THE PERFORMANCE IMPLICATIONS OF SHARED EXPERIENCE ACROSS CREATIVE PROJECT TEAMS

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Abstract

This study reviews recent empirical results that show the relationship between shared experience and project performance to be negative. After discussing the difference between sharing experience across projects and interaction and learning within projects, I propose two ways that shared experience might create performance deficits. One is that shared experience carried forward from previous contacts might create barriers to interaction in the current project. The second is that shared experience might constrain search and lead to the acceptance of projects of lower quality. The distributed cognitive structures that constitute shared experience may either displace important developmental processes or alter the processes that lead to project formation. I present a model of these processes as operating through a series of mediating variables and propose directions for future research.

In any group setting there are two components of shared experience, the current process of interaction (experience sharing) and the distributed cognitive structure that is carried forward into the current context from prior encounters between group members. Experience sharing (which I will hereafter call interaction) has generally been viewed as contributing positively to group learning processes such as information exchange and the development of common knowledge that are believed to lead to improved project outcomes. Except in studies that investigate the effects of familiarity between group members on task performance (Gruenfeld et al., 1996; Harrison et al., 2003; Wittenbaum & Stasser, 1996), the shared experience developed in past encounters has tended to be lumped together with the effects of current interaction. In studies of familiarity, the relationship between shared experience and performance has been seen as positive. Groups whose members know each other from before are more effective at sharing information and faster and better at completing tasks.

Recently I found results that run counter to this common view in two different kinds of creative project teams. In studies of performance in natural science research projects (Skilton, 2006a) and in Hollywood motion picture production (Skilton 2006b), I found that project teams whose members have worked together repeatedly tend to produce products that are *less* successful in the market. Other scholars have begun to report similar results. A recent study by Uzzi and Spiro (2005) which found a similar negative relationship between the level of shared experience and performance in the Broadway musical theatre industry. Guimerà, Uzzi, Spiro and Amaral (2005) report that collaborative teams in the social and natural sciences produce outcomes with lower performance when the level of repeat collaboration is higher. Berman, Down and Hill (2002) also report this relationship in a study of performance among National Basketball Association teams. Although studies of interaction have tended to look at process performance, and the studies of shared experience at market performance, the apparent contradiction between the two sets of results raises the question of how learning processes (interaction) and previously learned relationships (shared experience) combine to alter the performance of project groups.

One explanation for the negative performance outcome is that shared experience erects learned barriers to creativity and innovation in temporary project teams (and in longer lived teams, as in the NBA). An example of such a barrier would be the tendency of groups with

more shared experience to exhibit ‘not invented here’ biases (Cohen & Levinthal, 1990) that exclude information or ideas that would improve performance. An alternative explanation is that shared experience alters project selection processes. This would be the case if shared experience lowers the threshold of what kinds of projects are ‘good enough’ to reward the effort expended. That is, because team members who share experience do not need to learn to work together again, the cost of later projects may be lower, making it possible for lesser projects to pay off. In the first case, the quality of current interaction is impaired, which in turn degrades project performance. In the second case the performance deficit comes from project choice and current interaction may not be affected. The goal of this paper is to develop propositions that will enable future research to determine if either or both of these explanations reflect the realities of project based production.

This focus on the tension between current learning and previously learned relationships is an essentially different take on project based learning from the idea that best practice can be transferred from one team to another or diffused throughout an organization (Ayas & Zeniuk, 2001; DeFillippi, 2001; Keegan & Turner, 2001; Lindkvist, 2004; Meyers & Wilemon, 1989). In this study, I consider how the learning that occurs when project team members work together affects the team’s capabilities when they work together again. This approach creates an affinity between the current study and studies of transactive memory systems (TMS) in teams (Austin, 2003; Lewis, Lange & Gillette, 2005; Liang, Moreland & Argote, 1995; Wegner, 1987), with the difference that where studies of TMS tend to focus on the efficiency and effectiveness of team processes, I develop theory about project performance. The unit of analysis is the project team, and the research question is how outcomes change when team members stay together for multiple projects. This has implications for organizational learning that I address in the concluding section of the paper.

I discuss the results of existing research concerning interaction within projects and then summarize the results of recent studies that provide evidence of a negative relationship between shared experience and project performance. I compare and contrast the barrier creation and threshold reduction explanations, develop propositions that will enable future hypothesis testing and discuss the implications of this study for scholars and managers.

