Expertise Utilization in Project Teams:
A Status-Based Account of Process and Performance

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ABSTRACT

Why do some teams fail to use their members' knowledge effectively, even after they have correctly identified each other's expertise? Whereas the prevailing assumption in much of the micro-sociology and small groups literature suggests that teams will automatically defer to members who are believed to be experts, I argue that certain circumstances make team members unwilling or unable to use each other's expertise – even after they have accurately determined who knows what. In particular, my dissertation integrates micro-sociology (status characteristics theory) and small groups research to develop theory about how *status dynamics* in teams affect team-level expertise recognition and utilization processes and the resulting performance implications. I propose both team factors (shared representations) and task factors (performance pressure) that moderate the relationship between expertise recognition and utilization, and I identify mechanisms through which these factors either hinder or facilitate the process.

I refine and test my theory with a multi-method field study across two professional service firms, including six longitudinal case studies of project teams, multi-point surveys of 104 accounting and consulting teams (500+ team members), interviews and surveys with the teams' managing partners and their actual clients, and archival data.

My dissertation advances theory in two major ways. First, I demonstrate that teams do not automatically defer to their resident experts, and I identify conditions under which status dynamics will interfere with effective team-level expertise utilization. This finding has important theoretical implications for both status characteristics theory and for small groups research, and my dissertation develops and

tests theory to begin explaining *why* this process breaks down. Second, by relating group expertise processes to client-rated performance, my research brings a novel perspective to the study of inter-firm relations. Whereas existing literature has shown that high levels of human capital help to maintain positive client relations, I show that the appropriate *utilization* of team members' expertise contributes significantly to this outcome, over and above the mere *presence* of knowledge.

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CERTIFICATION OF DISSERTATION

I certify that the ideas, empirical work and conclusions reported in this dissertation are entirely my own, except where otherwise acknowledged. I also certify that this original work has not previously been submitted for publication.

Candidate: Heidi K. Gardner

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Signature of candidate Date

CHAPTER 1: INTRODUCTION

Why do some teams fail to use their members' knowledge effectively, even after they have correctly identified each other's expertise? Whereas the prevailing assumption in much of the micro-sociology and small groups literature suggests that teams will automatically defer to members who are believed to be experts, I argue that certain circumstances make team members unwilling or unable to use each other's expertise – even after they have accurately determined who knows what. In particular, my dissertation integrates micro-sociology (status characteristics theory) and small groups research to develop theory explaining how status dynamics in teams affect members' willingness and ability to use each other's distinct knowledge, ultimately leading to differential performance outcomes.

A review of the literature from micro-sociology and small groups research (Chapter 2) suggests some important gaps in our understanding of team-level expertise utilization processes. For example, status characteristics theory provides an important framework for understanding how perceptions of expertise translate into influence (and thereby knowledge application) in groups; given the theory's explicit proposition (i.e., the "basic expectations assumption") that individuals automatically defer to experts, however, important questions about boundary conditions or modifiers remain unexplored. Some field research in this domain similarly suggests that members of interdependent task-focused teams will be motivated to draw on others' recognized expertise for the good of the group, even when it means sacrificing their own social influence (Bunderson, 2003). Yet it is widely known that individuals from different functional departments or with varying professional backgrounds have difficulty reaching a common understanding of their tasks (e.g., Bechky, 2003), a

factor which is likely to influence their ability and willingness to use others' expertise in a cross-functional project team. Further, group members typically have both cooperative and competitive motives (Bazerman, Mannix, & Thompson, 1988) and thus are likely to engage in self-interested behaviors (e.g., Wittenbaum, Hollingshead, & Botero, 2004). Overall, we know that expertise recognition and utilization are critically important (e.g., Hollenbeck, Ilgen, Sego, Hedlund, Major, & Phillips, 1995; Lewis, 2004; Lewis, Belliveau, Herndon, & Keller, 2007) yet very difficult in teams (e.g., Baumann & Bonner, 2004; Littlepage, Schmidt, Whisler, & Frost, 1995; Stasser & Titus, 1987) , but we still know relatively little about the conditions that influence the links between this process – especially in teams where members might be less than fully motivated to give up their own influence over the group's outcome.

Beyond existing theory, I also draw on insights from an initial phase of qualitative work to develop richer, contextually grounded theory in the domain of professional service firms. Intensive case studies of six project teams across two professional firms led to some surprising insights about factors that impede effective team-level knowledge utilization. I test my theory in a multi-method field study including longitudinal surveys of 104 accounting and consulting teams (500+ team members) from a Big 4 audit firm, a set of archival databases, and performance data (interviews and surveys) with teams' managing partners and clients. Chapter 3 outlines the research design and methodology.

In developing theory about moderators of the link between expertise recognition and utilization, I turn first to the literature on shared representations (Chapter 4). We know from prior research that groups holding shared and accurate understanding of their task and teammates tend to be better coordinated and higher performing (e.g., Cannon-Bowers, Salas, & Converse, 1993; Edwards, Day, Arthur, & Bell, 2006;

Hirokawa, 1985; Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005; Rico, Sanchez-Manzanares, Gil, & Gibson, 2008; van Ginkel & van Knippenberg, 2008). This chapter addresses recent calls for theoretical and empirical exploration of shared representations in the following ways: (1) by examining the link between shared representations and the actual use of knowledge by teams (e.g., Rico et al., 2008), (2) by including measures of both accuracy and sharedness (e.g., Cooke, Kiekel, Salas, Stout, Bowers, & Cannon-Bowers, 2003; Rico et al., 2008), and (3) by distinguishing between team-related and task-related representations (e.g., Edwards et al., 2006).

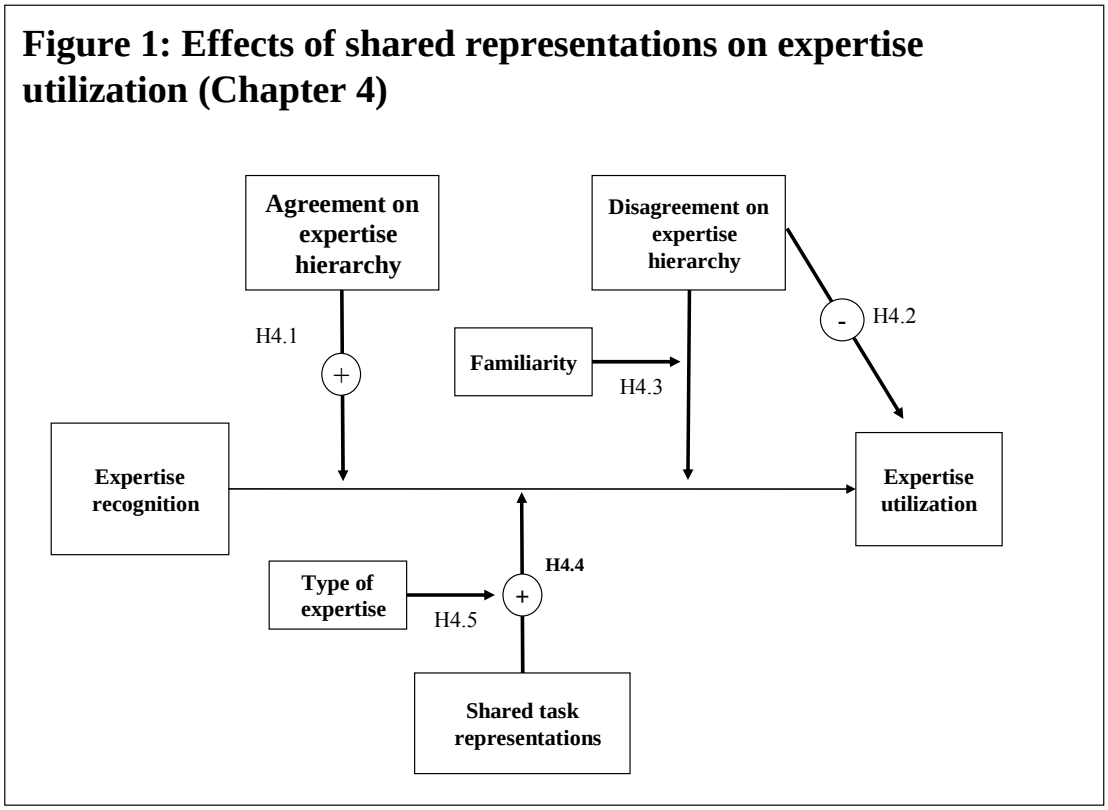
Shared team representations is conceptualized as the extent to which team members hold a consistent view of each other's relative competencies (i.e., agreement on the expertise hierarchy). A lack of shared team representations (i.e., disagreement on the expertise hierarchy) is likely to affect team-level expertise processes, although different literatures predict either detrimental or beneficial impact. Because it would generate relational conflict between members (Ravlin, Thomas, & Ilsev, 2000) and undermine the legitimacy of the perceived expertise ranking (Ridgeway & Berger, 1988), disagreement is likely to dampen the relationship between expertise recognition and utilization. Conversely, disagreement might stimulate the decision maker(s) to reconsider their views of whose influence to accept (Nemeth, 1986). To the extent that this re-examination leads to greater influence from actual experts, then dissent is likely to increase the effectiveness of the team's expertise utilization. These competing effects are explored and tested. In addition, I propose that member familiarity will interact with disagreement to strengthen its moderating effects on expertise utilization. Specifically, interpersonal familiarity should lessen concern about social acceptance, leading to lower conformity and higher willingness to express alternative perspectives and judgments (Asch, 1956; Nemeth, 1986).

Members' familiarity with one another should thus make disagreement more easily detectable within groups, increasing its effects.

I propose that *shared task representations* (Smith, Tindale, & Dugoni, 1996) affect the ability of both the expert and his/her teammates to utilize expertise most effectively by allowing them to overcome interpretive barriers and coordinate action more efficiently. I also posit that shared task representations affect teams' motivation by encouraging experts to share their knowledge and others to use uniquely held information. These benefits suggest that shared task representations will enhance the link between expertise recognition and utilization. By examining the relative status associated with different kinds of expertise in this setting, I further suggest that the strength of these benefits will be contingent on the type of expert whose knowledge is being considered.

These relationships are shown in Figure 1.1 below.

