Does Member Familiarity Help or Hinder Innovation? The Roles of Expertise and Dialogic Coordination

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Abstract. Organizations increasingly rely on flexible work arrangements such as innovation task forces and quickly assemble members with diverse expertise needed to create innovative solutions to problems. The literature has produced mixed findings on the relationship between member familiarity and innovation, which we suggest may be explained by two forms of coordination: expertise and dialogic. We hypothesize and find that dialogic coordination produces more innovative outcomes for unfamiliar task forces, while expertise coordination produces more innovative outcomes for familiar task forces. Further, dialogic coordination in unfamiliar task forces is associated with greater innovative outcomes than expertise coordination in familiar task forces. Our results also highlight the importance of temporal dynamics of dialogic coordination in task force work. Hypotheses were tested through a longitudinal analysis of survey data with external ratings of the innovation outcome from 179 individuals in 32 innovation task forces from 13 U.S.-based firms in the top 10% of the world's growth industries during a period of recession. The findings contribute to an understanding of coordination in contemporary turbulent work environments.

Keywords: Coordination; cross-functional teams; dynamic capabilities; familiarity; innovation task forces; interdisciplinary teams; multi-disciplinary teams

1 Introduction

To spontaneously react to unexpected circumstances and changing conditions, contemporary firms increasingly rely on flexible work arrangements as companies pull individuals with particular skill sets together into ad-hoc teams such as *innovation task forces* [1], [2]. Innovation task forces often consist of members selected based on their individual expertise from across firm units and functions with knowledge differences. Most often task forces involve multiple team membership [3], [4], as members work part-time on the project on top of their routine duties, which brings about greater communication and coordination challenges. The multiple membership of their members, as well as the brevity of the task force's lifespan, exerts pressure to minimize the time spent working on the task. The requirement to innovate within these task forces further increases this pressure. Task forces such as these are referred to as "organizations of the future" because they require fluid, fast-paced, and interdependent work, and create challenges for coordination and teamwork processes that remain understudied [5].

Ad hoc, temporary teams such as innovation task forces are often composed of members with varying degrees of familiarity [6–8]. Given that members are drawn from different parts of the same organization and are often recruited due to their particular knowledge, expertise, or the department they represent [9], [10], these task forces may bring together individuals with prior working relationships, but in many cases, members have not worked together before. Prior research presents mixed perspectives on the value of the degree of member familiarity for task force innovation and coordination. On one hand, having a higher degree of member familiarity is beneficial to teamwork, as it provides pre-existing social routines that help to share knowledge and combine diverse perspectives [11] which fosters efficient task solving and improves outcome quality [7], [12], [13]. On the other hand, member familiarity may breed established routines that narrow solution possibilities [14], [15]. One possibility for explaining these mixed empirical findings is that task forces varying in familiarity require different forms of coordination. When these coordination forms align with the degree of familiarity among members, innovative solutions are more likely to be generated. We define coordination following Faraj and Xiao [16] as the "temporally unfolding and contextualized process of input regulation and interaction articulation to realize a collective performance" (p. 1157) and distinguish between *expertise coordination* (which builds on individual expertise, leadership, and predefined roles) and *dialogic coordination* (which ignores formal roles and arises organically) [16].

We develop hypotheses on the two coordination forms and argue that their relative effectiveness depends on the degree of member familiarity with dialogic coordination being more beneficial for task forces with a greater proportion of unfamiliar members and expertise coordination more beneficial for task forces with a greater proportion of familiar members. We additionally suggest that the effectiveness of the coordination forms is an outgrowth of coordination activities that the task force undertakes throughout its life cycle rather than at any single point in time. To provide empirical evidence for our hypotheses, we collected a longitudinal dataset of 32 innovation task forces, including 179 members, from the start of their lifecycle to completion of a major innovation outcome, ranging from a few weeks to several months in duration.

Our findings help to illuminate why member familiarity may produce mixed results—positive and negative effects—on the ability of innovation task forces to successfully generate innovative solutions. Our coordination perspective characterizes member familiarity as a double-edged sword and helps to reconcile contradictory prior research [7], [12], [17] by suggesting that both high and low degrees of member familiarity can help to produce innovative solutions, depending on the form of coordination used. Our research contributes to the understanding of coordination in innovation task forces. While prior literature has described the importance of a dialogic coordination process in innovation task forces [18], [19], our findings suggest a more nuanced view in which expertise coordination still has a role to play particularly when the members are familiar with each other, whereas dialogic coordination is particularly well-suited for task forces with less familiar members.

2 Theoretical Background

2.1 Member Familiarity

We define task force member familiarity as the proportion of pairs of individual task force members who have worked together in the past [6], [7], [12], [20], [21]. The empirical literature on work member familiarity and team innovation has found inconsistent results on the relationship between team familiarity and innovation outcomes [7], [13], [17]. On one hand, greater familiarity facilitates interpersonal attraction and cohesiveness and helps teams develop shared understanding, integrate diverse knowledge, and coordinate teamwork. Harrison et al. [7] found that familiar teams worked faster and created higher quality products than teams composed of members without prior history. Familiarity can build trust [22], familiar teams make better decisions [12], and member familiarity is a critical ingredient to make “star-studded” (assembled from the best in their field) teams work, as Cattani et al. [23] show on Hollywood movie productions. In the context of software development, highly familiar teams outperform teams with lower member familiarity [6].

On the other hand, greater familiarity can be harmful to innovation if it creates routines that lead to inertia or rigidity in the organization and its members; such routines may interfere with creative processes [14], [15]. Greater familiarity may hinder the generation of new ideas and solutions because of social affiliative or conformity pressures that discourage sharing different viewpoints and critiques [20], [24]. Team members who are more familiar with each other are more interpersonally oriented, expending energy to strive for and maintain social status [25]. Teams with greater familiarity have stronger social ties, leading them to place disproportionate emphasis on shared versus novel information [26], [27]. Since the ability to produce innovative outcomes is aided by the novel information provided by weaker ties, groups with less familiar members should fare better. In fact, Ziller et al. [25] found that groups with less familiarity (because of membership changes) were more creative than groups with more member familiarity. Buengeler et al. [13] showed that when more innovativeness is required, the optimal extent of member familiarity becomes smaller.

These seemingly contradictory effects of familiarity on innovation outcomes have led some to theorize a curvilinear relationship between the two. For example, Xie et al. [17] found a non-linear relationship between team familiarity and team innovation, with moderate familiarity associated with the highest level of innovation. Zheng and Yang [15] also found a non-linear relationship in the form of an inverted U-shape relationship between repeated R&D collaborations and breakthrough innovations with the most innovations achieved by collaborations with moderately familiar partners.

Therefore, it is apparent that there is a relationship between member familiarity and innovation outcomes, but the mechanisms behind that relationship are not clear. Below we argue that the coordination processes that task forces follow as they do their work may compensate for the negatives of too much and too little familiarity, provided that those processes take advantage of the positives provided by high vs low familiarity. As such, we suggest that the type of coordination moderates the relationship between member familiarity and innovation outcomes.

2.2 Coordination of Innovation Projects

As discussed before, we use the term coordination to mean the "temporally unfolding and contextualized process of input regulation and interaction articulation to realize a collective performance" [16]. Coordination involves structural mechanisms, [9] as well as "dynamic social practices under continuous construction" [28] and in innovation task forces, coordination processes involve *exploration* and *integration* [16], [19], [29], [30].