Interaction and shared experience within projects

It has long been established that higher levels of interpersonal interaction within projects leads to better project outcomes, as demonstrated in Gerwin and Barrowman's meta-analysis (2002) of 20 years of integrated product development research. These outcomes include both process (speed, efficiency) and market (creativity, innovation, share) related types of performance. Because intensive interaction between team members is difficult and costly, it is reasonable to ask whether the benefits of interacting in one project can be carried forward or transferred to future projects (Ancona & Caldwell, 1992; Ayas & Zeniuk, 2001; Keegan & Turner, 2001; Meyers & Wilemon, 1989; Nonaka, 1994; Lewis et al, 2005; Liang et al., 1995; Purser, Pasmore & Tenkasi, 1992; Skilton, 2003). Many authors have proposed ways to transfer lessons learned, including various forms of training, debriefing, documentation and leader influence. That none of these methods appear to be especially effective leads me to ask what it is exactly that extensive interaction does in project teams.

The answer seems to be that interaction, which is the process of creating shared experience, helps groups share information and coordinate their actions (Coleman, 1988; Gerwin & Barrowman, 2002; Grant, 1996; Gruenfeld et al., 1996; Harrison et al., 2003; Hinds et al., 2001). Getting to know each other is associated with increased trust and commitment between agents (Brass et al., 2004; Uzzi, 1997), and with the formation of distributed routines and transactive knowledge systems (Austin, 2003; Lewis et al., 2005; Liang et al., 1995; Wegner, 1987). Interaction facilitates the emergence of shared knowledge about what matters and how to make decisions in the group, such as common knowledge or a shared world view (Dougherty, 1992; Wageman & Gordon, 2005). When team members have differing interpretations of team means or goals, interaction helps to align them (Nonaka, 1994). Studies by Pelled, Eisenhardt and Xin (1999) and Katz (1982) found that tenure within project groups was positively related to both the effectiveness of communication and project performance. Ancona and Caldwell (1992) reported a negative relationship between tenure diversity and performance. Teams whose members had similar terms of tenure had more effective communication processes and better project performance.

The consensus of theory, supported by empirical results, is that as interaction occurs it generates an implicit, taken for granted distributed cognitive structure within the team. This structure inheres in the dyadic relationships between team members, and is expressed as

systems of routine, roles, transactive memory systems and other forms of distributed knowledge. Team members become part of this structure by negotiating with each other, claiming and ceding roles, providing access to information and performing specialized work on behalf of the team. Interaction is the principal process of group learning by doing; the distributed cognitive structure that results from these processes is shared experience.

It is important to note here that when authors propose that shared experience in project teams makes knowledge less diverse (e. g. Guimerà et al. 2005; Wageman & Gordon, 2005), this doesn't mean 'know how' or even 'know what' knowledge. A pediatric oncologist and a molecular neurobiologist working together do not become expert in each other's domains. What they learn is how to work together, what matters for smooth functioning, how others work, what is important to the group. This is Grant's 'common knowledge' (1996) and Dougherty's 'world view' (1992). Learning how to interact routinely is a non-routine process, but routine is the result. As with any routine, the knowledge developed does not have to be shared, only mutually consistent. What A believes and does must dovetail with what B believes and does (Nelson & Winter, 1982). It is also worth pointing out that if A and B develop motives for project choice that converge, shared experience could generate the appearance of common knowledge and routine without actually changing the way team members interact. If agents systematically prefer to work on projects that require less effort from or if shared experience reduces search effort for the next project, performance could suffer without any changes at all to interaction or knowledge diversity.

Research directly addressing the effects of shared experience in project teams has not been widespread. As noted above, the shared experience construct has been usually been treated as an element of interaction. Recently there have been a number of archival studies that treat shared experience separately, the results of which I summarize below.

The literature of shared experience and project performance

I begin by noting that although one might expect participants in project based industries to work with different collaborators on every project, repeat collaboration is more common than random assignment would suggest. Zuckerman (2006) examined a variety of relationships in Hollywood motion pictures and found significant repeat collaboration as did Skilton (2006b) and Sorenson & Waguespack (2005). Scientists also work together repeatedly

(Guimerà et al., 2005; Skilton 2006a). For a variety of reasons, people in these contexts work together repeatedly (Faulkner & Anderson, 1987; Hinds et al., 2002).