Figure 1.1: Effects of Shared Representation on Expertise Utilization



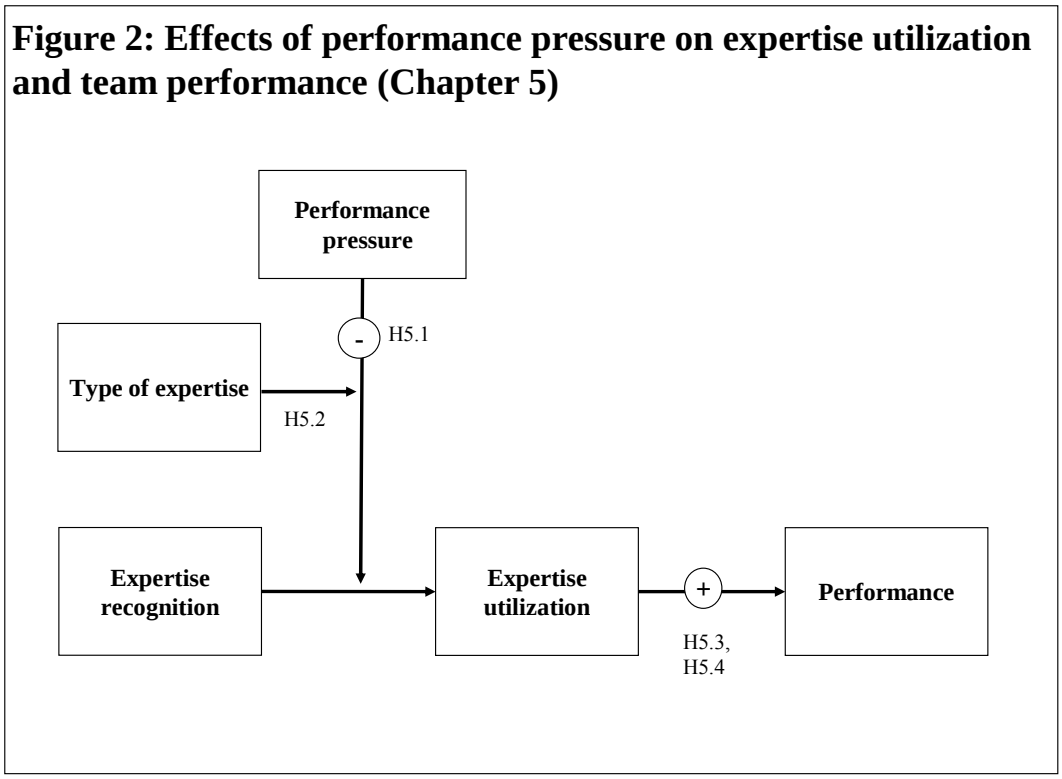
In summary, Chapter 4 deepens our understanding of team-level knowledge processes by showing how team members' shared representations concerning both their teammates and their task can moderate the link between expertise recognition and utilization. I further highlight how status dynamics – the assumptions about others' competence based on their position – can influence the way these factors interact.

Further, this dissertation identifies performance pressure as a critical barrier to effective knowledge utilization (Chapter 5). Performance pressure is a kind of stress experienced by team members who know that their work is subject to intense scrutiny and that lapses may lead to undesirable consequences affecting members' well-being

(e.g., Ellis, 2006; Kahn & Byosiere, 1992). Performance pressure creates threat rigidity effects in teams, meaning that they default to using the expertise of high-status members while becoming less effective at using team members with deep client knowledge. In other words, the moderating effects of performance pressure are contingent on the type of expertise under consideration.

Figure 1.2 shows these relationships.

Figure 1.2: Effects of Performance Pressure on Expertise Utilization and Team Performance



I also find that only the use of client-specific expertise (not the expertise of high-status members) enhances client-rated performance. Chapter 5 thus reveals a paradox affecting teams' use of members' knowledge: the more important the project, the less effective the team. This chapter contributes to the emerging literature linking team-level expertise utilization (instead of just recognition) with performance

outcomes and also adds a novel, team-level perspective to the literature on inter-firm relations.

In summary, my dissertation advances prior work in two major ways. First, I demonstrate that teams do not automatically defer to their resident experts, and I identify conditions under which status dynamics will interfere with effective team-level expertise utilization. This line of theorizing is in the spirit of McGuire's (1973: 452) "accounting for exceptions": although my findings confirm prior research suggesting that expertise recognition is *typically* related to expertise utilization, examining the conditions when this relationship does *not* hold true deepens our understanding of the mechanism underlying this process.

Second, by relating group expertise processes to client-rated performance, my research brings a novel perspective to the study of inter-firm relations. Whereas existing literature has shown that high levels of human capital help to maintain positive client relations, I show that the appropriate *utilization* of team members' expertise contributes significantly to this outcome, over and above the mere *presence* of knowledge.

CHAPTER 2: LITERATURE REVIEW

My dissertation integrates literature primarily from two research traditions – small groups research and micro-sociology (status characteristics theory). This chapter focuses on reviewing relevant research from both traditions. In addition, I begin by defining expertise as used in this dissertation and conclude by reviewing literature that addresses the effects of expertise utilization on performance.

Expertise definition

In the group decision making literature, a range of definitions have been offered for "expertise." It is sometimes narrowly defined to capture the distribution of specific task-related facts. Hollenbeck et al. (Hollenbeck et al., 1995:295), for example, define expertise as "the allocation of critical information (cues) about the decision to individuals in the team and knowledge of how that information should be used to reach decisions." In empirical work, expertise is often not explicitly defined but rather operationalized as prior individual performance, as in the work of Littlepage and colleagues (Littlepage & Silbiger, 1992; Littlepage, Robison, & Reddington, 1997; Littlepage et al., 1995), presumably on the assumption that expertise is the only / main driver of performance for the tasks under consideration. Hackman (1987) conceptualizes expertise considerably more broadly, referring to the collection of individual competencies, skills and knowledge that together constitute the group's resources. This dissertation draws on the broader meaning of expertise to include not only relevant information (i.e., raw data) and knowledge (i.e., understanding of how that information applies to particular situations), but also related skills (i.e., learned abilities for task performance) and associated talents (i.e., "natural" capabilities that many believe stem from inherent qualities such as

intelligence). An expert in a particular domain may draw on any or all of these sources to demonstrate expertise.

The strategy literature, specifically the interfirm relations literature that extends the resource-based view (RBV) of the firm, suggests a way of classifying expertise based on its relevance to one versus many relationship partners (i.e., customers, clients). The RBV perspective argues that differential firm performance is fundamentally attributable to firms' differential ability to accumulate capabilities that are rare, valuable, non-substitutable and difficult to imitate (Barney, 1991). The interfirm relations literature (e.g., Dyer, 1996; Dyer & Singh, 1998) builds on this view to suggest that competitive advantage may accrue to firms that jointly accumulate such resources through repeated interactions, specifically when those involve transaction- or relationship-specific investments (Williamson, 1981). Asanuma (1989: 21) elaborates the concept of the relationship-specific expertise as follows:

> "Basically this is the skill required on the part of the supplier to respond efficiently to the specific needs of the core [customer] firm. Formation of this skill requires that learning through repeated interactions with a particular core firm be added to the basic technological capability which the supplier has accumulated. In this sense the skill always consists of two layers: the surface layer which corresponds to accumulated learning acquired through transactions with a given core firm, on the one hand, and the basic layer which corresponds to general technological capabilities, on the other hand."

Following Becker (1964), the human capital (HC) literature similarly distinguishes between "general" and " specific" human capital. There are parallels between general HC and what Asanuma (1989) calls the basic knowledge layer and

between specific HC and Asanuma's surface layer knowledge. General human capital (such as literacy) is useful to all employers, whereas specific human capital refers to skills or knowledge that is useful only to a single employer or industry. I adapt this definition to the setting of professional service firms, where the usefulness of expertise relates to one's client(s) instead of employer: thus, general professional expertise is widely relevant across clients, while client-specific expertise pertains to a single client.

This conceptualization is consistent with prior definitions of professional knowledge that include both general and client-specific expertise, such as the one by Morris and Empson (1998: 613):

> "…knowledge [in professional service firms] is viewed as information which professional firms acquire through experience and training, together with the judgment which they develop which enables them to deploy that information effectively in order to deliver client service. Thus, knowledge is not limited to technical or product based expertise (professional know-how, as Sveiby & Lloyd, 1987, call it) but may also be knowledge of clients or industries and how they operate."

The following sections elaborate the definitions of general professional expertise and client-specific expertise.

General professional expertise

Professionals gain general expertise to conduct their work from a variety of sources. Overall, expertise can be classified as either articulable or tacit (Polanyi, 1966); both types are essential for professional skills (Maister, 1993). Typically, professionals gain articulable knowledge through formal education, including university, post-graduate programs such as law or medical schools, and advanced

qualifications such as the ACCA for accountants in the UK.[1] The value of a professional's education often holds throughout their careers (D'Aveni, 1996); long after they have completed their degree(s), a professional's qualifications are considered a signal both of their level of knowledge and their ability to continue acquiring professional expertise (Hitt, Bierman, Shimizu, & Kochhar, 2001).

Following their degrees, professionals continue to build necessary career expertise, often in the form of tacit knowledge gained through "learning by doing" (Pisano, 1994). As professionals advance through the firm and progress in their careers, they continue to acquire firm-specific and industry-specific expertise in their professional domain. Both organizational tenure (i.e., number of years at a particular professional service firm) and professional tenure (i.e., number of years practicing as a lawyer, accountant, etc.) are important indicators of a professional's level of tacit knowledge.

Together, an individual's level of articulable and tacit professional knowledge are often considered to be "human capital" – intangible resources that both the individual and his/her firm can draw on to create value and improve performance (Hitt et al., 2001; Hitt, Bierman, Uhlenbruck, & Shimizu, 2006). Human capital in these studies is thus conceptualized as a broad set of general professional expertise that is transferable across clients, industries and geographies. Human capital (i.e., knowledge, skills and abilities) is equivalent to the broad definition of expertise (i.e., knowledge, skills and talents) used in this dissertation; for simplicity and clarity, I use "expertise" throughout or "general professional expertise" where it is necessary to distinguish the concept from client-specific expertise.

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[1] An ACCA will have passed the professional examinations required for membership of the Association of Chartered Certified Accountants in the UK.

