needed included task skills such as previous use of software development tools, and interpersonal skills such as the ability to lead application development sessions and cooperate with other developers in an intensive team environment. Software development teams demonstrate many of the characteristics found across the spectrum of business teams. These teams are often autonomous, self-directed work teams whose members determine work schedules and work methods for their assigned tasks. These tasks usually require interdependent work, are meaningful, and are whole - having a definitive beginning and end. Self-directed work team members are usually evaluated, at least in part, based on the performance of the team as a whole (Janz, et al., 1997).
Self-directed work teams are increasingly being used as the fundamental organizational unit for managing a variety of business projects (Busch, et al., 1991). Teams are often more effective because they bring members together that possess a variety of skills appropriate for the task (Mennecke & Bradley, 1998; Kernaghan & Cooke, 1990).

Working in teams, however, is usually more difficult than working alone where the primary consideration is the technical expertise of the individual (Yamane, 1996; Sadler, 1994; McKinney & Graham-Buxton, 1993; Larson, 1989; Steiner, 1972). In a team environment, overcoming the added complexity that comes from integrating multiple personalities and abilities into a cohesive working unit requires the addition of interpersonal skills (Yamane, 1996). Interpersonal skills are needed for inter-team communication and coordination such as scheduling meetings, clarifying roles, resolving conflict, and many similar functions. Ideally, increased group performance will offset the losses that result from these interpersonal activities (Sawyer & Guinan, 1998). Research comparing team and individual task performance indicates that teams outperform the average group member and frequently outperform the best group member (Ganster, et al., 1991; Kernaghan & Cooke, 1990; Bottger & Yetton, 1987). However, in spite of the importance of teams to organizations, team performance does not always meet expectations (Devine, 1999; Mennecke & Valacich, 1998; Tudor, et al., 1996). Although team-based organizational structures may improve group processes (Janz, et al., 1997), many other team development efforts fall short of expectations. In fact, perhaps as many as one third of all transitions to teams in software development organizations fail (Zawacki, 1994).

Many organizations have turned to team-building interventions as a way to improve team performance, but do these interpersonal interventions increase team performance and if so, to
what degree? A recent meta-analysis involving eleven studies of ongoing teams (Salas, et al., 1999) showed mixed results. This study defined interpersonal skills as consisting of one or more of the following four components: goal setting, interpersonal relations, role clarification, and problem solving - which refers to meta problem-solving or solving problems in group processes. Over all, interpersonal skills interventions did not significantly affect team performance. However, these effects varied among the individual studies based on the way performance was measured, the characteristics of the teams, and the team-building component involved in the intervention. This meta-analysis found that only role clarification significantly predicted performance and suggested that task characteristics might be a moderating factor between the other interpersonal interventions and performance. After an extensive search of the literature involving interpersonal skills, we selected a representative sample of seventeen studies that report enough detail for a useful analysis. We found a pervasive lack of consistency in the reported results.

The primary goal of this paper is to organize reported results concerning the effects of interpersonal interventions on the performance of work teams in a manner that brings consistency to these results, thus revealing an underlying construct that should be considered in all research concerning interpersonal interventions in team performance. This paper introduces a variation of the team/task interaction that specifically includes the temporal characteristics of both teams and tasks. To demonstrate its usefulness in clarifying the findings concerning interpersonal skills, we place the results of a representative sample of published research in each quadrant and analyze the findings within each quadrant for consistency. We then posit that the framework is valuable because it predicts the team members’ expectation of future benefit from
the implementation of the intervention. This leads to a list of propositions derived from the framework that could be used to stimulate future research.

**Task vs. Interpersonal Skills in Teams**

Although many studies also suggest that successful teams require both interpersonal and task skills to attain acceptable performance, several studies have reported that task skills interventions are more effective than interventions that manipulate interpersonal skills. Task skills are referred to in the literature by terms such as: task knowledge, task-strategies or strategic skills (Devine, 1999; Woolley, 1998). Interpersonal skills are not task-specific but refer to the skills required for team members to work effectively together. These skills are used in activities such as decision-making, conflict management, leadership development, role clarification, interpersonal relations, solving problems in team dynamics, and goal-setting (Salas, et al., 1999). Interpersonal skills are referred to in the literature by terms such as: social process skills (Sawyer & Guinan, 1998), teamwork (Woolley, 1998), roles (Mennecke & Bradley, 1998), and soft interpersonal skills (McManus & Girling, 1998).

Even though interpersonal skills and team development show positive correlations with equipment maintenance team performance (Hyatt and Ruddy, 1997), business case analysis team performance (Porter and Lilly, 1996), software development team performance (Sawyer and Guinan, 1998; Janz et al., 1997), the results of several studies aimed at improving team performance through interpersonal interventions have produced conflicting results. Some studies show positive results (Druskat, 2000; Mennecke, Bradley and McLeod, 1999; Mennecke and Bradley, 1998; etc) whereas other studies show task interventions to be more effective than interpersonal interventions (Devine, 1999; Woolley, 1998; Ganster et al, 1991; Kernaghan and
The effects of interventions on team performance occur within a context that includes team and task characteristics. There have been several attempts to use these characteristics to develop a framework that could be helpful in explaining the conflicts in reported results. For example, McGrath (1984) in his conceptual framework for the study of groups began the development of his typology of groups with the two basic dimensions of team duration and task scope. Devine et al. (1999) also used the temporal dimension for teams, but categorized tasks into either project or production type. Neither of these frameworks explicitly included the temporal dimension of the task. McGrath and Arrow (1993) recognized the importance of the temporal dimension of the task, noting the lack of reported information concerning the persistence of the effects over time. Arrow & McGrath (1993) recognized the importance of the temporal dimension of the team, including a proposition concerning the timing of the change in relation to group development and expected future. We will attempt to apply these temporal factors to a representative body of reported research.