In the first of my studies dealing with the relationship between shared experience and project performance (Skilton 2006a), I found that research teams in the natural sciences produced articles with less scholarly impact when they had worked together more often. Based on a study of articles published in the most widely cited science journals, this conclusion was contingent on the level of multidisciplinarity in the project team. Multidisciplinary teams with less shared experience performed significantly better than multidisciplinary teams with more experience, while the difference between mono-disciplinary teams was not significant. Mono-disciplinary teams produced significantly less impact than multidisciplinary teams. It should be noted that performance change is relative – teams with multiple disciplines tend to do better than teams without. Performance is diminished relative to what it would be if the team had less shared experience.

Further probing produced evidence that multidisciplinary teams with little shared experience and a strong leader produced outcomes with the most impact, while multidisciplinary teams with high shared experience and a strong leader produced outcomes with the least impact. Assuming that multi disciplinary teams with little shared experience have to build cognitive structures from scratch while experienced or homogenous teams do not, these results suggest that the process of interaction is what matters. A strong leader can help this process be effective. The finding that teams with more shared experience and strong leadership perform poorly suggests that performance is impeded by the baggage carried forward from prior projects, and that the leader can be implicated in this carry forward.

However, since the study included no direct measure of interaction, I could not rule out the possibility that teams with more shared experience were simply producing projects that were intrinsically less appealing to the audience. Given the benefits to scientists of publishing frequently, I had to ask whether this result was not simply the result of shared experience lowering the threshold of which projects are ‘good enough’ to engage in.

One way to approach this question is to examine the relatedness of projects. If team cognitive structures consist of roles and contributions that are specialized to a certain technology, content area or project type, the threshold for producing projects of that type will be lowered by shared experience. I developed a post-hoc measure of relatedness between the

current project and the projects in which teams developed experience. Teams whose current projects were derivative of the preceding project stream had more shared experience, but relatedness to past projects did not influence performance in the current project. Some derivative projects are the crowning achievement of a research program, while others are simply easy publications. If the threshold for project choice is lowered by shared experience, the lower threshold is not reflected in project relatedness.

I found similar results in a study of behind the camera teams in Hollywood motion picture production (Skilton, 2006b). Teams of specialists who work together repeatedly are paid less, their films are marketed at lower levels and are less successful at the box office, relative to what we would expect from an equally competent team with no shared experience. Intermediate buyers *and* final audiences find less value in the products of teams with high levels of shared experience. In this setting, where multidisciplinarity is entrenched in the system of roles, the negative effects of shared experience were contingent on the quality of the team. I labeled this the Allen-Eastwood effect because it was associated with the filmmakers Woody Allen and Clint Eastwood, who diverge from Hollywood norms by working repeatedly with the same high quality behind the camera teams on many projects.

It is worth noting that because cost and performance are both less, profitability might be unaffected by this relationship. This once again raises the question of whether threshold reduction might be the operative explanation. I created a measure of the relatedness of the focal project and its preceding projects based on genre, rating and release timing. In this setting, where I have cost data, the results of this *post hoc* analysis are more complex than in the natural science case. The relatedness of projects is significantly and negatively related to project costs, but not to project performance. The relatedness measure was not significantly correlated with the level of shared experience. Shared experience and the relatedness of projects are independently negatively related to cost, but as in the natural science case, only shared experience is negatively related to performance. This suggests that specialization by team members in a certain type of project would tend to make that kind of project more profitable when these people are employed on it, but that shared experience between team members would not. Specialization and shared experience are different. This suggests once again that we must look beyond project relatedness to find support for the concept of threshold reduction in the project selection process as a driver of performance reduction.

A recent study by Uzzi and Spiro (2005) examined the relationship between performance and the small world characteristics of the industry network of the Broadway musical theatre. As a control they included a measure of shared experience, which proved to be strongly negatively related to the artistic but not the financial success of shows. This divergence may be due to the very limited nature of the financial success measure they used (hit, flop, failure) in contrast to their more complex measure of artistic success. For the purposes of this review, the finding that shared experience impacted critical appeal suggests that the quality of the project is impaired by shared experience. Whether this results from the creation of barriers or the lowering of thresholds is an open question.

A second study by Uzzi and his colleagues (Guimerà et al., 2005) examined the development of collaboration network structure in creative and science projects. They found that in Broadway musicals, economics, ecology and social psychology, project teams that are dominated by repeat collaboration 'typically have lower levels of performance.' The authors speculate that this performance decrement occurs because repeat collaboration 'tends to homogenize (the) pool of knowledge' making it less likely that the team will have innovative ideas. This speculation could implicate either interaction barriers or project selection problems as causes of weaker performance.