Client-specific expertise

In contrast to general professional expertise, client-specific expertise[2] is applicable to only a single client organization. This type of expertise includes knowledge about how one particular organization works, such as knowledge of the peculiarities of a firm's accounting system, understanding of the client's product market to forecast the value of an inventory, awareness of the client's political dynamics, and so on. A professional firm's knowledge of a client's business, industry and idiosyncratic policies and practices allows the firm to customize its service for the client (Hitt et al., 2006). Levinthal and Fichman (1988: 348) note that this sort of knowledge is often embodied in individual professionals and "can only emerge over time." This aspect suggests that professionals acquire client-specific expertise primarily through direct exposure to a client organization; although project team members may learn some details about their client from their firm's knowledge management databases (e.g., Hansen & Haas, 2001).

Expertise recognition and utilization processes in groups

Several streams of research in the groups literature provide insight into the processes and mechanisms that enhance or inhibit the recognition and utilization of members' expertise in work groups. These streams include research on distributed knowledge (e.g., "hidden profiles research"), minority influence, transactive memory (TM), expert influence in groups, and expert influence and hierarchical group decision making, reviewed below.

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[2] In the human capital literature, client-specific expertise is called "idiosyncratic human capital" (e.g., Levinthal & Fichman, 1988: 346).

Distributed knowledge

The distributed knowledge approach, associated most strongly with the work of Stasser and colleagues (for review see Stasser, 1999; Stasser & Titus, 1985; 1987) is useful for understanding processes of both expertise recognition and expertise utilization. This research focuses on whether and under what conditions group members are able to pool unshared knowledge and information in order to make informed decisions. Empirical research conducted in this stream relies primarily (but not exclusively, see for instance Larson et al. 1998) on a methodology developed by Stasser and colleagues called the "hidden profile" method. In brief, members of a group are each provided with a set of facts, some of which are common to multiple or all members, others of which are uniquely held by a single member. Collectively, then, the group holds all the information necessary to perform the task (i.e., solve a murder mystery with the given clues), but successful performance hinges on the members actually sharing all the information with each other. The key finding from this line of research is that group members who initially know different facts are ineffective at integrating their unique insights (Stasser & Titus, 1985; for review see Wittenbaum & Stasser, 1996). Instead, during task-related discussions group members are more likely to focus on ideas that members already have in common than to share specialized information that is held by individual members. This extensive line of research thus suggests that groups are often ineffective at both expertise recognition and utilization, and sheds some light on the reasons for this sub-optimal performance.

It is important to realize that a number of the theoretical assumptions underlying this approach "bear little resemblance to many naturalistic group decision making situations", as noted by Wittenbaum, Hollingshead and Botero (2004:71) in their

critique of this research paradigm. For example, an implicit assumption in Stasser's collective information sampling model is that group members are unbiased communicators. In reality, however, individuals are likely to share more readily the information that helps them further their personal goals, to withhold information that they see as unfavorable to them, and to distort information that they do share in such a way that it suits their needs. Despite these limitations, however, the distributed knowledge approach can be considered a useful starting point for theory building in this area.

When relating this approach to the present work on expertise recognition and utilization, it is most helpful to split factors affecting ineffective information pooling into two groups: those related to the sharing and discussing of unique information versus those related to decision making groups' propensity to use unique information to shape their decisions. One cause of ineffective sharing is *collective information sampling* (Stasser & Titus, 1987), meaning that the probability that a given piece of information will be mentioned during group discussion increases as a function of the number of people who are aware of it (Stasser & Stewart, 1992; Stasser, Taylor, & Hanna, 1989). This effect diminishes over time, however, as the stock of shared items becomes depleted and the likelihood of mentioning unique items increases (Larson, Christensen, Abbott, & Franz, 1996; Larson, Foster-Fishman, & Keyes, 1994). Explicit clues about where knowledge resides increases the likelihood of members sharing unshared information (Stasser, Stewart, & Wittenbaum, 1995; Stasser, Vaughan, & Stewart, 2000; Stewart & Stasser, 1995; Wittenbaum, 2000). Similarly, solution demonstrability has been found to facilitate the sharing of unique information, whereas the lack of a demonstrable answer leads groups to focus on consensus building and inhibits information sharing (Stasser & Stewart, 1992).

Finally, although *task familiarity* enhances the sharing of unshared information (Wittenbaum & Stasser, 1996), *member familiarity* (more specifically, "member connectedness") does not increase individuals' propensity to share unique information: Thomas-Hunt et al. (2003) found instead that team members who are socially isolated (i.e., have no social bonds or connections with any other team members) were more likely to share their unique information, perhaps in a bid to increase their acceptance by others.

The mere sharing of information does not mean, however, that it will be taken into consideration for the group's final decision, as there are a number of factors that affect groups' utilization of even shared knowledge. Stasser, Taylor and Hanna (1989) discovered that unique information, once mentioned, was more likely than common information to be ignored by the group, a finding replicated by Larson et al. (1996). In their review of the literature, Stasser and Titus (2003) suggest that, in the absence of social validation of information that occurs for shared information, members use other social cues to determine the source's credibility for unique information. For example, the designation of expert roles within a group validates the credibility of unique information, making group members more likely to repeat, accept and remember information contributed by the recognized expert (Stewart & Stasser, 1995). Similarly, unique evidence introduced by a familiar source is likely to receive greater consideration than that submitted by a stranger (Gruenfeld & Mannix, 1996). In contrast, without explicit cues about other members' expertise or when members are strangers to one another, groups tend to base their discussions, and subsequent decisions, on knowledge that they all hold in common, resulting in lower-quality outcomes (Gruenfeld & Mannix, 1996; Larson, Christensen, Franz, & Abbott, 1998).

To conclude this section, it is worth noting that a number of the potential process facilitators suggested by this stream of research are at least somewhat problematic in the professional services domain. Much of the task-relevant information is unlikely to be *shared* by a large proportion of the team, as many people enter the project with different experience bases and tend to specialize further once the project begins. In particular, client-specific expertise will be held only by those team members who previously worked with that same client and had similar experiences there. *Explicit clues* about who holds expertise may not be evident to team members, particularly if they are working together for the first time; again, client-specific expertise is hard to detect because it may not be at all correlated with obvious cues such as seniority. Problems are often not easily *demonstrable*; even in the audit domain that relies on accounting regulations, team members need to use significant amounts of judgment and discretion to apply those codified rules to a specific client situation. Finally, *member familiarity* may be low, especially when teams comprise experts from multiple domains (i.e., a tax specialist called in to supplement a standard audit) or from multiple locations.

Minority influence

Minority influence is an important factor that influences the way groups consider, weight and integrate group members' contributions (for a review see Argote, 1999). The term "minority" here refers to a numeric minority on a particular subject, meaning a small percentage of group members whose opinions deviate from the norm; it can refer to either an individual or small subgroups. Whereas research on social decision schemes suggests factors like cultural norms that promote the dominance of the group's majority over its consensual decision (e.g. Davis, 1973),

research on minority influence reveals factors that affect the ability of minorities to exert "disproportionate" influence over group outcomes. Work in this domain also examines the mechanisms through which exposure to minority views affects group processes such as conflict and divergent thinking that extend the field beyond consideration of influence only as persuasion.

Several individual characteristics of the minority member(s) may increase the propensity of the group to accept their views and incorporate them into the decision or solution. First, the minority's perceived credibility is especially important to their ability to influence the group (Wood, Lundgren, Ouellette, Busceme, & Blackstone, 1994). Credibility may stem from numerous actions of the minority such as consistently expressing an opinion (Moscovici, Lage, & Naffrechoux, 1969), especially when combined with indications of confidence (Nemeth & Wachtler, 1974) or demonstrating concern for the welfare of the group rather than self-interest (Eagly, Wood, & Chaiken, 1978). Other factors that bolster a minority's credibility include perceived expertise (Stewart & Stasser, 1995) and trustworthiness (Gruenfeld & Mannix, 1996). Status is another factor that influences a group's acceptance of individuals whose opinions deviate from the majority. Hollander (1958) introduced the term "idiosyncrasy credit" to explain the phenomenon whereby people of high status within a group are allowed greater latitude with respect to deviating from group norms. High-status individuals earn this "credit" for past performance and contribution to the group. As people deviate from the group norms, however, the credit account starts getting debited. Once the credit reaches zero, even high-status individuals might be subject to sanctions for deviating from the group norms, with the consequence of greatly reduced intra-team influence.

The work of Nemeth and colleagues (Nemeth, 1986; Nemeth, 1995; Nemeth & Kwan, 1987; Peterson & Nemeth, 1996) has been particularly influential in understanding how exposure to minority views affects group processes, and suggests that minority influence within a team may be a mechanism through which disagreement has positive effects on group outcomes. Nemeth's research shows that persistent exposure to minority views fosters greater thinking about a subject, in turn leading to higher ability to understand the issue. Where there is a conflict between views, people not only devote greater attention, but also exert higher cognitive effort to resolve the conflict. People exposed to minority views also attend to more aspects about the situation and re-examine their initial premises, stimulated partly by their initial assumptions that the minority view is wrong. This re-thinking can lead individuals to seek and find novel solutions to a problem (Nemeth & Wachtler, 1983), often using strategies that are more complex than those used by people only exposed to majority views (Nemeth & Kwan, 1987).

Further research by Peterson and Nemeth (1986) suggests that minority influence also aids people's ability to think "flexibly," that is, to switch between task dimensions as appropriate. Using the Stroop test (a task requiring attention to both the meaning of a word and the color in which it is printed – such as "blue" printed in red ink), the study found that subjects exposed to minority views were better than others at the part of the task that required mental flexibility – switching frequently between reading the word itself versus naming the color of the ink. Finally, Nemeth and Rogers (1996) found that minority dissent stimulates a search for more information, covering a greater range of views; in contrast, majority dissent leads individuals to conduct a more limited, more biased search for information. In summary, Nemeth's research suggests that the greater the difference between the

minority and majority views, the more likely it is that exposure to a minority view will prompt a rethinking, in turn leading to the use of better problem solving strategies and information search and to higher quality judgments and performance. In contrast, persistent exposure to majority views leads to unreflective acceptance of the prevailing opinion.