**The Team/Task Duration Framework**

This section presents the development of a framework that can be used to categorize team research in terms of the temporal nature of the team and the task. The studies discussed in this paper used a mix of task scopes and types. We found that, when evaluating the effect of interpersonal interventions on team performance, the scope of the task was valuable only as it correlated with duration – tasks with broad scope usually take longer than tasks with limited scope. The type of the task was not as influential a factor as the duration of the task. Wheelan & Kaeser (1997) noted that few published studies differentiate task type and do not report the
differences in interaction during the phases of the task. This observation certainly includes studies that investigate the effects of interpersonal interventions.

In our search for representative studies, we included published studies that investigated the effect of interpersonal skills on team performance. Dissertations and case studies were not included. On-line computer searches used term like team, group, intervention, software development, performance, social skills, and others. We rejected those studies where the details of the task and/or team duration were not reported or where the performance of the team was not clearly effected. We only accepted studies that reported enough detail to allow classification into either ongoing or short-term teams and either long or short duration tasks so we could demonstrate the within-quadrant consistency of effects on performance. One example of a study we did not include was a study involving silver miners (Buller and Bell, 1986). The results were inconclusive, so this study would not contribute to a discussion of the usefulness of the framework.

Team duration is construct critical to team performance. In this paper, teams are considered short-term if they both worked interdependently on a particular task and had the expectation of disbanding once the task is complete. Teams are considered ongoing if they both work together for an extended period of time (Devine et al, 1999) and have the expectation of working together on future tasks (McGrath, 1984).

The research in group development has been prolific. While researchers may not agree on the specific stages of development, the general consensus is that groups do move through stages of development. One example of these stages is reported by Wheelan and Kaeser (1997): (1) dependency and inclusion, (2) counterdependency and fight, (3) trust and structure, (4) work,
and (5) termination. Their discussion is based on the communication patterns of groups.

Communication implies personal contact. The Team/Task Duration Framework is based on this key component. The effectiveness of interpersonal interventions is not as dependent on the duration of a team as it is dependent on the amount of time the team members spend together.

A team that meets together only periodically may exist as a team for years, but only accumulate a few hours of actual interaction. In this paper, teams are classified based on the intensity and duration of their personal interactions, not merely on the duration of the team’s existence.

Ongoing teams work together regularly for extended periods of time. Two concomitant elements of team interaction are the presence of established normative behavior at the inception of the task (implying a “history” of team interactions) and the expectation of ongoing task performance (implying a “future” of team interactions). At the inception of a task, a team with intact behavioral norms would be receptive to an interpersonal intervention that may refine those norms. This would occur even if the ongoing team were performing a short duration task. A newly formed team with no history, however, would be embroiled in the task of integrating conflicting behaviors that each member has imported into the group into a single set of norms acceptable to all members. New team members would not be as receptive to an external interpersonal intervention. An ongoing team that expects to work together in the future recognizes the value (reward) of improved norms and is motivated to quickly implement a positive intervention. Normally, a short-term team that expects to disband following the task would not receive a long-term benefit from the implementation of an interpersonal intervention and thus would not be motivated to receive the intervention. Therefore, a team could work together for several months and still be considered a short-term team because of their lack of
expectation of future interaction. As discussed later, when these teams are working on a long
task, they can develop some of the characteristics of an ongoing team. These two types of teams
correspond loosely with McGrath’s (1984) Standing Crews and Task Force teams. Ignoring
team duration can lead to conflicting results (Wheelan & Kaeser, 1997).

Short-term teams, which have never worked together previously and expect to be disbanded at
the completion of the experimental task, operate differently from ongoing teams. Mennecke and
Valacich (1998) compared ongoing and short-term teams that completed a short decision-making
task. On an interdependent hour-long hidden-profile task, Mennecke and Valacich found that
ongoing teams discussed less unique information and spent less time on the task, perhaps
because the task was routine, familiar or contrived (Carley, 1986). However, ongoing teams
were more satisfied with the group process and group cohesion was significantly related to group
satisfaction and group decision performance. Conflict handling techniques also differ between
ongoing teams and short-term teams performing short tasks. Hall and Williams (1966) found
that short-term teams preferred compromise whereas ongoing teams preferred more creative
conflict-handling techniques.

Task duration is another construct critical to team performance. Tasks can be classified as either
short duration (usually measured in minutes or hours of interaction) or long duration (usually
measured in months or years of interaction). Again, this dimension is an indication of the
amount of time the team spends together on the task, not the total time required to accomplish
the task. The duration of the task is a measure of the period of time during which interactive
work is being accomplished by the team. A task that is accomplished primarily by independent
effort falls outside the scope of small group research. Experimental studies using short tasks are
common in the literature. These short tasks include Lost at Sea, Lost on the Moon, decision-making tasks, etc. Longer tasks are found less frequently in experimental studies probably because of the difficulty in finding subjects who are willing to submit to scrutiny over several months.