In a study that examined team performance in athletic teams, Berman, Down and Hill (2002) found an inverted U shaped relationship between shared experience and performance. Although this study examines athletic teams that are nominally like stable work groups, rapid turnover and variability in production contexts (opponents, road vs. home, playoffs), make athletic teams an intermediate form between true project teams and stable work teams. After a certain point it is beneficial to refresh an athletic team by injecting new players into the process. Otherwise performance declines as shared experience and its accompanying routines and distributed specialization systems take hold. It is more likely that basketball teams with high levels of shared experience face barriers to innovation and flexibility than that they opt for lower performance routines. It is also possible that teams with more shared experience become more predictable, allowing opponents to develop successful strategies against them. This raises the possibility that shared experience can influence external agents such as competitors or resource providers, and through them decrease performance.

Although they do not address the question of market performance, studies of familiarity and group performance and studies of group process performance and transactive memory systems are also worth noting, because they provide insight into process that is not accessible through archival studies. Groups whose members are familiar with each other tend to be more accurate and faster in the performance of tasks. The study by Harrison et al., (2003) provides the best example of this relationship as they found that continuing teams (teams who were initially unfamiliar, but stayed together) rapidly became as efficient as already- familiar teams in repeated performance of an experimental task. As teams stay together they become more efficient. Similar results are found in a number of studies of transactive memory systems. Research shows that teams with more accurate TMS, particularly in terms of knowing who knows what, have more efficient and effective processes (Austin, 2003; Faraj & Sproull, 2000; Lewis et al., 2005; Liang et al., 1995). This suggests that interaction in teams with strong TMS is more efficient because it is more accurately focused – team members know where to go for help. Despite this apparently positive result, efficiency and accuracy are not always associated with superior performance, especially in creative projects. Attending to the efficiency of a process may divert our attention from other aspects of process, such as rigidity or restriction in patterns of interaction.

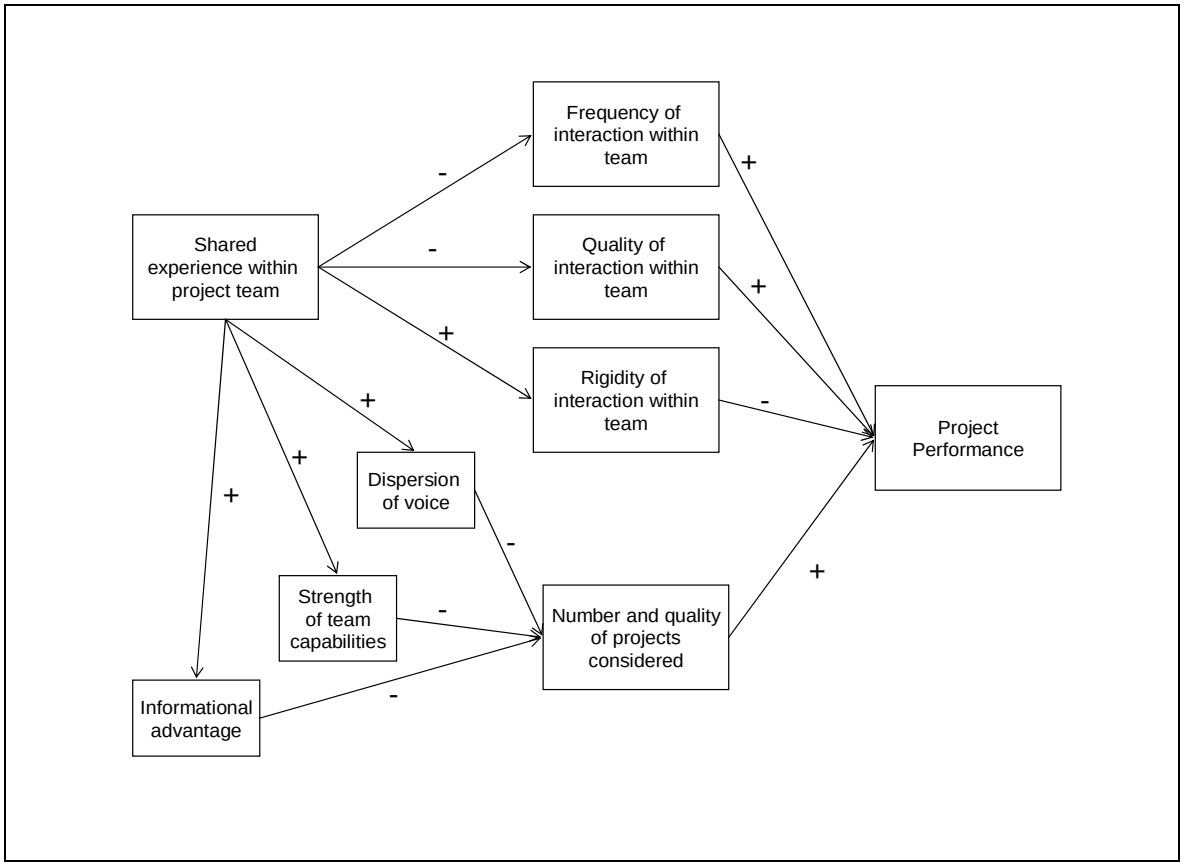
Finally, since much of what I propose rests on the assumption that team members who interact intensively come to share beliefs and values, it is useful to notice a study by Wageman and Gordon (2005) in which they studied the effects of interaction on the emergence of shared values. They found that after groups developed patterns of mutual interdependence, group members values were more strongly shared.