Exploration is the pursuit of tackling all or part of the innovation problem [31], [32]. Coordination for exploration [28] requires the pursuit of alternative solution paths both jointly and autonomously [19]. It encourages members to dissent from each other's opinions [33], diverging from the group's status quo and current prevailing thinking [34]. Since innovation problems are often better understood as the team learns more about the problem through iterative solution generation [35], coordination among members should be flexible [28]. For example, Lifshitz-Assaf et al. [19] found that groups successfully performing during innovation hackathons were more likely to diverge from pre-specified coordination activities which would lead them to persist with an initial idea far beyond its utility for solution generation.

Coordination for innovation involves not just autonomous exploration but also phases of integration, which involves offering solutions that synthesize the diverse skills, expertise, and perspectives of the task force members. Xie et al. [17] argue that integration is a vital coordination mechanism in creative teams because it facilitates not just generation but also implementation of ideas [36], [37]. In this way, integration provides teams with increased visibility into each other's work, the ability to anticipate each other's work, and a shared conception of activities and how they are to be performed [18].

Coordination mechanisms, therefore, must be identified that support both exploration and integration and can be tailored to the unique coordination needs of groups varying in degrees of member familiarity. Below, we identify two forms of coordination—*expertise coordination* and *dialogic coordination*—which we suggest support both exploration and integration. In the hypothesis development section, we then suggest that varying degrees of member familiarity create unique coordination requirements that are best fulfilled by only one of these forms of coordination if innovation outcomes are to emerge.

2.2.1 How Expertise Coordination Facilitates Innovation

Coordination can be managed through leadership and a set of stable roles in rigid structures, which has been referred to as *expertise coordination* [16]. While expertise coordination has been primarily applied to the carrying out of predefined tasks [38–40], we suggest that expertise coordination can also be used by an innovation task force to support exploration and integration. Fixed, expertise-based roles refer to coordination in which each member is assumed to hold a particular role in a fixed hierarchy (e.g., a mechanical engineer representing mechanical design, a software engineer representing software design, multi-knowledge individuals who serve as knowledge integrators [41], and a team leader).

Fixed, expertise-based roles support exploration because each role is expected to autonomously explore its own part of the solution. The roles provide a mutual understanding of how tasks will be completed [18] by creating knowledge about what others know and their capabilities. In such a transactive memory system, each individual known as an expert on a topic can foster independent exploration to improve innovation outcomes [42–46]. Roles allow coordination based on “knowing one another’s position in the role structure” [5].

Expertise coordination can also support integration. When the sharing of information is based on expertise, the presence of formal roles, especially a team leader, ensures that information is directed appropriately [16], [47]. Roles determine task interdependencies and the manner in which information is exchanged [48], [49]. Unambiguously identified roles have been closely linked to creating a shared understanding of how tasks will be completed [18]. Formal roles include the position of a team leader. Team leaders can align the different solutions emerging from the individual explorations, such as is done by “heavyweight” program managers [50]. Team leaders can help to identify interdependencies and ensure that needed information is exchanged [51], [52], and they also ensure integration by setting common goals, aligning different specialists, and tracking progress [53]. The team leader knows other’s expertise [48], [54] and this creates consistency and reduces ambiguity. It allows the team members to build social routines that help in problem-solving [55].

2.2.2 How Dialogic Coordination Facilitates Innovation

Dialogic coordination may also facilitate innovation by supporting exploration and integration, yet in a different way. While expertise coordination tends to be hierarchical and formal, dialogic coordination relies more on an organic approach to coordination, based on naturally occurring interactions [16]. In contrast to expertise coordination, dialogic coordination is defined as exploration and integration without relying on predefined and fixed roles but rather based on “continuous interactions, joint sensemaking, common responsibility, and cross-boundary interventions” [16]. Dialogic coordination enables exploration by granting more freedom to individual team members. It grants sufficient autonomy and room for exploration to foster innovation and creativity [56]. It allows the mobilization of each team member's individual specialization [19]. The positive relationship between autonomy and creativity is well established [11].

Dialogic coordination can also help to encourage the integration of individual contributions. The greater autonomy given to individual team members could represent a challenge for integration [31]. Therefore, the autonomy of dialogic coordination is coupled with rapid feedback through dialogue that allows the task force to swiftly sense shifts in exploratory directions of the collective scrutiny [19]. The rapid feedback allows team members to "adapt moment to moment to support working together or individually" [31]. Forms of coordination that enable autonomy and opportunities to integrate throughout have been found to be highly effective when it comes to innovative tasks [19]. These forms do not require deep engagement and complete mutual understanding [57], provided there is adequate boundary work. Boundary work helps functionally diverse individuals to understand each other [58]. Boundary work for innovation can take a variety of different product concept representations such as shared document structures [59], specific tools [60], metaphors [57], and drawings [61] that are maintained so that boundary work is up-to-date. Boundary work for innovation uses product concept representations as malleable scaffolds, providing the autonomy to explore and integrate knowledge and ideas [59], [62] without spending excessive time acquiring a deep understanding of each other's functional discipline [57]. The malleability of boundary work guarantees flexibility throughout team interactions and allows the team to accommodate the emergence of new interdependencies and unanticipated possibilities throughout the project [16]. As areas of non-alignment are identified through this boundary work, product concept representations will morph in response to the explorations of individual team members, helping to guide the team in a creative process of collective scrutiny, active editing, and linking to other information [63], [64].

3 Hypothesis Development

While we have argued above that both forms of coordination—expertise coordination and dialogic coordination—can each potentially support the exploration and integration required for innovation, we propose that task forces with more and less familiar members will have different coordination needs. These different needs predispose the different task forces to obtain value from one or the other form of coordination. We summarize these predispositions into five hypotheses (see Figure 1).

----- Insert Figure 1 about here. -----

3.1 Task Force Member Familiarity and Expertise Coordination

For task forces with a greater degree of familiar members to innovate, they must overcome the obstacles to innovation generation that familiarity creates. Namely, they must overcome their tendency to suppress unique knowledge to conform, be willing to explore in non-normative ways, and integrate across members in a way for all voices to be heard. We suggest that task forces with a greater proportion of member familiarity using expertise coordination will help to overcome these obstacles whereas if they choose dialogic coordination they will not. By instilling unambiguous expertise-based roles within a project structure of facilitative project leaders, each member is expected to participate to ensure equal representation of different perspectives. Because expertise among members differs, expertise-based coordination will provide the mechanism by which each member's unique knowledge is used. Each expert is expected to explore in ways that are appropriate to their discipline, not necessarily to that of any norms established by the group. Finally, a project leader can enforce equal participation, particularly during integration activities [57].

The coordination needs of task forces with smaller degrees of familiar members are different than those of higher degrees of familiar members. Task forces that mainly consist of strangers have less psychological safety to be creative [65], and have little understanding of each other's expertise [57]. Since others' expertise is not known, using expertise-based coordination may create more obstacles than it can solve. It will require members to learn about others' expertise, which may slow down the creative process [43], [45]. Thus, simply having formal roles for each member based on formally defined expertise and a designated leader may not be helpful for task forces of unfamiliar members. Thus, we put forward our first hypothesis:

Hypothesis 1 (H1): *The higher the degree of member familiarity, the more likely innovative outcomes will be generated if expertise coordination (rather than dialogic coordination) is used.*

3.2 Lack of Task Force Member Familiarity and Dialogic Coordination

To be innovative, task force members who are less familiar with each other are less likely to build on habitual routines, aligned terminology, or transactive memory. They are constantly exposed to the possibility of misunderstandings, which consume time and effort to resolve. Consequently, instead of expertise coordination, which presumes knowledge of each other's expertise, task force members with a lower degree of member familiarity may be better served with coordination that allows them to engage in dialogic inquiry as solutions are suggested. In the context of innovation generation, dialogic coordination takes the form of individuals autonomously exploring by "testing and seeing what would emerge" [19], followed by each member doing their own integration of these explorations with their own. This integration takes the form of in-process representations and rapid feedback by members describing reactions to ideas and knowledge shared. Repeating this coordination process iteratively as new tests and explorations are conducted eventually leads to an innovative solution [19], [57].