Several studies used software development projects which provide useful examples of a real, as opposed to contrived, tasks of longer duration (Janz, et al., 1997; Sawyer & Guinan, 1988; Mennecke & Bradley, 1998). Unlike short tasks, software development is often a task of meaningful duration that cannot be completed in one or two hours in a laboratory setting. Software development is a good example of a task that is comprised of many subtasks (Steiner, 1972). Some of the subtasks are completed independently while others are completed in a group setting. Classification in this situation is determined by the interdependence of the subtasks. Even when a subtask is performed independently by one team member, it can still be considered as an interdependent task for two reasons. First, the performance of the subtask must be accomplished in the context of the composite task since the output of the subtask must integrate smoothly with the output of the other subtasks. For example, when developing a software program, the data input into the program is formatted and transmitted to the program from another program that may have been developed by another team member. Likewise, the output of this program will likely be transmitted to one or more other programs to serve as data input into those programs. In software development, nothing can be accomplished in true isolation from the other project subtasks. Second, the team as a whole is held responsible for the performance of the project as a whole. One team member is not blamed independently for the failure of one part of the system, the team is held responsible since they should have caught the
error prior to the completion of the project. Because of the interdependence of the subtasks, team members perceive the composite project task as a single task which must be performed interdependently. Meaningful research using software development requires a project of sufficient duration to be classified as a Long Task. Classifying the team, however, is a little more difficult. These teams meet the qualification for working together for an extended period of time, but may differ on their expectation of future interaction. In a business environment, software development teams work together for many years, moving from one project to another as a team. In a contrived environment such as using students in a software development class at a university, the expectation of future interaction is weak at best.

The temporal dimensions of team and task are critical to impact of interpersonal interventions on team performance. These two characteristics can be used to develop a framework with temporal dimensions for the Team (Ongoing or Short-term) and the Task (Short or Long). (Figure 1)

<table>
<thead>
<tr>
<th>Team Duration</th>
<th>Task Duration</th>
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<tbody>
<tr>
<td>Ongoing Team</td>
<td>Short Task</td>
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<tr>
<td>Ongoing Team</td>
<td>Long Task</td>
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<tr>
<td>Short-term Team</td>
<td>Short Task</td>
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<tr>
<td>Short-term Team</td>
<td>Long Task</td>
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</table>

**Ongoing Team/Short Task:** In this quadrant, we expected that the abbreviated time frame imposed by the task would limit the magnitude of the effect on the experimental task. However, we also expected that the more mature relationships that existed in ongoing teams prior to the
task combined with their expectation of future interaction would prove to be fertile ground for
the positive impact of interpersonal interventions and overcome the negative impact of the short
time frame. Various field and lab studies have confirmed the positive relationship between
interpersonal interventions and team performance for ongoing groups working on short tasks.
Details of the following studies can be found in the Appendix.

Paul and Gross (1981) conducted a year-long field study involving equipment maintenance
teams, that perform short, cyclical tasks. They found that, for the communications and electrical
city workers, a three-day team-building intervention that focused on role clarification and group
problem-solving contributed to increased job satisfaction and production efficiency with no
decreases in customer satisfaction.

In another field study involving ongoing equipment maintenance teams, Hyatt and Ruddy (1997)
also found that interpersonal skills positively related to performance. Although teams operated
interdependently within given service areas, actual work on equipment was typically a short-term
task that was not interdependent. The factor of group support, which included team performance
rewards, information, and coaching offered by the organization, was most predictive of team
performance and customer satisfaction. Trust, the notion that team members were following
agreed upon procedures, was also significantly related to performance measures.

Kimberly and Neilsen (1975) also found training critical to performance. Specifically, team
building and problem-solving training for automotive plant workers over a period of eighteen
months were linked to positive changes in team attitudes and perceptions as well as quality of
output and company profits.
As expected for the Ongoing Team/Short Task quadrant, the more mature relationships in the ongoing teams resulted in the positive impact of interpersonal interventions, overcoming the negative impact of the short time frame. In ongoing teams, members have agreed to adhere to a set of habitual routines that guide their behavior. Members recognize the positive benefits of these habitual routines (time saving, harmonious relationships, increased confidence in roles, etc.) and submit to them. For example, if a team member fails to follow the norm in scheduling a meeting, other team members will pressure the errant member to correct the behavior.

Interpersonal interventions in an ongoing team tend to refine the existing processes that have already been formed and tested and are currently producing cohesion in the team.

**Short-term Team/Short Task:** In this quadrant, we expected that the abbreviated time frame combined with their expectation of future separation would cause team members to focus on the completion of the task to the exclusion of efforts to form cohesive team norms that would only benefit the members if they were going to remain together for the performance of future tasks. Because of this task focus, we expected that task-specific interventions would have a greater effect on task performance than interpersonal skills interventions. Many researchers attest to the importance of knowledge about the task itself and assert that increasing task knowledge is more likely to positively affect performance than increasing interpersonal skills.

Kernaghan and Cooke (1990) utilized a midpoint intervention in their experiment where team ranking of project-planning steps was compared to expert rankings. At the midpoint of the short task, an observer offered feedback on either interpersonal or task processes. Kernaghan and Cooke found that in high ability groups, task process interventions had a greater effect on performance than interpersonal process interventions.
Ganster, et al. (1991) reported a study that involved individuals ranking equipment necessary for survival on the moon followed by a problem-solving intervention and the same short ranking exercise in a team setting. They found that teams that received interpersonal skill training performed no better or worse than untrained teams.

In Woolley’s study (1998), the task was to construct a Lego building in fifty minutes that maximized points scored given a complicated scoring system. The task was open-ended, with no correct answer, time-delimited, and complex. In an effort to improve performance, teams self-administered an intervention designed to either increase their strategic, task-focused skills, or their interpersonal skills. This study demonstrated that task-related strategy interventions administered at the midpoint of the task contributed more to team performance than those administered at the beginning of the task or interpersonal interventions at either time.

It is reasonable to expect that midpoint task interventions would be more effective than task interventions at the beginning of the task because the benefit of task interventions is stronger after the subjects have had time to understand the task and the technologies needed to perform the task (Gersick, 1989; Gersick, 1988). Interpersonal interventions on the other hand should be effective even when implemented at the beginning of the task. Most workers join the team with a basic understanding of the task of team interaction and are no more ready to accept the intervention the midpoint of the task than at beginning.