Theory Development

There is, as noted above, plenty of positive evidence that interaction is essential to project performance. The results of studies of shared experience and performance in creative project teams suggest that the cognitive structures produced through shared experience are a deterrent to some types of success when they are imposed on future projects. In this section I ask whether shared experience creates barriers to interaction or lowers the threshold for project choices, or both. Model 1 presents these alternatives as a unified whole. What I propose is essentially a complex model of common cause, where shared experience influences interaction processes and project selection in a variety of ways. Because there are many paths

through which the influence of shared experience on performance can be felt, no single path needs to have a strong effect. The function of this model is to present these alternative pathways as having simultaneous effect, so that future researchers and managers will be better equipped to deal with the complex relationship between shared experience and project performance.

Model 1. The relationship between shared experience and project performance.



Barrier creation.

Barrier creation is the more strongly supported explanation for the negative relationship between shared experience and performance. Groupthink, a 'not invented here' mindset, or simply the development of a constraining cognitive structure (Argyris, 1986; Purser et al. 1992) may make teams less creative or less sensitive to the needs and wants of the market for their products. Shared experience may lead teams to go their own way, to 'fly the pirate flag' and to produce projects that they think are creative, but which do not match the wants and needs of the marketplace (Dougherty, 1992).

Direct support for this explanation would be provided if teams with more shared experience actually interacted less. A negative relation between shared experience and level of interaction would signal reliance on pre-existing cognitive structures. This would be consistent with the results in Ancona and Caldwell (1992) and with studies of TMS that report greater accuracy and efficiency in communication. Shared experience reduce the level of interaction, thus preventing team members from working together as intensively as strong performance would require. In causal terms, the relationship between shared experience and performance would be mediated by the level of interaction. That is, shared experience would lower the level of interaction, which would in turn cause lower performance.

Proposition 1a. Shared experience should be negatively related to the rate of interaction in project teams.

Proposition 1b. The rate of interaction should be positively related to project performance.

Proposition 1c. Reductions in the rate of interaction in teams should mediate the relationship between shared experience and project performance.

Support for the barrier creation explanation would also be found if teams with more shared experience experienced deterioration in the quality of interaction. An example of this would be when persistent teams develop defensive routines or social structures that sabotage performance (Argyris, 1986; Holmer, 2005; Purser et al. 1992). In this scenario, distributed cognitive structures that were developed through effective interaction in an original project may create dysfunctional interaction in subsequent projects. In teams with strong TMS accurate knowledge of who knows what might lead team members to anticipate responses, rather than soliciting negotiation. Shared experience could also contribute to deterioration in quality of interaction if the team's pre-existing distributed cognitive structure was a poor fit with current project tasks or goals. For example, a software development team whose members are accustomed to developing new products for mass markets, assigned to a project making modifications for a particular customer might well erect this type of barrier. The team might interact more than ever, but actually misdirect its effort into disputes, blame and contention, instead of negotiating to define and resolve problems.

Proposition 2a. Shared experience should be negatively related to the quality of interaction in project teams.

Proposition 2b. The quality of interaction should be positively related to project performance.

Proposition 2c. Reductions in the quality of interaction in teams should mediate the relationship between shared experience and project performance.