Social decision schemes (SDS)

For groups to use members' expertise effectively, they need to integrate disparate pieces of information into a collective product such as a group decision. The social combination approach to collective decision making is one way to understand this process, and it has been central to the study of groups for decades. It conceptualizes the process of cooperative problem solving in the form of social decision schemes (SDS), which are rules or procedures that convert individual preferences into a group product (Davis, 1973). The theory provides a formal mathematical model of group productivity, specifically addressing the ways in which member inputs get combined into a single group outcome or decision. Examples of SDSs include "truth wins," in which a single correct member proposes a response that is then accepted by the group; "truth supported wins," in which one member proposes a correct answer and (at least) one other member supports it, leading the group to accept this answer; "majority," where the group accepts the answer preferred by the majority of members; and "equiprobability" in which the group decision is equally likely among any of the proposed alternatives. The group processes can be either explicit (i.e., choose to use majority rule using a voting procedure) or implicit (the group behaves *as if* it were following a particular SDS).

The nature of the task affects which SDS the group uses. As task demonstrability increases, fewer members are needed to reach a collective decision (Laughlin & Ellis, 1986). Tasks that have an intuitively compelling answer (so-called "Eureka" tasks) typically use a "truth wins" SDS. Where there is a demonstrably correct answer, but it is difficult to prove the correctness of the answer, groups favor a "truth supported wins" principle. For judgmental tasks without a demonstrably correct answer, a majority or equiprobability SDS characterizes how groups make decisions (for reviews see Davis, 1980; Davis, 1982; McGrath, 1984; Penrod & Hastie, 1979).

It should be noted that the standard SDS model treats group members as interchangeable and indistinguishable from one another. In other words, the theory treats every member's input as holding the same weight or influence (Davis, 1973). Because typical professional service firm project teams have members who are differentiated both in status (e.g., presumed task expertise) and hierarchical position, it is important to consider application of a somewhat reformulated version of the SDS model. For example, Kirchler and Davis (1986) extended the theory to include groups where members were differentiated by status[3]. Their results show that member status does affect the SDS used for judgmental (but not intellective) tasks. Specifically, in groups with equal-status members, the majority SDS was used. Groups with "high-power" actors used a "power-wins" scheme. Given their manipulation based on expertise (see footnote below), this suggests that hierarchical and/or expertise-differentiated PSF project teams would be expected to rely more on

[3] Kirchler and Davis (1986) manipulate status by communicating alleged task ability, but actually measure items (i.e., ratings of person on adjectives such as *powerful*, *a leader*, *persuasive, capable, dependable*) that they average to create an "expected dominance" score.

those with perceived or demonstrated expertise as the source of greatest influence over group outcomes.

Transactive memory

Research on transactive memory directly addresses the processes of both expertise recognition and utilization. The notion of "transactive memory" grew out of research on dyads by Wegner and colleagues (e.g., Wegner, 1987; Wegner, Erber, & Raymond, 1991) and refers to a shared knowledge amongst group members about who knows what. According to Wegner, shared experiences often lead group members to encode, store and retrieve relevant information together. This collective knowledge forms a system that group members can rely on to locate and retrieve information that they do not personally possess. In such a way transactive memory acts as an external memory device, akin to a computer database, and enhances performance by providing an effective way to access and use the team's expertise during task-related interactions.

The recognition of expertise is essential in the development of a TM system because members' beliefs about what others know influence their tacit and explicit decisions to learn and remember new information. In their foundational study, Guiliano and Wegner (described in Wegner, 1986) studied transactive memory systems in dating couples. They measured each subject's beliefs about his/her partner's various areas of expertise and presented them with facts from various domains (i.e., "The Kaypro-2 is a personal computer"). The researchers manipulated the amount of time that each subject had to study the information so that one partner had an advantage over the other on some domains, then measured subjects' ability to recall the items. The results showed that perceived expertise directly related to

performance, in that items were more likely to be recalled when they represented domains of self- rather than other-expertise. Further, perceived expertise interacted with study time: subjects who had more time than their partner to study an item were more likely to recall it if they believed their partner's expertise in that domain to be low. In contrast, when subjects had less time to study an item, their perception of their partner's expertise in that domain had no effects on recall. These results suggest that subjects used perceived expertise as a guide for how to maximize their collective recall.

Wegner, Erber and Raymond (1991) further demonstrated the importance of perceived expertise for the development of transactive memory in their study of the operation of natural versus imposed TM systems. Briefly, they compared the recall performance of actual dating couples versus those pairs assigned in the laboratory, either using assigned responsibility for remembering informational items or without instructions for how to remember information. Results showed that intact couples performed better using natural rather than imposed systems; researchers surmised that the artificial system was confusing or maladaptive for couples who previously had knowledge of the other's expertise. In contrast, concocted couples performed better when they were assigned responsibility for remembering particular pieces of information, likely because they had no other way of knowing "who knows what."

The extension of transactive memory research into the area of small groups provides greater insight into the antecedents to TM systems in groups, all of which are related to member familiarity. The first set of antecedents concerns shared group experience, either in training exercises (for laboratory groups) or actual work experience for ongoing work teams. As Moreland and Argote (2003:138) write,

"Transactive memory systems usually arise through shared experience – as they spend more time together, engaging in a wider variety of activities, group members naturally come to learn more about who knows what." Researchers have found, for example, that small groups performing the task of assembling transistor radio kits performed better when they had been trained together rather than individually (Lewis, 2003, Study 1; Liang, Moreland, & Argote, 1995; Moreland & Myaskovsky, 2000). Similar findings emerged when studying groups performing complex induction tasks (Hollingshead, 1998). This research (Study 1) showed that group practice (as opposed to individual practice) enhanced the group's ability to identify correct hypotheses, to discover general principles for successful task completion, and to correct errors. Lewis's (2003, Study 3) research compared the development of TM systems across 3 types of ongoing work groups. As a caveat to prior findings, this research suggests that shared group experience is an antecedent to the development of TM systems only when team performance requires the integration of members' knowledge, rather than just the utilization of individual members' knowledge.

Apart from shared experience, there are other factors relating to member familiarity that have been as antecedents to group collective memory. Even in the absence of direct personal experience, knowledge about one another's skills and abilities can help develop group transactive memory. Moreland and Myaskovsky's (2000) work demonstrates that providing detailed, accurate evidence of members' relative task expertise can foster a group's transactive memory system just as well as group training. In a field study of customer care teams in call centers, Moynihan (2004) also identified some management practices that directly aid group members' understanding of each other's skills that enhance transactive memory development.

Empirical research has identified a number of mechanisms through which TM systems operate to influence group performance. Liang et al. (1995) identified three cognitive factors assumed to reflect the operation of a transactive memory system that mediated the effect of training on performance: *memory differentiation*, the tendency for group members to specialize in remembering distinct aspects of the task; *task coordination*, the ability of group members to work together smoothly while performing the task; and *task credibility*, the extent to which members trusted one another's knowledge about the task. Further, they ruled out the role of social factors (i.e., group cohesion, social identity) in generating the superior recall and task performance. In a replication study, Moreland and Wingert (1995, reported in Moreland, Argote, & Krishnan, 1996) additionally eliminated the role of group development and group learning strategies (i.e., task organization) on TM development. Lewis (2003) confirmed the underlying three-factor structure of the transactive memory systems construct using structural equation modeling on data collected in three studies, across a variety of tasks and settings as described above.

Expert influence and hierarchical group decision making

This section covers work by two sets of researchers who examine team member expertise and influence as inputs to the group decision-making process for non-eureka-type intellective problems. Given this overlap in their focus of research, the two sub-streams are reviewed together, despite differences in their methods, and to a lesser extent in their intellectual heritage.

First, the expert influence approach considers how well groups are able to recognize their expert members and how much these recognized experts exert influence over the team's decisions and outcomes. They initially drew from the small

groups research tradition that examined whether and why groups (fail to) perform better than their individual members (e.g., Einhorn, Hogarth, & Klempner, 1977; Steiner, 1972; Zajonc, 1962). This stream broadly follows the same set of techniques for empirical research. Typically, researchers either measure or manipulate members' pre-study expertise in a discrete domain (e.g., survival exercises, memory tasks), then evaluate members' perceptions of others' expertise, members' relative influence and group outcomes (Littlepage et al., 1995; Miner, 1984; Yetton & Bottger, 1982). Overall, findings suggest that expertise recognition is generally difficult for groups to do accurately, but critical to group performance because perceived expertise tends to guide influence over group outcomes (Baumann & Bonner, 2004; Libby, Trotman, & Zimmer, 1987; Littlepage et al., 1995; Trotman, Yetton, & Zimmer, 1983).

Second, research over the last decade by Hollenbeck, Ilgen and colleagues (Hollenbeck et al., 1995; Ilgen, Major, Hollenbeck, Ilgen, & Sego, 1995; Lepine, Hollenbeck, Ilgen, & Hedlund, 1997) has examined a specific form of team decision making. Like the expert influence approach, teams in this sub-stream have knowledge that is distributed amongst team members such that some members have unique information. Unlike the expert influence approach, teams in this research setting are structured hierarchically; that is, there are several junior team members reporting into a single team leader. This research program goes by the acronym TIDE^2 (Team Interactive Decision Exercise for Teams Incorporating Distributed Expertise). TIDE^2 research is based on individual decision making research by Brunswick in the 1940s and 1950s. Very briefly, this "lens model" suggests that rational decision makers obtain information on the relevant set of cues for any required decision, assign weights to those cues, and reach decisions. Hollenbeck, Ilgen and associates have adapted this model to create a multi-level team model, in

which team members are tasked with making a recommendation to a team leader, who has ultimate responsibility for weighting their input and incorporating it into a final decision. Findings from this research confirm that expertise recognition and utilization are vital predictors of team performance, as measured in terms of decision-making accuracy.

These two related research streams indicate that team members' ability to recognize each other's expertise is highly variable, suggesting that accurate recognition is difficult. Because expertise cannot be directly observed, people are either unaware of one another's expertise or unable to judge accurately the level of expertise. Much of the early work examined groups' ability to identify member expertise compared to random chance when working on survival exercises (e.g., Winter Survival Exercise, NASA Moon Survival Problem). Findings suggest that groups do identify their best members at a rate higher than random chance, yet the degree ranges from "little better" (Miner, 1984:121) to "significantly more accurate" than chance (Yetton & Bottger, 1982:313). As an example of how difficult the process is, Littlepage et al. (1995:881) found a correlation between actual and perceived expertise only .17 in teams solving the Desert Survival Situation task, similar to that of Littlepage & Mueller's (1997) correlation of .14 for those variables on the same task.