However, in the Woolley study, something occurred that might be of importance to the relationship between task and interpersonal skills. Although the teams that received the task intervention performed much better on average, two of these teams performed poorly. On examination, these two teams were unique in that they both clearly demonstrated interpersonal
problems that seemed to have negated the positive impact of the task intervention. Perhaps even on tasks of short duration, task training alone is not sufficient to increase team performance. In fact, this study seems to imply that while task skills are important to team performance, interpersonal skills are foundational. In other words, without some functional interpersonal processes, an increase in task skills may not increase team performance.

Devine (1999) studied the effects of interpersonal skills and task skills on the group performance of an approximately two-hour business plan development task and found task skills more predictive of group performance than interpersonal skills. Devine concluded that the interpersonal intervention in his study, attempting to induce conflict, was not able to affect group performance because during the short hour that the team worked together on the task, the intervention was unable to overcome social norms such as politeness toward strangers. Devine suggested that the task did not last long enough for the intervention to have an effect. If this is true, then studying the impact of interpersonal interventions on tasks of longer duration, or at least using ongoing teams, is essential to the search for interventions that result in an increase in overall team performance.

As expected for the Short-term/Short Task quadrant, the abbreviated time frame caused team members to focus on the completion of the task to the exclusion of efforts to form cohesive team norms. We were not surprised to find that task interventions had a greater effect on task performance than interpersonal skills. In addition, we found evidence that existing interpersonal skills need to be at least functional or the team may not be able to satisfactorily perform the task. The performance benefits of an increase in interpersonal skills take more than a few minutes to become evident. The team must not only have time to incorporate interpersonal
interventions into their behavior, they must also believe that the benefits of improved interpersonal skills are relevant and worthy of their time and effort. The duration of the tasks in all of these studies was approximately one hour with the interpersonal training session interjected at the midpoint, leaving only minutes for a team to modify their existing interpersonal relationships to such an extreme that team performance would be measurably improved. These teams also had no expectation of future task activity, so they were unwilling to respond to interpersonal interventions.

**Short-term Team/Long Task:** In this quadrant, we expected that the longer time frame demanded by the task would give the team both the time and the motivation to establish and refine behavioral norms. In other words, even without the expectation of future interaction, these teams expected the benefits of the intervention over the duration of the longer task to be worth the effort of its implementation. Teams are classified as short-term because they had no “history” or “future”, not because they were only working together for a short period of time. Tasks are classified as long because of the length of time it took for completion. This quadrant underscores the difference between the expectation of future interaction and the expectation of future benefit. In the Ongoing Team quadrants, the expectation of future interaction enforces the expectation of future benefit. In this quadrant, the expectation of future benefit is derived from the expectation of interacting as a team for extended amount of time. Therefore, we expected these teams to positively respond to interpersonal interventions. Many studies of short-term teams performing tasks of long duration attest to the importance of role clarification, interpersonal understanding and skills and their positive effects on performance.

Porter and Lilly (1996) recognized the positive effect of interpersonal skills in their study of
groups working intensively over a four-week period to complete an integrative business case. Specifically, they found that interpersonal skills, such as the ability to manage conflict, set goals, prioritize work, and reach consensus on an approach to the task, directly affected performance.

Mennecke and Bradley (1998) studied the effect of role assignment on the performance of teams working over a four-month period to build information systems. This study found that teams with assigned roles had higher cohesion scores and produced higher quality projects than did teams without assigned roles. Mennecke and Bradley manipulated the role clarification component, showing that role clarification produced a significant improvement in team performance for a real, longer-term task over the performance of teams that were not assigned roles.

A follow-up study by Mennecke, Bradley and McLeod (1999) replicated the earlier role clarification component and added training in additional team building topics. Over the first half of the four-month project, they presented one of the following training topics each week: Goals for the First Few Meetings, Stages of Group Development, Quality Leadership, Issues in Decision Making, Managing Conflict, and Quality Improvement. They found that interpersonal skill training in conjunction with role clarification contributed to greater increases in cohesion and performance than role clarification alone.

Stephens and Myers (2000) also extended the work of Mennecke and Bradley’s initial study by replicating the role assignment and adding a group meeting structure component. They found that a combination of role assignment and group meeting training contributed to greater increases in cohesion, performance, and satisfaction than role assignment alone.
Druskat (2000) also found interpersonal skills critical to team performance. She studied the effect of team-building interventions on team learning and performance and found that interpersonal understanding was most predictive of team performance on a four-month-long team research project.

As expected for the Short-term/Long Task quadrant, improved interpersonal skills had a positive effect on team performance. The longer time frame allowed by the task gave the teams both the time and the motivation to establish and refine behavioral norms. The majority of these studies involved information system project teams working on software development over the course of a four-month semester. Even though the team had no expectation of future work together, they were together long enough to perceive the relevance of improved interpersonal skills making them receptive to interpersonal interventions. Team members can endure poor interpersonal relationships for an hour or even a few days, but when team members must work closely together for an extended period of time, cooperative relationships are essential for cohesive team performance. Habitual routines evolve over time as the members gain experience with the task (Gersick and Hackman, 1990). These short-term teams had the opportunity to examine routines and conflicting behaviors and modify them to manage the conflict. In other words, over time, short-term teams working on long tasks begin to develop some of the behaviors of ongoing teams.

**Ongoing Team/Long Task:** In this quadrant, we again expected that the longer time frame allowed by the task would give the team both the time and the motivation to positively respond to interpersonal interventions. Studies of ongoing teams performing tasks of long duration also show a positive relationship between interpersonal skills and performance.
Friedlander (1966) studied armed services research and development teams, and with measurements taken six months after training, found that group problem solving training accounted for increased team effectiveness as compared to measurements taken prior to the training.