In contrast, for task forces with a higher degree of member familiarity, dialogic coordination may provide less benefit because their familiarity may lead them to suppress unique knowledge, avoid exploring in non-normative ways, and fail to integrate so that all voices are heard. Adopting more exploratory and less structured forms of coordination might even be detrimental to the innovation outcome because they reduce efficiency and misallocate time [19]. Therefore, we conclude that dialogic coordination matches the conditions dictated by unfamiliarity and put forward our second hypothesis:

Hypothesis 2 (H2): *The lower the degree of member familiarity, the more likely innovative outcomes will be generated if dialogic coordination (rather than expertise coordination) is used*.

3.3 Relative Efficacy of Matching Coordination Mode to Member Familiarity

Hypotheses 1 and 2 argue a matching profile: innovation outcomes from innovation task forces are higher when member familiarity is matched to the form of coordination, with dialogic coordination being matched to lower member familiarity and expertise coordination being matched to higher member familiarity. We extend this argument further by suggesting that matching does not yield similarly effective outcomes. More specifically, we suggest that the advantages and disadvantages of lower member familiarity are managed better with dialogic coordination than higher member familiarity is managed by expertise coordination.

This is because member familiarity itself provides a constraint on the diversity of input sources [17], [25] that the knowledge base for creating an innovative solution will be narrower than a task force of unfamiliar members using dialogic coordination. Task forces with a higher degree of members who have worked together previously and expertise coordination will tend to emphasize shared knowledge and other commonalities rather than novel ideas or deviating knowledge, harming the task force's innovative alternatives. Therefore, they will be less able to adapt to the ambiguity inherent in innovation projects [19]. This ambiguity will likely continue and prohibit the emergence of a novel innovative outcome. Thus, even though task forces of familiar members will be *more* innovative when using expertise coordination, they will not produce as innovative outcomes as task forces of unfamiliar members using dialogic coordination. It is only when the task force uses dialogic coordination that they will outperform task forces of familiar members. We summarize our reasoning in the following:

Hypothesis 3 (H3): *Innovation outcomes generated by task forces with lower degrees of member familiarity using dialogic coordination will be more innovative than innovation outcomes generated by task forces with higher degrees of member familiarity using expertise coordination.*

3.4 Temporal Effects of Dialogic Coordination

The coordination process is characterized by variation throughout the period of time that task forces interact [7], [28], [66], [67]. The demands for coordination continuously ebb and flow as the work cycles through integration and exploration, requiring adaptation to occur throughout the project [63]. Especially dialogic coordination is subject to such dynamics [16]. We propose that dialogic coordination may be particularly important in the later stages of a task force's project. Lifshitz-Assaf et al. [19] found that successful teams started their project with minimal coordination activities such as by simply "starting from somewhere" (p. 696) and then moved to a more dialogic coordination approach, especially as visions emerged, and challenges were encountered and overcome. Coordination activities increased and were accelerated with the continuation of the project [19]. In the later stages of the project, then, the early autonomous exploratory work needs to become integrated, therefore increasing the value provided by dialogic coordination. Thus, we propose:

Hypothesis 4a (H4a): *In task forces with lower degrees of member familiarity, dialogic coordination later in the project life cycle is more effective in producing innovative project outcomes than earlier dialogic coordination.*

The question arises of whether dialogic coordination in the early stages matters at all. If task forces can simply start with minimal coordination and then switch into a dialogic coordination mode, it might be possible to introduce dialogic coordination later and waive any coordination efforts at the beginning [19]. However, coordination practices cannot be simply induced from the outside, nor do they emerge out of nothing. Instead, they develop and grow through practice: "coordinating mechanisms do not arise prior to coordinating but are constituted through coordinating" [28]. Thus, using dialogic coordination early to keep the task force aligned likely perpetuates this form of coordination. This leads to our last hypothesis:

Hypothesis 4b (H4b): *Dialogic coordination early in the project leads to dialogic coordination later on*.

4 Method

4.1 Research Context

We tested our hypotheses by tracking the activities of real-world innovation task forces with real-world tasks via repeated surveys, from their inception to the creation of an outcome that could be assessed by internal firm clients of the task force (a higher-level manager). Real-world task forces were selected to ensure that results generalize beyond student populations and laboratory research contexts. The task forces consisted of employees that were assembled to solve a certain firm problem under time pressure.

4.2 Data Collection

The unit of analysis of our study was the task force with diverse expertise created to develop an innovative solution to a firm problem. There were no lists of task forces from which to construct a sampling frame. Therefore, we considered them to be a "rare" population for statistical sampling purposes [68]. Thus, our approach was to develop a judgmental or expert sample of these task forces by soliciting participation from firms that we expected to use such task forces [69]. Our rationale was that firms from competitive industries characterized by high economic growth and succeeding economically had developed consistent ambidextrous practices (i.e., dynamic capabilities) that they used to explore new opportunities and exploit those opportunities for consistent economic gain [70–73]. We used a large U.S. university's alumni database to create a list of executive-level alumni in firms within the high-growth competitive industries (based on the concentration ratio of the industry being less than 60%, according to the U.S. Census for manufacturers and retail trade at the time of our data collection). We identified senior executive alumni from 55 firms from the top 10% (50 out of 500 firms) of the Fortune 500 Global growth industries in 2008 (which we refer to as "high growth")[1]. We contacted each of the university's alumni at each firm by email and requested to commit their firm to participate in the study by helping identify task forces with innovation goals in their firm.

[1] Global 500 2008: Countries - U.S. (cnn.com).

These efforts resulted in senior management from 55 firms providing us with internal contacts. We defined three criteria for the selection of the task forces within these firms. First, the company needed to make frequent use of task forces by assembling members with different expertise from different parts of the firm regardless of their familiarity. Task forces should also be composed of members who varied in familiarity with each other (e.g., members who had worked together previously and those who had not) and were under time pressure to create an innovative outcome that could be evaluated by a manager to whom the task force reported. The deployment of such task forces should be expected and they should start and complete their project within our 2009-2010 time period. Second, executives needed to commit to notify us as soon as possible that an innovation task force was forming and allow us to survey the members repeatedly from three points in time: the beginning, the middle, and the end. Our third and final criterion was that the firm agreed to provide us with an evaluation of the task force's performance by a manager who was a knowledgeable evaluator inside the firm but not part of the task force following the completion of the task force's project.

After extensive discussions with these contacts, the initial set of 55 firms was reduced to 13 to meet our criteria. These remaining 13 firms were large, established companies representing the 10 fastest growing industries from the Fortune Global 500 in 2008. The competitiveness of these industries varied from highly competitive to oligopolistic, but none were pure monopolies (see Appendix Table A1).

We contacted each task force lead, discussed our research project with them, identified the expected time period of the task force, and obtained further information on each task force member who we then contacted allowing them the opportunity to opt-out of the study. None did at the time. This process resulted in 46 task forces from 13 firms and 10 industries. However, during data collection, we discovered that three were not actually task forces because they lost members and shrunk to one-person projects or split up from collaboration to working independently. Thus, rather than the initial 46 task forces, we started with 43 and successfully collected longitudinal panel data at three points in time from 32 task forces for a 74% response rate. Eleven task forces did not provide sufficient data across time to be included. For an overview of the task forces, see Appendix Table A2.