Support for the barrier creation explanation would also be found if teams with more shared experience displayed rigidity in patterns of interaction. Flexibility in patterns of interaction should indicate that a group is actively searching for solutions that can be negotiated effectively. Nonaka suggests that fluid interaction patterns are essential to knowledge creation (1994). Lack of change in patterns of interaction would signal the existence of strong distributed cognitive structures such as TMS. While rigidity would primarily be reflected in a fixed pattern of communication at reduced levels, it might actually be reflected in a constant or increasing level of interaction, if interaction is rendered ineffective by process losses or communication failures. Symptoms of rigidity barriers might include hierarchical communication patterns and the development of in-groups, cliques or factions. Rigidity makes interaction less effective by constraining communication among team members, by preventing negotiation and by demoralizing team members (Purser et al., 1992). It is worth noting that rigidity barriers can be made up of things that appear to be beneficial, such as friendship ties, power relations, identification with the group and commitment to shared values and beliefs.

Proposition 3a. Shared experience should be positively related to the rigidity of interaction patterns in project teams.

Proposition 3b. The rigidity of interaction should be negatively related to project performance.

Proposition 3c. Rigidity in patterns of interaction should mediate the relationship between shared experience and project performance.

Threshold reduction

Although it is not directly supported by any of the studies noted, the possibility that shared experience lowers the threshold for determining which projects are attempted still needs to be considered. Because the cognitive burdens of engaging in repeat collaborations might be less, the face validity of the explanation is considerable. If shared experience makes project work easier, it is not surprising to see scientists, movie makers, Broadway

professionals and athletes engaging in repeat collaborations (Hinds et al, 2003; Uzzi and Spiro, 2005; Zuckerman, 2006), even when there is a known cost to performance. The subsequent project may be attempted because the hard work of learning to work together is already done, rather than because the project outcome promises to be stellar. To fully understand this explanation, we need to consider the relationship between shared experience and the project selection decision, as shown in Model 1.

How can shared experience lower the threshold of quality that determines which projects are chosen? The basic mechanism I propose is that when teams stay together, the array of choices considered for the next project changes. In most cases these changes will tend to restrict the number and kind of projects that the team considers. Shared experience will simultaneously move some lower quality projects to the forefront of consideration and lower the amount of effort expended in searching for high quality projects. A narrower range of choices is less likely to include projects with the potential for great performance.

Proposition 4: The number of projects considered in the run up to project launch is negatively related to project quality and project success.

There are three basic processes that change the array of projects being considered. I call the first of these processes *dispersion of voice*. In a dispersion process, teams may choose projects with lower performance potential simply because more people have voice in project selection. Voice can be explicit or implicit. When voice is explicit all team members who remain have voice in the choice of which projects to pursue. If the team denies them voice, they may simply go elsewhere. In implicit voice, the decision-maker may consider a narrower range of projects in order to attract preferred repeat collaborators to the subsequent project. In either case the array of choices considered will be restricted by the intersecting preferences of team members, rather than broadened by the inclusion of multiple view points. As shared experience gives voice to more team members, compromise choices become more likely. If the dispersion of voice favors focused projects (i.e. the intersection of a multidisciplinary set of specialists) or pet projects, performance will suffer because these kinds of projects are likely to appeal to narrow audiences.

Proposition 5a: Shared experience is positively related to the dispersion of voice in the project selection process.

Proposition 5b: Dispersion of voice in the project selection process is negatively related to the number and quality of projects considered.

The second process influencing project choice is *extension*. Teams may attempt lower quality projects in new areas in order to exploit the capabilities they have developed. I call these extension projects. It is important to note that when I refer to extension projects, I am not necessarily referring to sequels or related projects. As noted above, while the data support the idea that related projects are less costly, related projects perform as well as projects in general. This is because follow-on projects may represent radical advances as easily as they represent incremental exploitation. In the natural sciences research programs may produce tentative or incomplete results at first, followed later by a truly groundbreaking project. This pattern also occurs in Hollywood sequels, the epitome of derivative projects. Sometimes sequels bomb, but sometimes they outperform the original. Relatedness is a poor predictor of project performance.

For the purposes of this paper extension projects are defined as additional applications of the project team's more or less intact capabilities. Extension projects include project choices based on capabilities or internal values and beliefs that restrict the kinds of projects the team considers. Dougherty (1992) raises exactly this concern when she suggests that as they share experience team members develop a shared world view, sometimes colored by power relations, that guides their choices and preferences. The stronger team capabilities and social structures are, the more likely the team to consider only the narrow range of projects that are consistent with those capabilities, at the expense of performance. That is, the Allen-Eastwood effect tends to produce projects that are consistent with the earlier projects of the group and inconsistent with the norms of the larger industry. Extension projects may be less likely to spur additional interest in the market, and may be difficult for the team to actually implement if they struggle to adapt capabilities or values to new settings.