Eden (1986) studied sixteen combat units in the Israeli defense force and found that interpersonal skill training that included role clarification for each unit’s command team resulted in increased teamwork, improved conflict handling and increased information about plans.

Sawyer and Guinan (1998) studied forty software development teams over time and found that production method skills with automated development tools and software methodologies (task skills) were less critical to project quality than social process (interpersonal) skills. While production methods provided no explanation for product quality and team performance, interpersonal processes accounted for over 25% of variation with poor interpersonal processes linked to poor project performance.

In another study also involving software development teams (Janz, et al., 1997) showed that the level of team development, as measured by mission clarity, team coordination and team unity, was predictive of improved work outcomes, increased job satisfaction, satisfaction with personal growth, and worker motivation.

As expected for the Ongoing Team/Long Task quadrant, improved interpersonal skills had a positive effect on team performance. The ongoing teams approached the task with intact norms and the expectation for future performance beyond this task. These preexisting norms made the team members receptive to interpersonal interventions while the expectation of future tasks
provided strong motivation to modify their behavior. An ongoing team has already endured the initial turmoil associated with the establishment of behavioral norms and is in the refinement mode. Team members would view an interpersonal intervention as an aid in this refinement and

<table>
<thead>
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<tr>
<td><strong>Ongoing Team/Short Task (Positive)</strong></td>
</tr>
<tr>
<td>Hall &amp; Williams (1966) – found that for groups of managers, ongoing groups performed better than short-term groups and preferred creative conflict-handling techniques</td>
</tr>
<tr>
<td>Hyatt &amp; Ruddy (1997) – found that trust and the factor of group support, which includes team performance rewards, information, and coaching offered by the organization, was predictive of team performance and customer satisfaction for equipment maintenance teams</td>
</tr>
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<td>Kimberly &amp; Nielson (1975) – found that for automotive plant workers, group problem-solving was linked to positive changes in team attitudes, perceptions, quality of output and company profits</td>
</tr>
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<td>Paul &amp; Gross (1981) – found that role clarification and group problem-solving contributed to increased job satisfaction and production efficiency for communications and electrical city workers with no decreases in customer satisfaction</td>
</tr>
<tr>
<td><strong>Short-term Team/Short Task (Negative)</strong></td>
</tr>
<tr>
<td>Hall &amp; Williams (1966) – found that for groups of managers, short-term groups performed worse than ongoing groups and preferred the conflict-handling technique of compromise</td>
</tr>
<tr>
<td>Kernaghan &amp; Cooke (1990) – found that in high ability groups, task process interventions had a greater effect on performance than interpersonal process interventions</td>
</tr>
<tr>
<td>Ganster et al. (1991) – found task skills were likely more important to team performance than increasing team member problem-solving skills prior to task commencement</td>
</tr>
<tr>
<td>Woolley (1998) – found that task skills contributed more to group performance compared to interpersonal skills</td>
</tr>
<tr>
<td>Devine et al. (1999) – found task skills more predictive of team performance than interpersonal skills</td>
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therefore be more receptive to it. Since they are anticipating a productive relationship beyond
the task, they are aware of the long-term benefits they would derive from improving
interpersonal skills.

The studies listed above report consistent results for each quadrant of the framework. Thus the
framework adds consistency to the results of studies in this body of research, especially in its
ability to explain the Short-term Team/Short Task quadrant where the studies are found that
report findings that conflict with the findings of the studies in the other three quadrants. It is our
position that the studies in this quadrant are different from the others in that these studies
provided neither the time nor the motivation required for the team members to implement and
benefit from interpersonal interventions.

Conclusions
The fundamental conclusion from the implementation of this framework is that studies in
interpersonal interventions must incorporate both the time and motivation for the intervention to
be properly implemented. This paper demonstrated that when the Team/Task Duration
framework is used to categorize team performance research, the findings of team performance
research are consistent within the quadrants. Research in all quadrants, other than the Short-term
Team/Short Task quadrant, support the positive effect of interpersonal skills on team
performance (see Table 3). This positive effect occurs even in the Ongoing Team/Short Task
quadrant. A shortcoming of our use of the framework is that in this quadrant, no published
research could be found that measured the effect of an interpersonal intervention on the
performance of an ongoing team performing a single, short duration task. Research in this
quadrant is composed of either observations of existing teams without interventions or the effect
of interpersonal interventions on the team as it performs a series of short tasks. For example, the job satisfaction of team members and the efficiency of teams of electrical workers, who performed many small tasks each day improved over time following an interpersonal intervention (Paul and Gross, 1981). Ongoing teams have had the time to develop foundational relationships and habitual routines (Gersick and Hackman, 1990). These interpersonal skills allow ongoing teams to outperform short-term teams (Hall & Williams, 1966; Mennecke and Valacich, 1998). To improve team performance, an intervention must bring about an improvement in these skills. Available research demonstrates that this improvement can happen over time, but the question remains as to the effectiveness of an interpersonal intervention on the performance of a single, short duration task by an ongoing team. In the application of these findings to existing teams, this may be a moot point. Even if the intervention is not effective for the single short or cyclical task but takes a few weeks or even months to result in improved performance, the intervention is still a valuable tool for team managers. Conversely, the impact of interpersonal interventions should not be expected in teams in which these foundational relationships do not exist as in the Short-term Team/Short Task quadrant.