4.3 Variables

4.3.1 Dependent Variable

Innovativeness of project outcome. The project's outcome assessment was based on a six-item five-point Likert scale. For assessing each project, a separate evaluator was responsible, who was not involved in assembling the task force. Since the projects came from a wide variety of companies in different industries, we adopted the innovation assessment scale by Pirola-Merlo & Mann [74]. The items were, e.g.: "The task force's outcomes provide a major breakthrough that is not replicated currently in our organization" and "The task force's outcomes provide a major competitive advantage that is not replicated in other organizations in our industry that I know of." Scale reliability was satisfactory (Cronbach's alpha = .81). The rating resulted in a bimodal distribution, as some of the projects were very high in their innovativeness while others were poor, with no projects in-between. The dip test for unimodality [75] ($p < .05$), as well as Ameijeiras-Alonso et al.'s [76] test ($p < .001$), supports a non-unimodular distribution. Thus, we calculated a binary variable distinguishing successful from less successful projects by performing a median split.

4.3.2 Independent Variables

Familiarity. Familiarity was measured consistent with Reagens et al. [77] as the percentage of overlapping membership from previous working relationships between each pair of task force members averaged over the number of task force members. We found a high within-group agreement based on a rectangular null distribution [78] showing high agreement with r_{wg} = .96. Thus, we averaged the familiarity score across all the members in the task force for each project. We centered this variable.

Expertise coordination. Consistent with criticisms of the uncertain status of the task force structure concept in the small group literature [79], [80], we grounded our operationalization of expertise coordination in the long tradition of work on formal structure in sociology and organization theory [81], [82] and simplified the coding for respondents by creating dichotomous categories consistent with other parts of our survey rather than Likert scales as both scales have similar properties [83]. We created a three-item scale based on Galbraith [82] asking whether they used any of the following practices associated with expertise coordination: fixed roles and responsibilities: (1) "Coordinate through a project manager/leader," (2) "Assign someone other than the project lead to be a full-time coordinator of task force activities," and (3) "Have a hierarchy in the group to coordinate decisions." To test within-group agreement, we used Fleiss' Kappa [84]. Values in all task forces were higher than .87.

Dialogic coordination. Dialogic coordination was measured by creating a scale of the different practices used in dialogic coordination described in [57]: (1) "Together, we created a conceptual frame that included different definitions of the problem, issues and solution concepts so that each person's individual knowledge fit," (2) "Together, we identified a way to organize the different issues raised by different people on the task force so the issues could all be seen at once," (3) "Together, we developed solutions that generated visible excitement among all members," (4) "Together, we referred to common work-related stories that helped to explain different perspectives on the project," (5) "Someone on the task force created sketches that we used to understand each person's perspective," (6) "Together, we kept those shared ideas that were built on and dropped those only few people built on," (7) "Someone on the task force sensed low energy level and acted to increase it," (8) "Together, we openly discussed each person's priorities," (9) "Together, we made it easy for people to come and go from the project by creating mini-projects that everyone present worked on," (10) "We kept a continuous display of what was being done so everyone could see current status," and (11) "Task assignments were based on individuals volunteering for tasks that excited them." We use a five-point Likert scale to measure each item (ranging from "no use" coded as 1, "some use" coded as 3, and "great extent of use" coded as 5).

Prior to the data collection, we pilot-tested the scale on student teams and three real-world task forces not included in the sample to ensure face validity and understanding of the statements and made adjustments. We asked the task force members to complete the scale halfway through the project and again after project completion but before being rated. Reliability across the items at each time point was good (Cronbach's alpha = .90 mid-project and .92 after project completion). Each task force member answered these items independently. Agreement within the groups was acceptable $r_{wg(j)} = .75$. Therefore, we aggregated the responses into an average for each task force.

Control variables. We calculated two control variables motivated by the possibility of variations in time pressure and functional diversity. The first control variable, *time pressure*, was measured by three items adapted from [85] (1) "I often wish I had more time to complete my work," (2) "I have plenty of time to think carefully about project-related details" (reversed), and (3) "On this project, I believe I am under a lot of time pressure." Scale reliability was good (Cronbach's alpha = .85). We measured this variable mid-project. Our second control variable was the *functional diversity* of the task force members. We measured functional diversity as the Hirschman-Herfindahl Index (HHI) of the task force member's functional professional expertise (marketing, engineering, etc.) [86], [87] based on the initial survey (before the project started). Due to the high correlation between member familiarity and dialogic coordination, we centered those variables when estimating their interaction effect. Variance inflation factors (VIF) scored between 1.07 and 1.89 throughout all regressions. Descriptive results and pairwise correlations of the variables are listed in Table 1.

----- Insert Table 1 about here. -----

5 Results

5.1 Hypothesis Testing

We tested H1 and H2 using logistic regressions because innovativeness was a binary measure. Model 1 in Table 2 shows the control variables only. Model 2 adds the interaction of member familiarity with expertise coordination, which turns out to be positive and significant ($b = 5.747$, $p < .05$), supporting H1. Model 3 shows the interaction effect of member familiarity with dialogic coordination. The effect was negative and significant ($b = -2.392$, $p < .05$), supporting H2. In addition, dialogic coordination had a positive direct effect ($b = 1.316$, $p < .05$). Figure 2a shows interaction plots of familiarity with expertise coordination. It shows a strong decline in the likelihood to achieve a highly innovative outcome with expertise coordination if familiarity is low (for the plot, we assumed a median split of familiarity). Figure 2b shows interaction plots of familiarity with dialogic coordination, showing a positive impact of low member familiarity with increasing dialogic coordination.

----- Insert Table 2 and Figure 2 about here. -----

To test H3, we directly compared the innovativeness of high and low member familiarity projects with their respectively best-matching form of coordination (i.e., expertise coordination for high familiarity and dialogic coordination for low familiarity). We applied a median split for familiarity, expertise coordination, and dialogic coordination to calculate a Wilcoxon signed rank test for non-normal distributions on project outcome innovativeness. The test showed that projects with a low degree of member familiarity and high dialogic coordination produced better project innovation outcomes (mean = 4.10, median 3.92) than projects with higher member familiarity and high expertise coordination (mean = 3.05, median = 3.00). The difference was statistically significant ($p < .01$). Figure 3 shows a boxplot of the comparison. The innovativeness of the project outcomes under low member familiarity and dialogic coordination (left box) is distinctively higher than the outcomes under high member familiarity with expertise coordination (right box). Thus, H3 was supported.

----- Insert Figure 3 about here. -----

Testing H4a involved comparing the interactions of familiarity with increased use of dialogic coordination between the mid-project phase (t1) and the project completion phase (t2). Model 2 in Table 3 shows the interaction between familiarity and the increase of dialogic coordination from the mid-project timepoint (t1) to the end-project timepoint (t2). The model shows a significant and negative effect ($b = -3.217$, $p < .05$). Thus, we found support for the hypothesis. Figure 4 shows the interaction (again by using a median split on familiarity). There was a strong incline in the likelihood of achieving a high innovativeness outcome with the increase of dialogic coordination over time when familiarity was low.