Why is accurate expertise recognition difficult for teams? Research in the expert influence approach has identified a number of factors that either facilitate or impede a group's ability to identify members with higher levels of expertise on a task; the ones that are most pertinent in the context of professional service firms are reviewed here. Henry for example, has shown that explicit performance feedback helps groups to

improve their identification of member expertise. Instructions to discuss explicitly which of the individual contributions is best also increases member recognition of expertise (Henry, 1995). Littlepage (1997) set out to investigate the conditions that moderate the development of cognitive systems that allow for effective recognition and utilization of expertise, and found that, for non-eureka tasks, members must learn of others' past performance. These findings are in line with research in the transactive memory stream, reviewed above, that link member familiarity with expertise recognition. Beyond this, however, Littlepage et al. (1997) demonstrated that even if group experience facilitates accurate perceptions of others' expertise, it only leads to higher performance if expertise transfers to new performance situations. This means that member expertise must be correlated across tasks as an aid to accurate recognition. Finally a group's size affects expertise recognition. Littlepage and Silbiger (Littlepage & Silbiger, 1992) found that the size of the groups increased their accuracy of expertise recognition for quiz tasks. Specifically, 10-person groups were better at identifying expertise than individuals or 5-person groups, and 2-person groups were better than individuals.

Despite its difficulty, accurate expertise recognition is an essential step to aid teams in using their members' expertise. In a task where loan officers predicted bankruptcy of disguised companies, Libby et al. (1997) found that the most influential members were significantly better than the average member, but far worse than the real best member; these findings show that while groups have some ability to use expertise as a weighting factor, there remains potential for significant gains from better expertise recognition and utilization. Littlepage et al. (1997) used both regression analyses and structural equation modeling to demonstrate that expertise recognition is a significant predictor of expertise utilization on quiz tasks. Littlepage

et al. (1995) found a correlation between perceived expertise and influence of .55 in a survival exercise, and showed via structural equation modeling that perceived expertise mediated between various antecedents (i.e., participation, actual expertise) and intra-group influence. Similarly, Bonner et al. (Bonner, Baumann, & Dalal, 2002) found that identified experts (subjects who did well individually on a pre-task and whose scores were shared with the group) yield greater influence than other members in a task using Mastermind.

Prior research in the expert influence tradition suggests that the link between team members' recognizing and utilizing expertise (or between being seen as an expert and actually using that expertise to influence group outcomes) is problematic. In the study of loan committees, mentioned above, Libby et al. (1987) found no differences in performance or expertise utilization between ad hoc vs. practiced (intact) groups. Their interpretation of these results is "… that the impact of more accurate knowledge of relative expertise in the practiced groups (if any) was offset by the effect of social pressures." Watson et al.'s (1991) findings appear to corroborate the effect of social influences on group's ability to use expertise most effectively. In a longitudinal study, they found that at times 1 and 2, the best member score was most predictive of the group score; at T3, however, the average member score was most predictive. One interpretation of these results suggests that teams' utilization capabilities erode over time, possibly as a function of social pressures for conformity. Additional empirical evidence shows the difficulty of using expertise, even after identifying it. Durham, et al. (2000) found that pooled individual rankings were not correlated with the groups' final scores, suggesting that over time individual, pre-project knowledge was not effectively utilized. This occurred because the group members disagreed about the solution, and those individuals whose answers were most accurate were not always

most influential. Baumann and Bonner (2004) found that even groups that accurately recognized their best expert only relied on that expert 62% of the time; in their study, there was no way to know why groups failed to rely on their experts in 38% of the trials. In conclusion, research shows expertise utilization is very difficult; many teams' performance apparently suffers because they fail to draw appropriately on the actual expert, allowing instead for less-knowledgeable members to exert higher influence over the team's outcome.

Where this stream of the literature appears to fall short, however, is in examining *why* the stage between expertise recognition and utilization is so difficult for teams. Surprisingly, Littlepage et al. (1995:877) set out to examine "social processes that … lead to influence and effective performance in groups solving non-eureka problems," but only examined inputs (i.e., direct antecedents) to influence; they failed to predict or examine any factors moderating the link between expertise recognition and utilization. No other research could be found that addresses the connections between expertise recognition and utilization.

Summary

The above research across several streams of group research supports two important conclusions: (1) expertise recognition is important for performance, and (2) groups are often inaccurate in assessing intra-group expertise, resulting in sub-optimal allocation of influence and ultimately lower quality decisions and outcomes.

Yet numerous empirical studies suggest that subjects do attend carefully to clues about team mates when inferring their expertise, whether those signals are as obvious as expert role assignment (Stasser & Stewart, 1992) or designated performance ranking (Shelly, Troyer, Munroe, & Burger, 1999) or as subtle as the proportion of

time a team member spends talking during group discussion (Littlepage et al., 1995). This discrepancy suggests that there are either social or contextual factors inhibiting members' ability to recognize expertise accurately. Likewise, the difficulty in appropriately using the team's expertise, even after these resources have been accurately identified, suggests that factors inhibit the team's ability to do so. Thus despite the impressive findings to date that indicate the importance and difficulty of expertise recognition and utilization processes in teams, we still know relatively little about how contextual factors influence this process. We need research that identifies not only group-related moderators of the expertise recognition process, but also accounts for the effects of task and organizational factors.

Developing a contingency model of when expertise recognition leads to influence would make a significant contribution to this literature. Doing so requires a theoretical framework that allows us to explore the stage of the process in which a team's expertise hierarchy determines how and how much members utilize one another's expertise by allowing experts to exert greater influence over the team's outcome.

Status

The basis for the required theoretical framework to understand both expertise recognition and utilization processes can be found in status characteristics theory (Berger, Cohen, & Zelditch, 1972; Berger, Fisek, Norman, & Zelditch, 1977; Berger, Rosenholtz, & Zelditch, 1980) and related research in the tradition of expectation states theory (Berger, Zelditch, & Anderson, 1966; Berger, 1958; Berger, Conner, & McKeown, 1969). They provide a well-developed framework for examining social interaction processes related to expertise recognition and utilization. To preview, the

theory asserts that actors form "performance expectations" of themselves and others, which entail "generalized anticipations of one person's capacity to make useful contributions to the group task compared with another's" (Ridgeway & Johnson, 1990:1199). These beliefs are "…explicit attributions of task ability to actors by others" (Fisek, Berger, & Norman, 1995: 723). In other words, status characteristics theory provides a structure for understanding the first stage of the expertise recognition and utilization process, in which members make attributions of one another's competence in an effort to identify individuals' relative expertise. Further, the theory explains how these expertise attributions form a status hierarchy within the group, and how one's rank in that hierarchy determines the level of influence she/he exerts over the team's outcome. These steps can be seen as the second stage in the expertise recognition and utilization process. In summary, status characteristics theory provides a model of the main effects in the process, with particular antecedents leading to expertise recognition leading to expertise utilization.

The following sections explain this model in greater detail, summarizing the fundamental theoretical underpinnings and the key empirical findings in expectation states theory and status characteristics theory. These theories developed from a long tradition of studying status in sociology and in the small groups tradition. Although a full review of the historical literature is clearly beyond the scope of this document (for reviews see: Berger et al., 1972Chapter 2; for reviews see: Berger et al., 1977, Chapter 2 ; Berger et al., 1980; Berger et al., 1980; Jasso, 2001; Merton, 1968, Chapter 6-7) the section begins with a brief review of sociological and small groups literature on status that is known to have influenced the development of expectation states theory.

Status-organizing processes in sociology: Simmel-Park-Hughes tradition

A status-organizing process is a process by which the differences in evaluations of individuals, or social categories of them, become the basis for observable differences in the interaction between them and thereby for stable inequalities in the structure of social interaction (Berger et al., 1977:3). The field of sociology has long been concerned with issues surrounding the status-organizing process, dating back at least to work by Georg Simmel in 1908. Simmel wrote, "The first condition of having to deal with somebody at all is to know *with whom* one has to deal" (Simmel, [1908] 1950:307, emphasis original). He noted that there are two sources of this knowledge: one may have direct experience of the individual, but commonly also knows something of others based on their belonging to particular social categories defined by age, race, occupation, and so on. He emphasized the relational nature of this knowledge: the relationship between persons creates a set of conditions under which they develop "pictures" of one another. His idea ([1908] 1950: 309) that "…the real interaction between the individuals is based upon the pictures they acquire of one another" appears to be a direct precursor of later theorizing about another psychological concept, expectation states, as the basis for interpersonal interaction (e.g., Berger et al., 1966; Berger, 1958).

Simmel's tradition of theorizing about status-organizing processes was developed more fully by Robert Park (1925) and Everett Hughes (1945). Park (1928) suggested that status characteristics emerge out of interaction when ambiguously defined situations create pressure for actors to define relative positions. Once apparent, status characteristics determine how people categorize themselves and others in subsequent interactions, generalizing the characteristic from specific individuals to others who are like them (i.e., social types). Hughes (1945) extended

this idea to situations that encompass multiple characteristics, in what would later become known as the theory of status-determining traits (Hughes, 1984). The basis of this theory concerns the way that individuals use both primary and auxiliary status-determining traits to establish relative social roles. When the status traits associated with a given situation are in contradiction (i.e., a status dilemma created by one person possessing both high- and low-status characteristics, such as a black physician), the ambiguity compels people to define their and others' relative positions. In this way, concrete social structures like race relations (Park, 1928) or professions (Hughes, 1945) are simply instances of more general, more fundamental social processes. This idea that a similar process underpins a wide range of superficially discrete social phenomena was instrumental in the later formulation of status characteristics theory (Berger et al., 1977).

Status-organizing processes in small groups

Status-organizing processes were also a major source of investigation in the small groups tradition of research in the 1950s and 1960s, and this literature further influenced the development of status characteristics theory (Berger et al., 1977). This research on status processes concerned small groups of three types, including (1) unstructured groups of status equals, (2) groups where members had been initially alike in status but then established an informal hierarchy, and (3) small groups whose members were initially differentiated on some external status characteristic.

Of the first type is research by Bales and colleagues (Bales, 1950; Bales, 1953; Bales & Slater, 1955). They studied small, informal, task-oriented groups of three to seven unacquainted Harvard sophomores during multiple, hour-long sessions.