Two reasons for this phenomenon come readily to mind. One reason is because teams can endure poor interpersonal relationships for an hour, or even a few days, but when team members must work closely together for an extended period of time (ongoing teams), cooperative relationships are essential for acceptable team performance. In other words, for the short-term team that has no expectation of working together following the completion of the current task, the “future” may be perceived as the latter portion of the long task. The anticipated benefit of integrating the interpersonal intervention into their interactions is seen as outweighing the costs of the
integration effort. A second reason is because interpersonal interventions are not like task training in that the effect of the interpersonal intervention is not immediately evident in the performance of the team. Although interpersonal techniques can be applied immediately, their effects require a sufficient amount of time to become integrated into the processes of the team and into the behavior of the team members.

The temporal components of both teams and tasks are the key to understanding the effect of interpersonal skills on team performance. In the Ongoing Team/Short Task quadrant, previously accomplished tasks have provided team members an opportunity to develop foundational relationships prior to the beginning of the new task. In the two Long Task quadrants, the required time span is embedded in the task duration. Even short-term teams, when performing tasks of long duration, develop many of the interpersonal skills and motivations usually found in ongoing teams and are thus able to benefit from interpersonal interventions. Only in the Short-term/Short Task quadrant is this time component missing which makes the observation of a positive effect of interpersonal interventions in this quadrant unlikely. As expected, the research listed in this quadrant does not support the effectiveness of interpersonal interventions as a means of improving team performance.

**Future Research**

The Team/Task Duration framework suggests several possibilities for future research. Although the importance of interpersonal skills to team performance is clear, more empirical research is needed in each of the four quadrants. This paper lists only a representative sample of published research to illustrate the framework. New studies need to be designed to be replicable in the four quadrants. This is not a trivial challenge as the tasks and teams involved must be shown to be
equivalent in every aspect except duration. Several research questions need to be answered, among them are questions concerning the boundaries of the quadrants. Both the team and task duration dimensions are continuous. Therefore, at what time does a short task become a long task? What other factors are involved in locating a team or a task on the continuum? How are these factors measured?

Additional questions exist in the Ongoing Team/Short Task quadrant. Can an interpersonal intervention have a positive effect on the performance of an ongoing team performing a single, short duration task? If so, under what circumstances does this occur? If not, how does the effect of the intervention manifest itself over a series of short tasks? Furthermore, how do different team habits or routines influence the effects of interventions on performance?

Research in the area of team performance is dependent on accurate measurements. The importance of an expected future for a team is derived from the implication that the benefits of an interpersonal intervention will take time to develop. The team members must anticipate sufficient future interactions to allow this development to occur. The foremost need is a measurement of the level of expectation of benefit from an interpersonal intervention. Also critical is the measurement of performance. Cohesion is a frequently used measure that has exhibited demonstrable consistency. In general, the results of the studies included in this paper that used cohesion as a performance measure are consistent, reporting a positive correlation between cohesion and performance. Is there a causal relationship? Mullen and Copper (1994) suggest that the cohesion performance effect is strongest in real groups, compared to short-term experimental groups, and that the most direct effect may occur from performance to cohesion instead of from cohesion to performance. However, the precise relationship between these
variables is still not clear. How do task skills interact with cohesion? What is the impact of even one technically incompetent team member on existing team cohesion? How is cohesion affected when there is a change in the makeup of the team?

The Team/Task Duration Framework suggests several relationships that are dependent on the level of expectation of benefit that should be tested.

**Proposition 1:** The level of expectation of benefit from an interpersonal skill intervention will be higher in ongoing teams than in short-term teams performing short tasks.

Even without interventions, ongoing teams perform differently from short-term teams on short tasks. On short decision-making tasks, Mennecke and Valacich (1998) found that ongoing teams discussed less unique information, spent less time on the task, but were more satisfied with the group process and made better decisions than short-term teams. Hall and Williams (1966) showed that ongoing teams reacted creatively to conflict and performed better than short-term teams that preferred compromise to conflict. The more mature relationships in the ongoing teams result in the positive impact of interpersonal interventions, overcoming the negative impact of the short time frame. In ongoing teams, members have agreed to adhere to a set of habitual routines that guide their behavior. Members recognize the positive benefit of these habitual routines (time saving, harmonious relationships, increased confidence in roles, etc.) and submit to them. For example, if a team member fails to follow the norm in scheduling a meeting, other team members will pressure the errant member to correct the behavior.

Interpersonal interventions in an ongoing team, however, tend to refine the existing processes that have already been formed and tested and are currently producing cohesion in the team. In the beginning of the life of a team, however, these processes are in turmoil (Forming,
Storming, Norming). If a team is in the midst of the intense performance of a time-constrained task, team members are unlikely to accept an attempt to modify their behavior (Gersick and Hackman, 1990). Also, if the team is not expected to remain as a team following the performance of the task, there is no reward or motivation for developing or revising behavioral norms. Their energy must be directed toward the accomplishment of the task and the attainment of the reward for completing the task.

**Proposition 2**: The level of expectation of benefit from an interpersonal skill intervention will be the same in ongoing teams whether they perform short tasks or long tasks.

Ongoing teams expect to work together in the future and recognize potential benefits from interpersonal interventions. Many of the routines employed by ongoing teams, however, have evolved over time and changing these routines is costly. Interpersonal interventions provide an impetus to change so that ongoing teams can reflect on and change those normative behaviors that are not productive for the team or task at hand. Frequently, teams need a natural pause or task endpoint in order to reflect on norms associated with how they are operating as a team (Gersick and Hackman, 1990). For ongoing teams performing short tasks, the frequent task endpoints provide such pauses and for teams performing long tasks, there are both task endpoints and natural mid-task pauses where teams can accept interpersonal interventions. These teams will show improvement in performance of the task at hand, if the task is of sufficient duration, or in future work together for ongoing teams working on short or cyclical tasks.