Proposition 6a: Shared experience is positively related to the strength of capabilities developed by the team.

Proposition 6b: The strength of team capabilities is negatively related to the number and quality of projects considered.

The third process that lowers the project quality threshold is an *informational advantage* process. Teams that stay together may have an information advantage in the

decision making processes of project owners or resource providers. Shared experience makes it possible for teams to succeed with proposals that would not be funded if proposed by teams that have no track record together. This is because having a track record together gives resource providers better information about the capabilities and reliability of the team, which may translate into favored status. Grants for science projects and green lights for movies and plays may face lower thresholds when the teams proposing them are relatively intact. Relatively intact teams may be successful proposing extensions, pet projects and narrowly focused work while better proposals by less known teams are rejected. Resource providers may actually be aware of this, and view the decision as a trade-off between reliability and potential performance. In this process shared experience is related to choices made by resource providers. If this is the case, the project team itself may be propose the best project it has and operate with no change in interaction, and performance would still be less. This process may be one of the reasons that Woody Allen and others like him continue to win approval for their projects. Their projects have reliable although predictably lesser results. Adaptation by competitors to consistent project choices would have a similar effect.

Proposition 7a: Shared experience is positively related to informational advantage with resource providers.

Proposition 7b: The level of informational advantage with resource providers is negatively related to the number and quality of projects considered.

It is worthwhile to remind the reader at this point that this model conceives of project choice and interaction as distinct processes influenced by shared experience. The proposed effects appear to be sequential – the project has to be selected before interaction can occur – which raises the possibility that the selection process in some way causes changes in interaction. I think that this is unlikely. What is more likely is that, in choosing to work on projects, team members consider the benefits to themselves of the potential for success, and weigh that against the costs to themselves of participating. I suspect that the lesser quality of projects selected is knowingly traded off against the lower cost to team members of repeat collaboration. The trade off leads them to accept the restricted lower potential choices associated with shared experience, rather than engaging in costly and difficult search for a killer next project, followed by another costly process of interaction. This suggests that the frequency, rigidity and quality of interaction is established simultaneously with project

selection. Because the effects are simultaneous rather than sequential, the common cause set of simultaneous mediated paths presented in Model 1 is better than a sequential model.

Discussion and Conclusions: Learning across projects and organizational learning

The model brings together two consequences of shared experience: changes in the way team members interact and changes in the ways that projects are selected. Together these ideas constitute a more encompassing theory of the relationship between project team composition and project performance. Proposing these ideas together encourages scholars to look more broadly for the causes of project success and failure. Although we know that interaction processes within projects are important, they do not fully explain performance. We can come to a richer understanding of how projects work by also studying pre-project processes of selection, the effects of prior contact or even the way resource providers or competitors respond when project teams have more shared experience.

The theory of interaction presented in this study is relatively simple and based strongly on prior research. The important idea I present is that it is the processes of interaction that matter for project success, rather than the diversity of knowledge or the cognitive structures that develop. Learning and doing may matter more that having learned. This paper suggests that carrying forward distributed cognitive structures such as TMS, shared values and shared experience from one project to the next can undermine current interaction. The products of a beneficial process may suppress that process in the future. While it does not address the details of what kinds of interaction are best, this paper provides dimensions along which interaction processes in different teams can be compared. Support for my theory would be provided if shared experience leads to relative reductions in the frequency, quality and rigidity of interaction, and these, in turn, lead to relative reductions in performance. Finding support for the propositions would make it possible to develop a more fully grounded theory of which distributed cognitive structures are valuable under which circumstances. TMS, for example, may be valuable in related or repetitive tasks and damaging in creative ones.

Because there has been relatively little attention to the question, my theory of the relationship between shared experience and project selection processes is a significant contribution. This theory would be potentially more important if it were shown that shared experience does not lead to changes in patterns of interaction, or that it makes interaction better. Recognizing that there are strong beliefs, based on strong evidence, that the distributed

cognitive structures such as TMS enhance the efficiency and effectiveness of groups, I have tried to generate an alternative explanation for the negative relationship between shared experience and project performance. Understanding how the products of learning can alter project selection rather than interaction processes is a way to reconcile two apparently contradictory results.