Although these groups were initially unstructured (i.e., had no apparent or designated leader) and the members presumably were equal in status to begin with, Bales found that inequalities in participation and influence typically emerged within the groups. Not only did these inequalities emerge quickly (often within the first session) but once established were highly stable and continued to shape subsequent interaction patterns. Bales further noted that the four inequalities he observed were highly inter-correlated. These four behaviors included (1) participation in the form of attempts to solve the group's problem, (2) opportunities to participate or contribute to the solution, (3) communicated evaluations of an individual's participation and (4) changes of opinion after exposure to other group members' views. Finally, once established, these inequalities tended to persist throughout the group's interaction.

Harvey (1953) and Sherif, White and Harvey (1955) studied groups in which subjects were initially similar in external status characteristics, but had developed a group hierarchy over the course of interaction. They found that individuals' ranking in the group structure correlated with and predicted the extent to which his performance was over- or under-estimated by other members. For example, Harvey (1953) selected three members (the leader, the lowest-status member and a mid-ranking member) of different naturally occurring high-school cliques to participate in an experiment. Although members of each clique had presumably initially been status equals, by the time of the experiment each clique had formed a stable hierarchy. Their task was to predict their own and other members' performance in accurately throwing darts at a target prior to each of 50 throws, and to estimate their own and others' score after each throw. Harvey found that low-status members underestimated their own future performance, unlike other members. Conversely, the higher a member's standing in the group hierarchy, the more he tended to overestimate his

performance. Similarly, the higher the level of an individual in the group hierarchy, the more others were likely to over-rate his performance. Similar findings came from the well-known studies of boys in summer camp, where status predicted expectations for throwing balls at a target (Sherif et al., 1955), and of naturally occurring street gangs where group ranking determined performance expectations for members' bowling abilities (Whyte, 1943).

Finally, studies of groups where members were initially differentiated on (at least) one external status characteristic showed that interaction inequalities are correlated with initial status differences. Strodtbeck and colleagues (Strodtbeck, James, & Hawkins, 1957; Strodtbeck & Mann, 1956) for example, found that subjects' incoming status differences, both socio-economic and gender (male), predicted the number of acts they initiated in a mock jury problem solving group. Similarly, Leik (Leik, 1963) found that "temporary" families (i.e., with one father, mother and daughter each of different real families) based their distribution of task and emotional behaviors in line with expected gender-age status differences[4]. Importantly, however, status-organizing processes in these unequal groups showed a number of striking similarities with those of status equals, described above. In particular, inequalities in interaction (i.e., participation opportunities, received evaluations) are highly correlated and persist over time after emerging.

All three types of groups studies were influential in the development of expectation states theory, to which we turn next.

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[4] Interestingly, Leik (1963) found that real families' behaviours did not correspond to expected status differences. Heiss (Heiss, 1962) also found that intimacy changed the way status differences determined group member behaviours: the degree of male dominance decreased as the level of intimacy and commitment in a couple's relationship increased. These differences to the theoretical

Expectation states theory

It is often noted that expectation states theory is not a single theory, but is rather a family of interrelated theories (e.g., Berger, Ridgeway, & Zelditch, 2002; Berger, Conner, & Fisek, 1974; Ridgeway, Berger, & Smith, 1985). As such, it is often called a theoretical research program because it includes a set of interrelated theories and the theoretical, empirical and applied research that supports them. The following sections outline the initial development of the core of expectation states theory, then focus on the extensions of the theory that are most relevant to understanding expertise recognition and utilization in ongoing work groups.

Expectation states theory emerged from the doctoral work of Joseph Berger (1958), and its first formulations sought to explain the emergence and maintenance of differences in power and prestige in small problem solving groups (Berger, Ridgeway, Fisek, & Norman, 1998:97-113; Berger et al., 1974; Berger et al., 1980). The processes were strikingly apparent in the research of Robert F. Bales (1950; 1953; Bales & Slater, 1955), as described above, which reported the emergence of highly differentiated patterns of four types of behaviors. By refining the categories of observed behaviors, Berger and colleagues developed short-hand labels for them, as follows: (1) *performance outputs* for any attempts to solve the group's problem (2) *action opportunities* for chances to participate in group problem solving (3) *reward actions* for positive evaluations of others' performance outputs and (4) *influence* for successfully changing others' opinion following disagreement (Berger et al., 1977). Because of the high intercorrelation of these behaviors, the founders of expectation

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predictions are not likely to arise in professional groups comprising members who have not worked together extensively, as in the case of many professional service project teams.

states theory (Berger, Bernard Cohen, Morris Zelditch and colleagues) conceptualized them as components of a uni-dimensional "power and prestige order" of the group.

Early work by Berger and colleagues (Berger, 1958; Berger et al., 1969) investigated the conditions under which these inequalities arise, their intercorrelations, and their stability over time. Although Bales' results had occurred across a variety of conditions, they seemed most likely to occur under the following circumstances: first, when the group is task-oriented, when they believe that success completion is dependent on some characteristic or ability (not chance), when members are collectively oriented (and therefore inclined to take one another's views into account) and when groups are homogenous in terms of members' external status characteristics (i.e., age, education, race) (Ridgeway et al., 1985:6). Under these circumstances, Berger and colleagues began to reason that the process of interpersonal interaction leads group members, who were initially equals, to develop differential *performance expectations* for self and others. Performance expectations are stable anticipations of future performance that arise out of task-related interactions of group members (Humphreys & Berger, 1981; Ridgeway & Berger, 1986). As group members form expectations for one another, their evaluations of individuals' specific past behaviors give rise to generalized anticipations of future behavior.

Once formed, such performance expectations are believed to determine subsequent power and prestige behavior within the group (or dyad). As an example, imagine two persons, A and B, who are interacting to solve a problem. If they both hold high expectations for A and low for B, then we expect the following behaviors: A will initiate more performance outputs than B; B will defer to A by giving A more opportunities to perform; B will communicate more positive evaluations of A's performance than vice versa; and A will influence B more (i.e., cause B to change his

opinion). In this way, performance expectations are seen to influence both the performer and reactor(s) in a group (Ridgeway et al., 1985). The theory of performance expectations thus accounts for the intercorrelations between actions that represent the power and prestige order of the group: they are all functions of the same underlying expectation-states structure.

It is important to note that the theory treats expectation states as "a theoretical construct, a product of the theoretician's mind and it is not assumed that it necessarily exists in the subject's mind" (Berger, Fisek, Ridgeway, & Norman, 1998:30). This idea has served as a guiding principle in expectation states theory and has driven research design of much of the field's empirical investigations (see Driskell & Mullen [1988: 399-412] for a fuller discussion of this issue). The theory has primarily been tested and advanced using the Standardized Experimental Setting (SES), as outlined in Berger et al. (Berger et al., 1977). The typical experiment creates the conditions for subjects' formation of performance expectations, and then observes the behavioral outcomes, without any attempt to measure or assess the intervening expectation states in any way. The theory assumes that actors are unable to express or report their expectations accurately, because as Berger and Zelditch (1985:37) write, "… we do not think of these as consciously guided processes, or processes that the actor monitors, or processes that the actor may even be aware of." More recent empirical work in the status characteristics theory (e.g., Bunderson, 2003), however, does directly measure expectation states, as discussed below.

Beyond explaining the intercorrelations between observed behaviors, expectations states theory also addresses the *stability* of the power and prestige order in a group whose members were initially status equals, as demonstrated in research by Harvey

(1953), Sherif (Sherif et al., 1955) and others. Berger and colleagues (Berger, 1958; Berger et al., 1969; Berger et al., 1977) suggest that the stability, or endurance, of the power and prestige order is a function of performance expectations' dual dependence upon and effect on interaction behaviors. That is, the behaviors of group members have consequences for their performance expectations of self and others; these performance expectations then shape subsequent behaviors.

Subsequent work on expectation states theory extended the work beyond groups of status equals to theorize on the emergence and maintenance of power and prestige orders in groups where members are initially differentiated on external characteristic(s) such as age, sex, occupation, etc. This extension was influenced by earlier studies, such as that by Strodtbeck et al. (1957), which found that when members of a goal-oriented group differed on socially significant characteristics, their emerging interaction patterns tended to reflect these differences. As outlined above, however, these studies left unanswered the question of how these processes occurred. In addition, the work by Leik (1963) and Heiss (1962) showed exceptions to this pattern, but no theoretical explanation provided a consistent explanation for them. This theoretical gap encouraged Berger and colleagues to formulate expectation states theory as an account of the underlying process that (1) considers the formation of interactional status structures and (2) and explains how these structures develop in both groups of initially social equals and in groups where members differ on socially significant characteristics (Berger et al., 1977). Therefore, although expectation states theory began as an account of status structures in homogenous ad hoc groups, its explanation of power and prestige orders for groups of social unequals has become the most highly developed and commonly used aspect of the theory (Correll &

Ridgeway, 2003). This latter branch of expectation states theory is known as status characteristics theory (Berger et al., 1977).

Status characteristics theory

The earliest proliferant[5] of expectation states theory sought to explain how and under what circumstances members' initial status differences determine the power and prestige order in problem solving groups. Previous research had shown that a wide variety of characteristics had produced observable differences in groups' power and prestige orders, even ones that were not apparently related to the task (for review see Berger et al., 1972; Strodtbeck et al., 1957; Strodtbeck & Mann, 1956). Building on key concepts from the expectation states research, Berger, Cohen and Zelditch (Berger et al., 1966) began formulating status characteristics theory to address these disparate findings. Status characteristics theory[6] seeks to explain how beliefs about status characteristics get translated into performance expectations that subsequently determine the behaviors of group members (Berger et al., 1977). In particular, Berger and colleagues drew on the idea that power and prestige behaviors are determinants of and maintained by expectation states. The key advance to the theory is the assertion that performance expectations emerge not from evaluations of others' behavior, but from initial differences in socially significant characteristics. Thus, a fundamental principle of status characteristics theory is that performance expectations in groups

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[5] Berger and Zelditch (1985:4) distinguish between "proliferants" and "elaborations" of expectation states theory, where the former involves a shift in the domain of the theory (i.e., status characteristics theory examining differentiated groups instead of status equals) and the latter involves reformulation (i.e., later status characteristics theory examining multiple cues instead of a single basis for differentiation of members).