----- Insert Table 3 and Figure 4 about here. -----

To test H4b, we regressed end-project dialogic coordination (t2, shortly before project completion) on mid-project dialogic coordination (t1) using OLS regression analysis. Model 1 of Table 4 includes only control variables and was non-significant (F = 0.760). Model 2 includes mid-project dialogic coordination (t1) and shows a positive and significant effect of this variable on the late dialogic coordination (t2; $b = 0.653$, $p < .01$). This finding confirms H4b.

----- Insert Table 4 about here. -----

5.2 Robustness and Post-Hoc Tests

5.2.1 Controlling for Task Force Size

Due to the sample size, we decided in the main analysis to include only the most critical control variables. In this robustness check, we added *task force size*—the number of members—as a further control. The regression analysis indicated the same results (see Table 5) as the main analysis. The relationship hypothesized by H2 was stable at 5% significance when adding task force size (Model 3). Our hypothesized relationships for H1 dropped to a 10% significance level (Model 2). When removing either time pressure or familiarity, the relationship became significant at a 5% level again.

----- Insert Table 5 about here. -----

5.2.2 Adding Company-Level Fixed Effects

Since each of the firms provided us with multiple task forces, we ran a robustness check controlling for unobserved variability on the firm level by adding in company-level fixed effects. The results of H1 and H2 were replicated (Table 6).

----- Insert Table 6 about here. -----

6 Discussion

Our work sheds light on the relationship between member familiarity and forms of coordination for achieving innovative outcomes in innovation task forces. Our findings clearly show the character of the relationship between member familiarity and coordination. Further, our findings draw on real-world task forces with real-world projects in a sample of large established firms in the top 10% of worldwide growth industries during a recession. We theorized and demonstrated how the degree of member familiarity affects the form of coordination best suited for developing innovative outcomes of task forces that work under time pressure. We also shed light on the temporal dynamics of dialogic coordination throughout the project lifecycle.

Our study helps to explain the complex role of member familiarity in producing innovative outcomes in task forces and teams, particularly temporary teams with multiple membership [4], such as innovation task forces. It helps to reconcile mixed findings in prior literature regarding the relationship between familiarity and innovation [7], [17] by articulating that whether member familiarity is an asset or a burden for innovativeness depends on the form of coordination adopted. As opposed to previous research showing a non-linear relationship between familiarity and innovation in which moderate levels of familiarity produce the greatest innovation [15], [17], our findings suggest that both low and high levels of familiarity may also be associated with innovative outcomes if they use the appropriate form of coordination. Specifically, member familiarity can be exploited with expertise coordination. This coordination form enables members to build on the scaffolding of their pre-existing social roles and routines to use their functional diversity as an advantage. By contrast, lack of familiarity may have benefits by preventing social routines from becoming overly rigid. In this case, dialogic coordination provides a powerful way to leverage members' functional diversity to create innovative outcomes. Indeed, our results show that dialogic coordination among unfamiliar task force members is more likely to produce innovative outcomes than expertise coordination among familiar task force members—presumably because the former group is not impeded by reliance on established scripts and routines that may limit creativity and novel ideas [14], [15]. While familiarity is often preferred as it leads to smoother and more efficient collaboration [88], our findings contribute to a deeper understanding of the unique benefits of unfamiliarity for creativity—when specific forms of coordination strategies such as dialogic coordination are employed. This is important in managing contemporary firms, which increasingly bring together strangers in flexible and structurally dynamic work arrangements such as innovation task forces.

Our findings also make a contribution to the collaboration literature, by responding to Jarzabkowski et al.'s [28] call for a richer understanding of coordination mechanisms that provide sufficient flexibility to adapt to situations that require novelty. We extend qualitative studies of expertise coordination and dialogic coordination [16], [35], [57], [59] and quantify their relationship with familiarity and innovation. Our study supports that dialogic coordination provides a way to manage the conundrum of the need for dialogue without the time for dialogue by focusing dialogue on sensing, adjusting, and feedback cycles rather than discussions about methods, measurements, materials, and design specifications in advance [16], [19], particularly for creative tasks where task force members may not know the specifications and imposing them will unnecessarily constrain the outcome [35]. We add that member familiarity is not required nor it is helpful for dialogic coordination to work, which challenges commonly held assumptions in the coordination literature [19], [35], [57]. Moreover, member non-familiarity can be a powerful basis for dialogic coordination. Our findings also show that expertise coordination still has an important role to play in task forces and teams with a high degree of member familiarity. In this way, we support coordination literature [16], [38] showing that expertise coordination can lead to certain degrees of innovativeness and thus can be critical for task force and team success.

We also contribute to temporal perspectives of coordination. Our study supports the idea that dialogic coordination needs to intensify towards the end of the project [19]. However, we also showed that dialogic coordination is subject to path dependency, meaning that early dialogic coordination drives it later in the project. This indicates that task forces need to develop some experience with this form of coordination earlier in order to be able to use it effectively later. This experience might be particularly important because close to project end, conflicts are more likely [89] as time pressure increases.

Our results also have implications for practitioners. They suggest that project leaders should overcome the natural urge to compose task forces out of established groups, but instead deliberately foster member non-familiarity, especially when innovative outcomes are the goal. Bringing unfamiliar individuals together represents a larger innovation potential, which is mainly overlooked in current business practice. Even more importantly, our results suggest a contingency model in which task forces need to adapt their mode of coordination to the given level of member familiarity. Implementing expertise coordination in task forces with low member familiarity will likely be unsuccessful as will implementing dialogic coordination under high member familiarity. Project leaders and task force members need to be aware of the degree of familiarity and adjust their mode of coordination. When member familiarity is low, it is also important to begin early in the project with dialogic coordination.

Our study is limited in several regards. Although a quantitative, survey-based approach repeated over time offers several advantages, such as a direct comparison of different coordination mechanisms, it also restricts the richness of insight into coordination. Qualitative, explorative research should more closely investigate how the interaction between the coordination form and (non-)familiarity unfolds. In this way, future research could further specify the mechanisms that unleash or hinder creativity in teams. Also, mixed-methods approaches are promising for researching (non-)familiarity in interaction with coordination mechanisms. Our study also simplifies the role of functional diversity by only controlling for this factor. Future research should enrich the role of functional diversity, and other forms of diversity, by building on the large literature on team diversity, e.g., [67], [86], [87], [90], and detail how it interacts with (non-)familiarity. We speculate that non-familiarity together with dialogic coordination unleashes the potential of functional diversity. The specifics of this relationship contain valuable insights for the management of task forces and thus represent attractive future research opportunities. Finally, it should be noted that—as many studies measure innovation or creativity—we cannot claim that our dependent construct measures innovativeness of the project outcome in the sense of being "new to the world"; instead, our measure more closely reflects innovativeness relative to the firm of the task force [91]. Using an evaluator from the firm sets the firm as the benchmark for the degree of innovation, relative to this firm the project is assessed.

Most importantly, future research should also address the question of how task forces and teams adopt specific coordination mechanisms based on their member familiarity. We showed that low (high) familiarity task forces are more successful with dialogic (expertise) coordination, but it is unclear how these coordination mechanisms are adopted in the first place. There might be a natural tendency for task forces with high member familiarity to apply expertise coordination and it is unclear whether unfamiliarity leads to dialogic coordination. Future research should approach this question because its answering provides important insights into our understanding of coordination theory and yields huge practical value. Future research should also address the differences between innovative task forces in large established high-growth firms versus smaller early-stage firms. It remains unclear whether or not dialogic or expertise coordination will lead to more innovative outcomes in these smaller and less resource-endowed firms.