In the first set of propositions concerning threshold reduction, I raise the question of how dispersion of voice would operate in the context of project selection. It would be conventional to argue that greater variety of voice in a decision process would lead to a wider search, but I think that this is not the case, since each team member would add constraints to search. The result would be a search limited to the intersection of individual interests rather than the union of all possible interests. Narrow, fragmented search is less likely to identify a high performance project. I further suggest that teams that develop strong capabilities in early projects may be more likely to select lesser quality projects in the future, thereby reducing project performance. While the evidence suggests that related projects, the most obvious form of extension, have lower costs but not lower performance, there are other forms of extension. Teams that develop strong team culture, shared beliefs and transactive memory systems may try to apply those capabilities in new contexts, with predictably less successful results. Finally, I propose that teams with shared experience may have greater leverage with resource providers. In this case the team can win support for projects that would otherwise be rejected. Resource providers may trade off lower performance for more predictable performance, a process that requires no learning, change in interaction or unintended preference for lower performing projects on the part of the team itself. Even if shared experience has no impact on interaction, these project selection processes would be sufficient to undermine project success – if they occur. Research drawing on primary sources is called for to determine the validity of these propositions. If they are supported, a whole new area of project based learning research will be opened up.

Both dimensions of this theory have implications for learning from projects at the organizational level and hence for managerial practice. Project oriented organizations face the challenge of ambidexterity; they must balance exploitation of current knowledge against the need to make new discoveries and break new ground. On the exploitation side, favoring well established teams and encouraging extensions is beneficial, especially if the organization can

overcome barriers just enough to stimulate interaction without eroding the efficiency of shared experience. On the exploration side, the challenge is more difficult. If organizations seek innovative and challenging proposals, can they develop routines that encourage such proposals even from well established teams? Implementing such routines requires answers to questions that have not been previously asked in project based learning research. If interaction is what matters in project teams, and interaction is reduced by shared experience, does that mean that every project team should be created from scratch? In small organizations this would be difficult. Are there ways to stimulate interaction on teams with histories of repeat collaboration? How much interaction is necessary? How can a manager know which projects require more interaction? If project choice is restricted by shared experience, how do managers get teams to open the search process up? How are managers implicated in the restriction of choices? Do managers facilitate dispersion of control? Are they seduced by the promise of easy payoffs in extensions? How are managers as resource providers implicated in providing resources to familiar teams?

It is worthwhile pointing out that project based industries have evolved processes that deal with some of these issues. For example, participants in project based industries appear to be particularly conscious of the benefits of keeping levels of shared experience down. It is probably not accidental that persistent whole teams are rare in creative projects and scientific research. Persistent dyads and triplets are relatively common, but larger groupings are not. Participants in Hollywood projects and on Broadway not only continually reconfigure the mix of participants in projects, they also systematically bring newcomers into the process. Scholars in scientific research have developed the graduate and post doctoral systems to do exactly the same thing. Inducting novices compensates for mortality losses among participants and refreshes interaction processes by breaking up intact teams. These observations raise interesting questions about how to be competitive in project based industries. What level of persistence in the composition of project teams is optimal? Is it better to shuffle grous of experienced team members, or is it necessary to sometimes bring newcomers into the production process? Is the unit of competition the project or the project leader, the senior scholar or movie producer who puts the project team together?

Finally, this study has some limitations. The study builds from results in a narrow range of creative, project based industries. Making art and science may be somehow different

from designing new products or developing real property, but the nature of the presumed difference is not clear to me. The projection of pre-existing distributed cognition onto the current project should have the same effects whether the task is making a movie or building an office park. It would be more difficult to extend this theory to work teams that are not project based, since presumably the tasks of such groups are much more routine that the novel and unanticipated flow of problems on creative projects.

Because the studies that led to this paper were archival rather than based on primary sources such as team members surveys, interviews or observation, I do not deal with the details of which kinds of interaction within teams might determine project success. There is an extensive case literature on the details of interaction in project teams which may provide further insight into this question, but doing so is beyond the scope of this study. It should be noted that my take on performance is oriented toward market acceptance rather than process measures like speed or efficiency. I take this approach because performance in the market is what matters in the long run for project owners and the careers of project participants. Because every path in the model is mediated, the effects of shared experience along any path may be diluted by factors that affect the mediating constructs. Given this, it is remarkable that the studies I cite have produced consistent results. If my model of the shared experience – performance relationship is underspecified and all these studies have detected the relationship, it seems likely that the relationship is a strong one, worth developing theory about. Having developed theory, the next step is to seek empirical confirmation from primary sources.

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