[6] Status characteristics theory is also called the "theory of status generalization" (Webster & Foschi, 1988) because it explains the process of attributing specific abilities to individuals based on the status characteristics they possess. For simplicity, this paper uses the terminology of Berger and colleagues: status characteristics theory.

are informed by the status, or personal meaning, that members assign to their own and others' various personal characteristics.

Berger et al. (1980:482) define a status characteristic (commonly also called a status cue) as follows:

> "A *status characteristic* is any characteristic of an actor that has two or more states that are differentially valued in terms of honor, esteem, or desirability, each of which is associated with …stabilized beliefs about how an individual possessing a given state of the characteristic will perform or behave."

Consistent with expectation states theory, the performance expectations arising from status characteristics are believed to determine the power and prestige order of the group. To clarify terms, the "power and prestige order" signifies the observable behaviors of the group, whereas the "status hierarchy" refers to beliefs about who has higher status. Unfortunately, this latter term is frequently used in the literature as synonymous with power and prestige order, with confusion stemming in part from the failure to measure actual rankings and instead using the behaviors as an indicator of underlying beliefs. This paper uses "power and prestige order" to mean strictly the observable rankings based on behaviors, and "status hierarchy" to signify beliefs about status.

Fundamental assumptions

The core of status characteristics theory[7] consists of five fundamental assumptions that link beliefs about these status cues to behavior (Berger et al., 1977; Berger et al., 1980; Ridgeway & Berger, 1986) as outlined below.

Salience. First, the salience assumption suggests that a characteristic must be socially significant for the group members in order for it to affect their performance expectations. According to the theory, one way that cues become salient is when members believe them to be relevant to their task. Certain characteristics might be considered directly related to the task, such as verbal fluency for a group tasked with writing copy for a television ad. Another characteristic like gender might be indirectly related to the task, as when group members believe that females are more creative and relate gender to writing good advertising copy. To cover both direct and indirect cases, status characteristics theory developed the concept of path of task relevance: this is a cognitive connection that links an actor and his related characteristics to the task outcome (success or failure). The degree of relevance is operationalized as the path length, roughly corresponding to the number of mental steps that an individual must make to connect the focal actor (via his characteristics) to the expected task performance (Berger et al., 1977; Norman, Smith, & Berger, 1988; Norman, Smith, & Berger, 1988). Humphreys and Berger (1981: 962) conclude, "…the longer the path of relevance between a status element and the task, the less information it provides."

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7 The initial formulation of status characteristics theory (Berger et al., 1966; Berger et al., 1972) concerned the effect of a single status cue on the behavior of interacting dyads; over time the theory was expanded to include multiple cues (Berger et al., 1974) and additional actors (Berger et al., 1977). This review focuses on the more recent developments in the theory.

Task relevance implies that differences between members in beliefs about the task goals will affect the level to which they believe a characteristic is important for completing the task; salience for any particular characteristic may differ between members. For complex or ambiguous tasks, especially, different members might interpret their group's primary goal differently, making some cues more prominent (i.e., having shorter path length) for one member than for another.

Status characteristics can become salient without a path of task relevance. Instead, cues may become salient in any given situation by discriminating the actors (Berger et al., 1977; Humphreys & Berger, 1981). A given status cue will thus become more salient in any local situation to the extent that group members differ on that characteristic and that they are mindful of these differences. The same characteristic (i.e., having a Masters degree) can advantage an actor in a group of less well-educated individuals, may have no impact on status if all members hold the same degree (or are unaware of education levels), or be a disadvantage in groups where all members hold doctorates. These two mechanisms underlying salience thus indicate that no status characteristic will necessarily (dis)advantage an actor across situations.

Burden of proof. The second assumption of status characteristics theory is the burden of proof principle, which concerns characteristics that differentiate the actors but are not initially relevant to the group task. When characteristics that distinguish between group members become prominent through the saliency assumption, above, actors behave as if such characteristics are relevant to the task. In other words, group members will apply status characteristics and status advantages to new situations, placing the burden of proof on demonstration that they should not be associated in the new situation. Thus the burden of proof assumption says that group members use all

salient status information to form performance expectations, unless something (or someone) explicitly disassociates the characteristic from the task. To take an example from the consulting context where women make up a relatively low percentage of employees, gender is often a salient characteristic and will differentiate the performance expectations of men and women, even though gender itself is not relevant to the problem-solving task. Ridgeway and colleagues (Correll & Ridgeway, 2003; Ridgeway & Balkwell, 1997) suggest that it is through the burden of proof principle that many diffuse characteristics (see below) such as age, gender or race "have modest but pervasive effects on the status hierarchies that emerge across a large range of settings in which they have no obvious task relevance" (2003: 33).

Sequencing. The third assumption specifies what happens to status characteristics when an actor leaves or enters an existing social situation. The basic assertion is that no status information is lost. The performance expectations formed in one situation carry over to the next, even if the specific actors change. As explained in Berger et al. (Berger et al., 1980:487), for a situation with two actors *p* and *o,* the theory assumes that the dyad members will define their status hierarchy as they interact with each other. If *p*'s initial partner o_1 is replaced by a new member o_2, "the status-task information that *p* developed with o_1 will continue to operate while it is further elaborated and organized in interaction with o_2, just so long as the situation itself remains the same." Provided that (1) professional service project teams remain intact for the duration of a project and (2) entirely new teams are formed for each new project (requiring fully new status hierarchies to be developed), the sequencing assumption has less relevance to the model developed below.

Aggregation. In actual groups, members are likely to differ along several status characteristics at the same time, and these multiple cues may convey conflicting or inconsistent performance expectations. The fourth assumption concerns the way group members combine these characteristics to form performance expectations. In essence, the theory assumes that actors are information processors, capable of combining all units of status information to form aggregated states for themselves and others. According to the *attenuation principle*, any additional consistent information is subject to a declining marginal impact. For example, if a consultant knows that a team member has a Wharton MBA and six years' experience in the industry under study, then learning that the team member is a white male will not convey much additional information for performance expectations. The *inconsistency principle* suggests that a single positive cue in the midst of otherwise negative cues (or vice versa) will carry disproportionate weight, relative to its effect alone. In contrast to the above example, if a consultant found out that a 60-year-old client secretary who joined the team also held a Wharton MBA, this latter characteristic would be more influential than in the absence of age or role information[8].

Basic expectations assumption. The fifth assumption relates group members' relative ranking on the status hierarchy, based on performance expectations, to their position in the group's observable power and prestige order. Specifically, this assumption posits that an actor's position relative to another in a group's observable power and prestige order is a direct, continuous function of his or her expectation (dis)advantage relative to this other member. By assuming that performance expectations directly affect the degree to which individuals receive (and capitalize on)

[8] This example assumes that this consultant who is forming impressions believes that somewhat advanced age and a secretarial role are negative status markers.

opportunities for involvement and influence in group decision making processes, this assumption limits the theory from considering other factors that might intervene or influence the link between performance expectations and behavioral outcomes.

Empirical evidence

A large body of empirical evidence, across a range of social settings, supports the central claim of status characteristics theory linking status cues to the development of performance expectations (for a meta-analytic review of research, see Driskell & Mullen, 1990). Experimental data were initially conducted using a standardized laboratory setting to examine dyads[9] (Berger, Balkwell, Norman, & Smith, 1992; Berger et al., 1992; Driskell, Olmstead, & Salas, 1993; Driskell & Webster, 1997) and groups (Chizhik, Alexander, Chizhik, & Goodman, 2003; Kalkhoff & Barnum, 2000). Additional evidence confirms the effect of status characteristics and performance expectations on behaviors for members of freely interacting laboratory groups (Shelly et al., 1999; Shelly & Webster, 1997; Skvoretz, Webster, & Whitmeyer, 1999). The link between status cues, attributions and behaviors has been tested in field studies of police car dyads (Gerber, 1996), corporate research and development teams (Cohen & Zhou, 1991) and manufacturing production teams (Bunderson, 2003). Finally, status characteristics theory has also been applied to examine status interventions in school settings (Cohen, Lotan, & Catanzarite, 1988). .

Status characteristics and social categories

It is useful to distinguish the process of social influence as an outcome of the status-organizing process from that deriving from social identity based on group categorization. Briefly, the latter process is one based on Self-Categorization

Theory[10] (Tajfel & Turner, 1979; Turner, 1985), which asserts that the classification of individuals into groups generates strong in-group/out-group perceptions. Members not only perceive greater similarity within their group and decreased similarity between their group and others, but they also favor their own category over others. These cognitive outcomes have two implications for the process of social influence that differ markedly from the process as explained by status characteristics theory. First, according to self-categorization theory, members of low-status groups are motivated either to change their membership or seek a positive re-evaluation of their group. In contrast to in-group favoritism, status beliefs are thought to be social representations that consensually validate one category as more worthy than another (Berger et al., 1977). Thus, even members of a low-status group accept that another group is more worthy or deserves higher status than their own (Jost & Burgess, 2000). As a second implication for group process, self-categorization theory argues that social influence results from a process of uncertainty resolution, following disagreement between members of the same group. That is, people believe that fellow group members would hold the same opinions as they themselves; when disagreements surface, a process of (mutual) influence occurs to reduce uncertainty. In contrast, according to status characteristics theory, social influence is a result of performance expectations whereby low-status actors will defer to high-status actors based on the belief that they are more competent.

Kalkhoff and Barnum (2000) conducted a study to test directly the effects on social influence from group categorization and from status characteristics. Their

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[9] In fact, many of the dyad studies involve only a single subject, as the experimental "partner" is a computer program, a videotape of a confederate, or another similar mechanism.

[10] As Turner's Self-Categorization Theory is generally considered an extension of Social Identity Theory (see for example Hogg & Turner, 1987), for current purposes findings from both theories are

experimental design manipulated the group membership (based on preference for one painting versus another) and relative status (based on a single diffuse characteristic: current level of education) for the subjects and their two fictitious partners. Results support the basic premises of both self-categorization and status characteristics theories: both membership and status affected influence levels, albeit from different sources (perceived similarity versus perceived competence, respectively). Interestingly, both sources generated equal amounts of influence and both processes appeared to operate concurrently. A series of cross-condition analyses showed that high-status, in-group members were more influential than either partners who were only high status, only in-group, or any combination of those factors with minimizing (i.e., low status, out-group) characteristics.