In conclusion, our study characterizes member familiarity as a double-edged sword. In large high-growth firms, familiarity can be both a help and a hindrance in achieving innovative outcomes depending on whether appropriate coordination mechanisms are used. With high member familiarity, task forces can rely on their established structure of expertise for coordination while with low member familiarity task forces need to adopt dialogic coordination.

7 References

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8 Tables and Figures

Table 1: Descriptive Statistics and Pairwise Correlations

Statistic	N	Mean	St. Dev.	Min	Max	(1)	(2)	(3)	(4)	(5)
(1) Innovativeness of outcome	32	0.531	0.507	0	1	1				
(2) Expertise coordination (t2)	32	0.372	0.301	0.000	1.000	-.180	1			
(3) Dialogic coordination (t2)	32	0.000	0.660	-1.615	1.044	**.461**	-.177	1		
(4) Functional diversity	32	0.587	0.220	0.000	0.881	.149	-.099	.103	1	
(5) Time pressure	32	3.346	0.811	0.200	4.444	.271	-.087	.221	.323	1
(6) Member familiarity	32	0.238	0.222	0.000	1.000	-.106	-.021	**-.357**	.042	.106

Bold indicates significance $p < .05$

Table 2: Logistic Regressions Testing H1 and H2

	Dependent variable:		
	Innovativeness of project outcome		
	(1)	(2)	(3)
Time pressure	0.474	0.498	0.575
	(0.352)	(0.390)	(0.458)
Functional diversity	0.436	0.311	-0.449
	(1.112)	(1.204)	(1.243)
Member familiarity		-0.870	-0.528
		(0.605)	(0.697)
Expertise coordination		-1.153	
		(0.924)	
Member familiarity x expertise coordination (H1)		**5.747***	
		(2.929)	
Dialogic coordination			1.316*
			(0.584)
Member familiarity x dialogic coordination (H2)			**-2.392***
			(1.118)
Constant	-1.781	-1.740	-1.869
	(1.281)	(1.358)	(1.607)
Observations	32	32	32
Log Likelihood	-20.748	-17.385	-15.268
Akaike Inf. Crit.	47.496	46.769	42.536

Note: *$p < .05$ (two-tailed)

Table 3: Increase of Dialogic Coordination Driving Innovativeness of Project Outcome

	Dependent variable: Innovativeness of project outcome	
	(1)	(2)
Time pressure	0.474	0.817
	(0.352)	(0.459)
Functional diversity	0.436	0.380
	(1.112)	(1.233)
Member familiarity		-1.257
		(0.976)
Dialogic coordination (delta t2-t1)		0.743
		(0.557)
Member familiarity x dialogic coordination (delta t2-t1) (H4a)		**-3.217***
		(1.571)
Constant	-1.781	-3.189
	(1.281)	(1.666)
Observations	32	32
Log Likelihood	-20.748	-16.662
Akaike Inf. Crit.	47.496	45.323
Note:		*p<0.05 (two-tailed)

Table 4: OLS Regression of Dialogic Coordination at Project End as a Result of Earlier Dialogic Coordination

	Dependent variable: Dialogic coordination (t2)	
	(1)	(2)
Time pressure	0.170	0.097
	(0.156)	(0.136)
Functional diversity	0.105	-0.115
	(0.573)	(0.498)
Dialogic coordination (t1) (H4b)		**0.653****
		(0.197)
Constant	-0.632	-2.285**
	(0.534)	(0.679)
Observations	32	32
R^2	0.050	0.318
Adjusted R^2	-0.016	0.245
Residual Std. Error	0.665 (df = 29)	0.573 (df = 28)
F Statistic	0.760 (df = 2; 29)	4.347* (df = 3; 28)
Note:		*p<0.05; **p<0.01 (two-tailed)

Table 5: Robustness Test: Controlling for Task Force Size

	Innovativeness of project outcome		
	(1)	(2)	(3)
Time pressure	0.518	0.508	0.580
	(0.362)	(0.394)	(0.461)
Functional diversity	0.157	0.212	-0.506
	(1.156)	(1.243)	(1.290)
Task force size	0.096	0.036	0.027
	(0.090)	(0.108)	(0.140)
Member familiarity		-0.763	-0.428
		(0.688)	(0.856)
Expertise coordination		-1.142	
		(0.934)	
Member familiarity x expertise coordination (H1)		**5.613^{t}**	
		(2.939)	
Dialogic coordination			1.312*
			(0.587)
Member familiarity x dialogic coordination (H2)			**-2.376***
			(1.119)
Constant	-2.300^{t}	-1.919	-2.013
	(1.281)	(1.471)	(1.782)
Observations	32	32	32
Log Likelihood	-20.181	-17.332	-15.251
Akaike Inf. Crit.	48.362	48.665	44.502
Note:	$^{t}p<0.10$; $^{*}p<0.05$ (two-tailed)		

Table 6: Robustness Test: Adding Company-level Fixed Effects

	Dependent variable: Innovativeness of project outcome	
	H1	H2
Time pressure	0.647	0.911
	(0.350)	(0.681)
Functional diversity	-0.059	-0.662
	(1.605)	(2.613)
Member familiarity	-4.005	0.324
	(2.572)	(0.695)
Expertise coordination	-3.336	
	(2.009)	
Dialogic coordination		0.375
		(0.721)
Member familiarity x expertise coordination	**10.520***	
	(4.957)	
Member familiarity x dialogic coordination		**-2.006****
		(0.757)
Constant	2.572**	2.460*
	(0.976)	(1.115)
Company fixed effects	Yes	Yes
Observations	32	32
Log Likelihood	-10.473	-10.974
Akaike Inf. Crit.	56.945	57.949

Note: Cluster-robust standard errors.
$^{t}p<0.10$; $^{*}p<0.05$; $^{**}p<0.01$ (two-tailed)

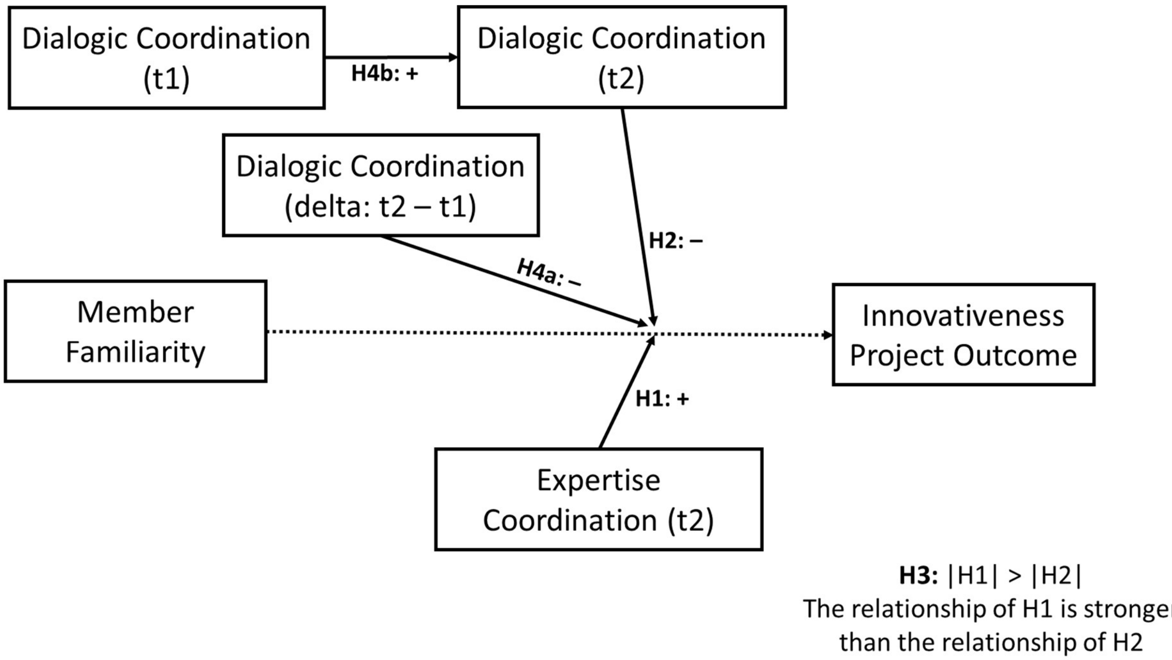

Figure 1: Research Model (t_1 = mid-project **stage; t_2 =** *late-project* **stage)**