**Proposition 3**: The level of expectation of benefit from an interpersonal skill intervention will be higher in short-term teams performing long tasks than in short-term teams performing short tasks.
Short-term teams that expect no future work together only accept interpersonal interventions if
team members recognize there is enough time to benefit from the intervention and for the
intervention to positively affect performance. In a time-constrained short task typical of artificial
lab settings, the artificial teams are focused on the task to the exclusion of norms associated with
how they are performing as a team (Gersick and Hackman, 1990). However, short-term teams
performing long tasks have enough time to benefit from the interpersonal interventions and are
more likely to accept such an intervention.

**Proposition 4:** The level of expectation of benefit from an interpersonal skill intervention will be
the same in both short-term and ongoing teams performing long tasks.

Interpersonal interventions should be applied at the beginning of the task and reinforced
throughout. According to Tuckman’s (1965) forming, storming, norming, and performing model
of group development, the impact of interpersonal relationships would begin to be felt by the
team from the very beginning of the task as the team members identified individual strengths,
resolved roles, etc. in preparation for the actual performance of the task. Interpersonal
interventions modify these interpersonal relationships, so it is reasonable to expect the impact of
interpersonal interventions to take time to become evident (Buller & Bell, 1986), thus
meaningful studies of the impact of interpersonal interventions on team performance require that
the team work together over a period of months instead of minutes. Long tasks provide the time
necessary for the positive effects of the intervention to be felt, not only for short-terms teams, but
also for ongoing teams. The effects of interpersonal interventions on the performance of short-
term teams working on long tasks may be even clearer than for ongoing teams working on long
tasks. Short-term teams may have less tenacious routines established which interpersonal
interventions can more easily affect. The tenacity of routines is marked by the following characteristics: orientation, with socioemotional issues more difficult to change than task issues; depth, with more deeply embedded routines more resistant to change than surface routines; and centrality, with more central routines more difficult to change than more peripheral routines (Gersick and Hackman, 1990). The positive effects of interpersonal interventions on short-term teams that have less tenacious routines are quite clear whereas the results of studies of interpersonal interventions on the performance of ongoing teams, which have routines of varying tenacity, show more variability, though the results are also positive.

This paper demonstrated the value of using a framework to interpret and generalize research in team performance. Using the framework, we find that short-term teams (as defined by lack of “history” and expectation of a “future”) performing short tasks consistently fail to demonstrate performance benefits from interpersonal interventions. Because of this, we recommend that future research in the area of interpersonal skills and team performance should include specific references to team and task classifications. It appears that greater benefit would come from studies that avoided the use of short-term teams performing short tasks. Future research should be designed to test the Team/Task Duration propositions so this body of knowledge concerning the effect of interpersonal interventions on team performance can be easily understood and applied.