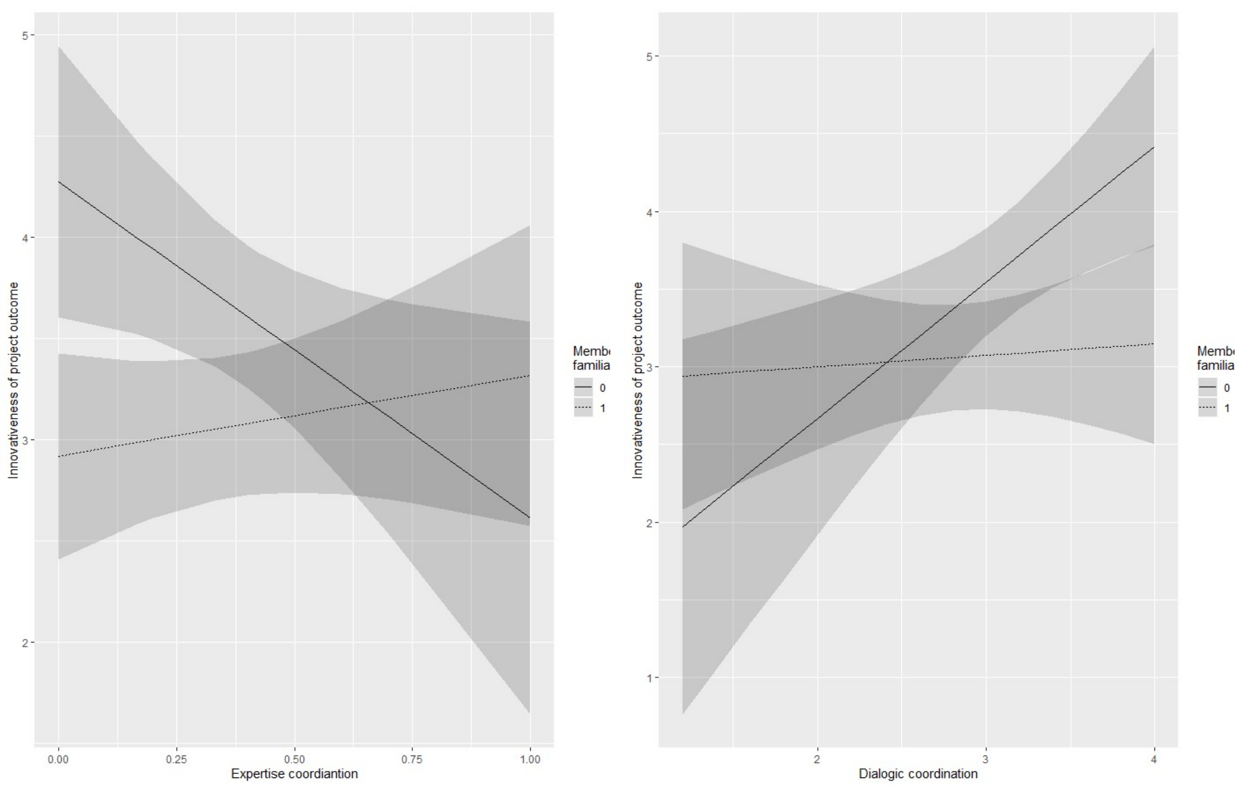

Figure 2: Interactions of Member Familiarity with Expertise Coordination and Dialogic Coordination

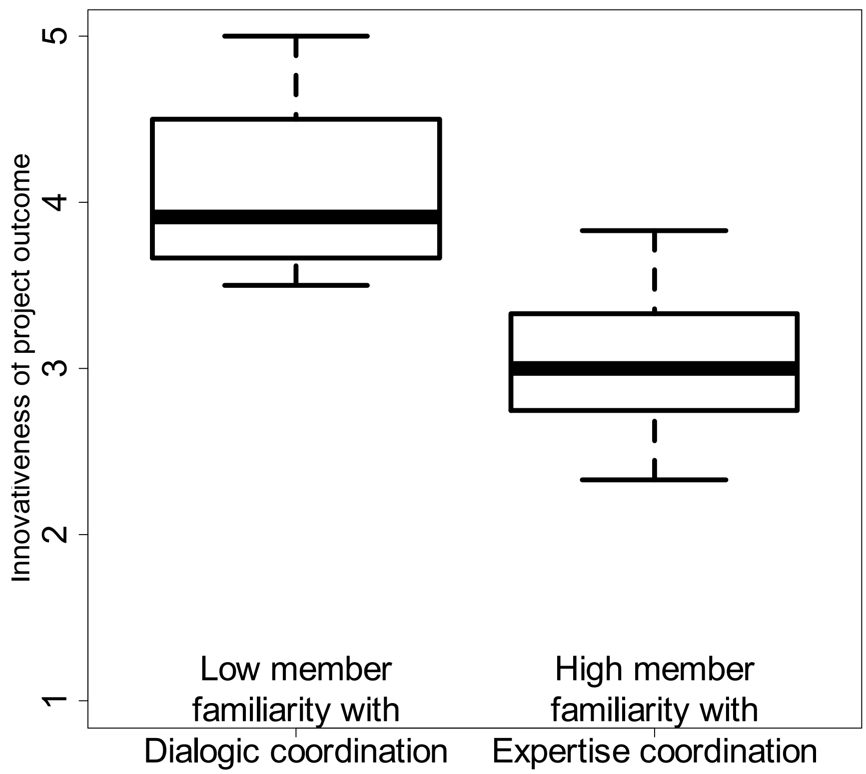

Figure 3: Comparing Innovation Outcomes between Low Member Familiarity Teams with Dialogic Coordination versus High Member Familiarity Teams with Expertise Coordination (H3)

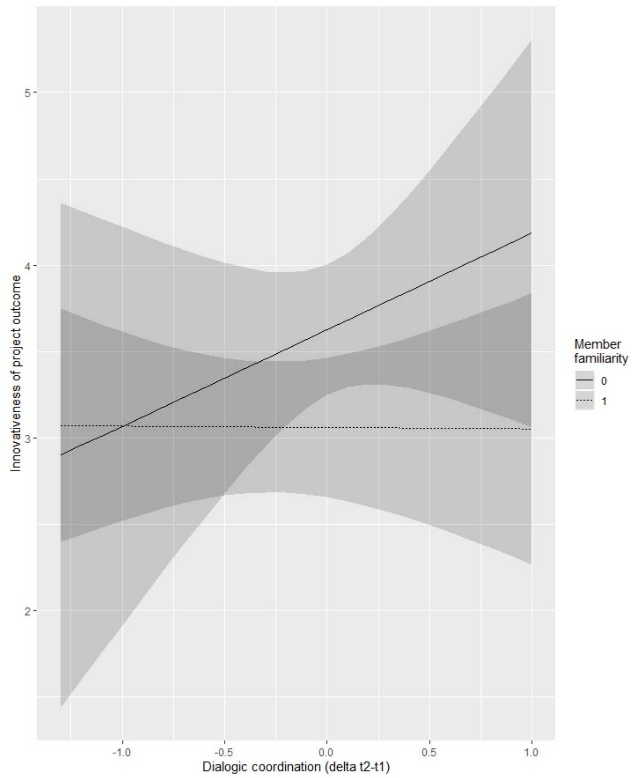

Figure 4: Difference of Low Member Familiarity with Dialogic Coordination between t2 and t1

9 Appendix A:

9.1 Appendix 1: Industry Characteristics

Table A1: Industries of the 13 firms with ranks by growth in revenue and growth in profit (2006-08)

	% change in Revenues from 2006		Concentration Ratios			
Industry	Ranked by Revenue Change 2006-08	Global 500 2008: Countries - U.S. (cnn.com)	Year	NCAIS Code	Concentration Ratio (C4 - Top 4 firm Percent of Total value of shipments-%)	Source
Petroleum refining	2	18.3	2007	32411	47.5	US Census of Manufacturers ECN_2007_US_31SR12
Telecommunications	5	12.2	2007	3342	37.4	US Census of Manufacturers ECN_2007_US_31SR12
Electronics, electrical equipment	7	9.5	2007	3344	34.1	US Census of Manufacturers ECN_2007_US_31SR12
General merchandisers	10	7.2	2007	4521	40.0	www.investopedia.com & US Census of Retail Trade 2007
Aerospace & defense	13	11.5	2007	3364	58.1	US Census of Manufacturers ECN_2007_US_31SR12
Computers, office equipment	14	9.9	2007	333313	49.8	US Census of Manufacturers ECN_2007_US_31SR12
Information Technology Services & Manufacturing	19	8.1	2007	3342	37.4	US Census of Manufacturers ECN_2007_US_31SR12
Health care (electromedical and electrotherapeutic apparatus)	27	7.3	2007	334510	35.0	US Census of Manufacturers ECN_2007_US_31SR12
Entertainment (manufacturing & reproducing magnetic and optical media)	34	5.4	2007	3346	40.4	US Census of Manufacturers ECN_2007_US_31SR12
Household and personal products (apparel manufacturing)	35	12	2007	315	7.9	US Census of Manufacturers ECN_2007_US_31SR12

9.2 Appendix 2: Detailed Description of the Task Forces

Table A2 provides a detailed description of the 32 task forces in our final sample. These task forces varied in size from 2–12 members with an average of 6 people. The table shows indicators of the task force's diversity measured with the Hirschman-Herfindahl Index (HHI), which is bound to a minimum of 0.00 and a maximum of 1.00. Functional diversity in our sample varied from 0.00 to 0.88 with a mean of 0.59. The task forces were also educationally diverse with HHI values that ranged from 0.29 to 0.89 with a mean of 0.58. Some ranged from 73% with Ph.D.'s or equivalent to others with 83% a master's degree, to others with 100% undergraduate degrees. Seven of the task forces had at least 10% of the members who had at least two degrees from a mix of fields such as business and engineering. In terms of experience, the sample averaged 11.8 years (ranging from 1.5 to 29.0 years) within their functional assignments.

Table A2: List of task forces in sample

Number	Size	Task Force Type	Functional Diversity (HHI)	Educational Degree Diversity (HHI)	Functional Experience (Yrs)	Objective
1	3	Software	0.78	0.44	9.3	Develop a new product feature that is embedded with the existing digital product throughout the supply chain
2	5	Software	0.88	0.48	13.7	Develop process improvements around workflow automation
3	7	Software	0.00	0.61	10.1	Develop an application to improve workflow tracking of digital media
4	4	Software	0.38	0.63	5.0	Develop a central talent tracking system
5	2	Software	0.50	0.50	19.0	Develop a proof-of-concept automated forensic tracker of digital media use
6	3	Software	0.78	0.89	15.0	Upgrade existing datacenter
7	4	Software	0.69	0.69	10.7	Develop a portable master control room for on-air recovery
8	3	Software	0.67	0.80	13.3	Add additional audio and video digital feeds for global marketing purposes

9	4	Human resources	0.63	0.56	10.0	Find solutions to reduce customer churn.
10	3	Human resources	0.44	0.67	11.0	Develop a new mentoring program for future leaders
11	11	Human resources	0.69	0.47	5.7	Using a new visioning technique and telepresence tool that allows a large geographically dispersed set of stakeholders to develop a vision statement for a newly formed business unit
12	6	Strategy	0.72	0.61	9.9	Sales and IT working together to use wireless data in a new product.
13	11	Software	0.74	0.60	16.3	Adding new functionalities for a new design tool
14	12	New product development	0.72	0.57	6.9	New medical device development
15	6	Financial instruments	0.72	0.65	7.2	Develop a new currency exchange online product meeting national government 1 requirements.
16	7	Financial instruments	0.49	0.69	6.6	Develop a new currency exchange online product meeting national government 2 requirements.
17	5	Financial instruments	0.35	0.65	8.1	Develop a new currency exchange online product meeting national government 3 requirements.
18	3	Financial instruments	0.55	0.51	1.5	Develop the search tools for a new currency exchange product
19	10	Software	0.81	0.48	4.0	Successfully launch a new software product at customers' manufacturing sites.
20	5	New product development	0.68	0.52	29.0	Develop and implement a migration plan for process improvements to manufacture a new product line in a new location
21	7	Software	0.71	0.50	6.9	Develop and enhance a new software product for online contracting among business owners.
22	5	Process improvement	0.15	0.87	22.80	Improve the capability to track customer problems.
23	6	Process improvement	0.23	0.42	12.30	Identify root causes of fabrication errors and changing policies and practices to control root causes.
24	5	Process improvement	0.70	0.29	6.70	To analyze decision making processes throughout a company to identify possible areas for improvement
25	10	Human resources	0.88	0.57	10.40	Create a corporate-wide celebration of the founding of the company
26	11	New business development	0.80	0.45	13.90	Generate new research leads to put firm into a good position for future business and develop research and budget proposals.
27	4	Process improvement	0.57	0.39	2.50	Improve the supply chain
28	5	Strategic problem solving	0.59	0.51	29.00	Develop and implement a migration plan for process improvements to manufacture a new product line in a new location

29	5	Software to diagnose systems integration	0.60	0.59	17.00	Systems integration of a subsidiary's product into overall corporate systems.
30	5	Financial instruments	0.61	0.57	25.00	Developing new financial measures for costing production of a new product
31	5	New product development	0.12	0.84	11.10	Develop tools for internal social networking in virtual spaces
32	12	Software	0.60	0.58	7.00	Develop a company-internal open communication/social media platform to enhance corporate improvements in decision making

Dear Professor Dr. Brem and Reviewers,

We are very pleased to resubmit our manuscript "Does Member Familiarity Help or Hinder Innovation? The Roles of Expertise and Dialogic Coordination" to *IEEE Transactions on Engineering Management*.

The paper investigates how familiarity of team members in innovation tasks forces interacts with their coordination (expertise-based or dialogic) on innovation performance. It sheds new light on the notion of familiarity and its relationship to innovation performance.

The review panel provided us with highly valuable feedback, which helped us to improve the paper.

In case of any questions, please do not hesitate to contact us.

Kind regards,

The authors