References


<table>
<thead>
<tr>
<th>Authors</th>
<th>Tasks</th>
<th>Teams</th>
<th>Interpersonal Skills Investigated</th>
<th>Performance Measure</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devine, 1999</td>
<td>Task: Simulated strategic decision-making task&lt;br&gt;Task duration: 115 minutes</td>
<td>Teams: 50&lt;br&gt;Team size: 4&lt;br&gt;Participants: 200 undergraduate students</td>
<td>Cognitive conflict and information sharing</td>
<td>Team profit and group decision effectiveness</td>
<td>Task-related knowledge and cognitive ability best predict team performance</td>
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<td>Druskat, 2000</td>
<td>Task: Research Project including topic selection, literature review, data analysis, written and oral reports&lt;br&gt;Task duration: 15 week semester.</td>
<td>Teams: 26&lt;br&gt;Team size: 5-8&lt;br&gt;Participants: 138 graduate MBA students</td>
<td>Team-building modules emphasizing importance of open communication and experiential activities</td>
<td>Project grades and self-report questionnaires collected at beginning, middle and end of 15 week project</td>
<td>Interpersonal understanding, confronting team norm-breakers (negative predictor), and proactive problem solving best predict team performance</td>
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<td>Eden, 1986</td>
<td>Task: Combat preparation&lt;br&gt;Task duration: Teams work together on a daily basis</td>
<td>Teams: 16 combat teams&lt;br&gt;Team size: 8-12 per combat team&lt;br&gt;Participants: intervention included combat teams; performance measured with 500 combat company soldiers</td>
<td>Team-building activities, revising roles, interpersonal contracts and implementation plans</td>
<td>Thirteen measures of organizational functioning</td>
<td>Team development improved team performance areas of teamwork, conflict handling, and information about plans</td>
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<tr>
<td>Friedlander, 1967</td>
<td>Task: Various tasks of problem discussion and resolution, information dissemination, decision-making, policy formation, future-planning</td>
<td>Teams: 12&lt;br&gt;Team size: 5-15 members&lt;br&gt;Participants: 91 armed services R&amp;D station employees</td>
<td>Meta-problem-solving issues</td>
<td>Self-report Group Behavior Inventory given at beginning and 6 months later</td>
<td>Intervention improved group effectiveness, mutual influence, and personal involvement</td>
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<td>Ganster, Williams and Poppler, 1991</td>
<td>Task: NASA Moon Survival Problem&lt;br&gt;Task duration: 60 minutes</td>
<td>Teams: 43&lt;br&gt;Team size: 4, 5, or 6 (mean = 4.7)&lt;br&gt;Participants: 203 Undergraduate students</td>
<td>Decision-making problems of hypervigilence, unconflicted adherence, unconflicted change, and defensive avoidance</td>
<td>Results compared to expert solution</td>
<td>Training intervention did not improve team performance; suggested that knowledge about task itself may better predict team performance</td>
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<tr>
<td>Study</td>
<td>Task</td>
<td>Teams</td>
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<td>Participants</td>
<td>Consensus, Conflict Resolution, Creativity</td>
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<td>Hall and Williams, 1966</td>
<td>12 Angry Men (consensus decision-making task concerning film’s 12 characters)</td>
<td>20 ongoing teams</td>
<td>(mean = 7.2)</td>
<td>144 managers</td>
<td>Consensus, conflict resolution, creativity</td>
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<td>Task duration: less than 60 minutes</td>
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<td>Team size: (mean = 7.1)</td>
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<td>141 managers</td>
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<td>Participants: 144 managers</td>
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<td>Teams: 20 short term teams</td>
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<td>Participants: 141 managers</td>
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<tr>
<td>Hyatt and Ruddy, 1997</td>
<td>Maintain electro-mechanical equipment such as personal computers, faxes, copiers and printers</td>
<td>100 ongoing teams</td>
<td>4-7</td>
<td>592 team members</td>
<td>Six factors: Process orientation, work group support, goal orientation, work group confidence, customer orientation and work group processes</td>
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<td>Task duration: short tasks</td>
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<td>Team size: 4-7</td>
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<td>592 team members</td>
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<td>Participants: 592 team members</td>
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<td>Participants: 592 team members</td>
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<tr>
<td>Janz et al., 1997</td>
<td>Software development</td>
<td>27 ongoing teams</td>
<td>(mean = 9.9)</td>
<td>231 information system professionals and 135 stakeholders</td>
<td>Team development, autonomy, cooperative learning, and organizational climate</td>
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<td>Task duration:</td>
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<td>Team size: (mean = 9.9)</td>
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<td>231 information system professionals and 135 stakeholders</td>
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<td>Participants: 231 information system professionals and 135 stakeholders</td>
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<td>Kernaghan and Cooke, 1990</td>
<td>Project Planning Simulation</td>
<td>114</td>
<td>approximately 5</td>
<td>547 executives in management development seminars, organizational members participating in development programs or graduate business students</td>
<td>Rational process, goal-setting and testing, team communication and support</td>
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<tr>
<td>Task duration: sequence 20 management activities in order leading to most successful project completion—less than 60 minutes</td>
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<td>Team size: approximately 5</td>
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<td>547 executives in management development seminars, organizational members participating in development programs or graduate business students</td>
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<td>Study</td>
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<td>Kimberly and Nielsen, 1975</td>
<td>Assembly-line tasks</td>
<td>Task duration: less than 60 minutes</td>
<td>12 teams</td>
<td>5-15 members</td>
<td>900 employees of automotive division of multiplant, multidivisional organization; 90 foremen also completed organizational and supervisory questionnaires</td>
</tr>
<tr>
<td>Mennecke and Bradley, 1998</td>
<td>Software development</td>
<td>Task duration: 15 week semester</td>
<td>approximately 25 teams</td>
<td>3-5 members</td>
<td>106 undergraduate MIS students</td>
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<tr>
<td>Mennecke, Bradley, and MacLeod, 1999</td>
<td>Software development</td>
<td>Task duration: 15 week semester</td>
<td>approximately 50 teams</td>
<td>3-5 members</td>
<td>approximately 200 undergraduate MIS students</td>
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<td>Paul and Gross, 1981</td>
<td>Maintenance of radio communications center, radio systems and communication equipment, traffic signals and outside lighting, and maintenance and collection of parking meters</td>
<td>Task duration: varied</td>
<td>? teams</td>
<td>? members</td>
<td>90 employees of a communications and electrical division of the city of San Diego</td>
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<td>Porter and Lilly, 1996</td>
<td>Integrative Business Case: New product introduction</td>
<td>Task duration: 4 weeks of full-time work</td>
<td>80 teams</td>
<td>5-6 members</td>
<td>464 undergraduate students</td>
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<table>
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<tr>
<th>Study</th>
<th>Task</th>
<th>Task duration</th>
<th>Teams</th>
<th>Team size</th>
<th>Participants</th>
<th>Roles</th>
<th>Cohesion</th>
<th>Social processes</th>
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<tbody>
<tr>
<td>Sawyer and Guinan, 1998</td>
<td>Software development (Each team responsible for software modules that are integrated)</td>
<td>?</td>
<td>40</td>
<td>4-14 (mean of 9.0)</td>
<td>138 information system professionals; other stakeholders</td>
<td>Informal communication and coordination, supportiveness, conflict management, and formal coordination</td>
<td>Software product quality measured by stakeholders, team performance measured by stakeholders and team members</td>
<td>Social processes can account for as much as 25% of variation in team performance; individual talent also accounts for variance</td>
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<td>Stephens and Myers, 1998</td>
<td>Software development</td>
<td>15 week semester</td>
<td>?</td>
<td>3</td>
<td>Two sections of Undergraduate MIS course students</td>
<td>Roles: team members played each of three roles (facilitator, scribe, scheduler); structured meetings with minutes, action list and agenda</td>
<td>Cohesion Role clarification and team organization improved team performance and cohesion</td>
<td>Role clarification and team organization improved team performance and cohesion</td>
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<tr>
<td>Woolley, 1998</td>
<td>Lego-building construction</td>
<td>Teams complete task: 50 minutes (excluding intervention); teams received either beginning or midpoint strategy (task) intervention or beginning or midpoint interpersonal (teamwork) intervention</td>
<td>29</td>
<td>3</td>
<td>87 Undergraduate students</td>
<td>Unspecified interpersonal skills</td>
<td>Buildings scored on size, sturdiness, and aesthetics</td>
<td>Interpersonal skills did not improve performance</td>
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</tbody>
</table>