In summary, the fundamental principle of expectation states theory is that expectations determine behavior and that behavior also determines expectations. In this feedback cycle, *expectations* is the core theoretical concept and the *formation of expectations* is the basic process.

I turn now to the topic of authority, a core concept related to status.

Authority

Authority is generally conceptualized as legitimate power, reflecting an advantaged actor's right to dominate others (Barnard, 1938; French & Raven, 1959; Scott, Dornbusch, Busching, & Laing, 1967). Zelditch (1992:995) in the Encyclopedia of Sociology, defines authority as a claim by A, accepted by B, that A

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used in clarifying the distinction between effects of status characteristics from those of social categorization.

has the legitimate right to expect B's compliance, even if where doing so runs counter to B's interests.

An authority structure in a group is often represented by a hierarchy of formal positions. While a vast sociological literature exists explicating the conditions under which a positional hierarchy becomes legitimate (e.g., Weber, [1918] 1968), some experimental evidence suggests that the mere appointment of a group leader (e.g., arbitrary designation without providing justification) creates an authority structure that mimics (at least in the short term) legitimated structures in terms of bestowing influence on the leaders (Ridgeway & Berger, 1986; Shelly et al., 1999; Shelly & Webster, 1997). This effect has been explained because formal positions produce inequality in groups by granting social rights, privileges, and responsibilities to an individual (Shelly & Webster, 1997: 86).

A group's authority structure is a determinant of social interaction that has been long studied in the expectation states and status characteristics traditions. An early experiment by Evan and Zelditch (1961) examined the erosion of authority in professional firms as subordinates' expectations of their bosses changed from relatively high to low. This study found that hierarchical positions (authority) worked like status characteristics, creating initial performance expectations[11]. For subjects in the condition where incongruence developed between their expectations of their supervisor and supervisors' actual performance, three effects were observed: first, their compliance to task-related technical commands decreased moderately; second, their belief in the supervisor's "right to hold the job" (e.g., legitimacy of authority) decreased; and third, they shifted their belief in the basis of the supervisor's authority

from professional (i.e., based on expertise) to bureaucratic (i.e., "It's his job to give orders").

Subsequent work in status characteristics theory suggests that leaders legitimately appointed to their positions (i.e., based on ability) will be high status group members and will therefore be evaluated more favorably than will other group members (Berger et al., 1977; Ridgeway et al., 1985). The link between formal position and attributions of competence appears to operate through the process outlined by Berger (1977) as the "burden of proof principle": unless a trait's relevance to a task is challenged, then actors will assume it *is* relevant and subsequently form task expectations based on it. In other words, in situations where formal positions typically signal expertise, members will assume that it does so unless a significant event forces them to reconsider. A number of experimental studies indicate that designated leaders are rated as more competent and more willing to contribute than others (e.g.,Lovaglia & Houser, 1996; Shelly et al., 1999). Once legitimated, status orders create the presumption of collective support for the status hierarchy (Ridgeway, Johnson, & Diekema, 1994). Influential members can draw on that presumption to elicit support from others, further reinforcing their position. Beyond the effects of authority positions on leaders themselves, the hierarchy has implications for all members of the group. Shelly and Troyer (2001) demonstrated that a task-related structure creates the most legitimacy for an advantaged actor and also for the rest of the actors because the leader "chooses" who will be the second-most-dominant, third-most-dominant, etc.

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[11] The term "performance expectation" was not used in this early study; the results are interpreted through the lens of expectation states theory that was being developed concurrently.

In summary, a body of theoretical work and empirical evidence exists within status characteristics theory that links higher position in the status hierarchy with higher attributions of expertise in the task domain.

Legitimation

Legitimacy has long been recognized as a fundamental construct that mediates the relationship between power and authority (Dornbusch & Scott, 1975; Scott et al., 1967; Walker & Zelditch, 1993; Weber, [1918] 1968). As Weber (Weber, [1918] 1968) pointed out, beyond persuasion and force, legitimacy is what allows high-ranking members of social hierarchies to issue commands and receive compliance. Alone, pure power is relatively impotent: to use power effectively, an authority must gain the support or consent of a significant portion of the governed (Zelditch & Walker, 1984). Determining the mechanisms through which leaders gain this consent – the process of legitimation – requires a multi-level theory that addresses relevant social factors at both the local level of the object of legitimation (i.e., the leader) and the level of the encompassing framework (Berger et al., 1998; Dornbusch & Scott, 1975; Walker & Zelditch, 1993). Drawing on work by Stinchcombe (1968), Blau (1964), and Dornbusch and Scott (1975), Zelditch and Walker (1984) argue that there are two sources from which an authority can mobilize the necessary support: exogenous and endogenous to the system. First, resources granted to the authority from outside the system (i.e., the larger organization or society) provide a necessary condition for authority to achieve compliance. Second, the direct personal approval given to the authority by subordinates within the system can bolster a figure's perceived right to govern. Importantly, however, it is not each individual's sense of the authority's legitimacy that matters. Rather, Walker and Zelditch (1984:)

conclude, "legitimacy is a fundamentally collective process and seldom a question of private individual consent."

Although Zelditch and Walker's (1984; 1993) analysis was based on multi-level, formal hierarchical systems, many of the core principles influenced subsequent theorizing about informal power and prestige orders in small groups from the expectation states perspective (Berger et al., 1998; Correll & Ridgeway, 2003; Ridgeway & Berger, 1988). In particular, the ideas that legitimacy is a collective, macro-micro process shaped the branches of expectation states theory concerning legitimation (Ridgeway & Berger, 1986; Ridgeway & Berger, 1988) and delegitimation (Berger et al., 1998). Berger, Ridgeway and colleagues conceptualize legitimacy as the outcome of a process of social construction, by which cultural accounts from a larger social framework are used to support the existence of social entity such as a status hierarchy. The theory argues that when diffuse status characteristics are salient in a group context, the associated status beliefs implicitly cause members to expect that those members advantaged by the diffuse traits are more likely to occupy higher positions in the group's hierarchy. In their example (1998: 384-5) of an informal task group comprising a white man (A), a white woman (B) and a black woman (C), cultural beliefs that the traits of white and male are more valued lead members to engage in deferential or dominating behaviors congruent with their race and gender. In other words, A will become the legitimate leader if either B or C defers to him, provided that the other does not challenge this deference.

Berger et al. (1998) formalize the previous theory of legitimation (1986, 1988) to suggest that the order between actors is legitimated if expectations become normatively prescriptive, relevant, and have collective support. They assume that

collective support means both unanimity of agreement and the "presumption of consensus" (p. 383). That is, they expect not only that all group members hold the same referential structure (i.e., expected link between expertise hierarchy and influence), but also that each actor believes that all other group members agree with him or her. They write (1988:214), "It is this anticipated collective and behavioral validation which gives a legitimate order its normative moral quality."

Much as legitimacy affects the relationship between an actor's potential power and his ability to use it, legitimacy allows an actor with recognized expertise to become influential within the group (Ridgeway & Berger, 1988). A legitimated power and prestige order means that actors' expectations that the expertise hierarchy determines influence are thus "augmented from simple anticipations of what will occur to expectations of what should occur" based on collective support (1988:213, emphasis original).

Moderators and contextual factors

Although as long ago as 1988 Markovsky (1988:357), suggested that contextual factors "may strongly affect status organizing processes", little work has been done to understand these factors, either in the groups tradition (summarized above) or in status characteristics theory. Markovsky suggested that the context (in his definition, any variables outside the task group itself) might effect evaluations of characteristics, the group's collective orientation, members' valuation of the task, and others. Troyer (2001) empirically supports the notion that modifying the standardized experimental protocol (e.g., varying features of the task) can change scope conditions and subsequent behavioral outcomes. In one study she changes the SES by de-emphasizing task scores (i.e., changing the typical paragraph that clarifies levels of

poor, average and superior performance to a single sentence). She demonstrates that this small change decreases the group's task orientation, one of the crucial scope conditions for status characteristics theory: subjects in this changed condition are significantly less concerned about whether their group reached the right answer.

Recently Bunderson (2003) used status characteristics theory to begin developing a contingency model of expertise recognition and utilization in groups, positing two group characteristics (average tenure and power centralization) as moderators of the process. In his model, however, these characteristics only affect the first step in the process (expertise recognition) rather than utilization. Bunderson suggests that this work is only a beginning; he called for more research on expert recognition and utilization in field settings where the impact of meaningful context cues can be evaluated.

Scope conditions

All of the theorizing on expectation states theory, and subsequent out-growths, is limited to a particular set of circumstances, or scope conditions. As defined by Berger et al. (1977:27), "The scope of a theory consists of assertions describing the features and properties of situations to which the theory is applicable. […] Scope conditions are general theoretical constructs…as much a part of the 'theory proper' as are its basic assumptions about the phenomena within its scope."

Initially the two primary scope conditions for the expectation states theory were task orientation and collective orientation. Individuals are task oriented when they are primarily motivated toward solving a problem, as opposed, say, to being focused on a goal of developing stronger intra-group relations. Groups such as task forces, juries, and student project teams are examples of task-oriented groups because their raison

d'être is completion of a particular task; in contrast, groups such as people socializing at a party are outside the scope of the theory. Individuals are collectively oriented when they share a focus on the group goal. Under this circumstance, they consider it legitimate and necessary to consider each other's contributions when completing the task.

Summary

In summary, expectation states theory and its related research streams, especially status characteristics theory, provide a theoretically grounded and empirically supported framework for examining social interaction processes related to the expertise recognition and utilization. Importantly, this theoretical model provides a strong basis for understanding antecedents to expertise recognition, including both status characteristics (diffuse and specific) and authority. As argued above, however, once group members recognize expertise, they must utilize it effectively in order to enhance group performance. Status characteristics theory, and related research focusing on legitimation processes and sentiments, offer starting points for determining how and under what conditions performance expectations actually lead to differential levels of member influence in ongoing work teams.

Expertise utilization and performance

Effects of expertise utilization on team-level task performance

Beyond the knowledge resources *available* to a group based on their members' collective expertise, prior research suggests that group process will have a strong effect on whether that knowledge actually translates into higher performance. Evidence comes primarily from two streams of research in the groups literature: the

expert influence approach and transactive memory approach.

First, the expert influence approach considers how well groups are able to recognize their expert members and how much these recognized experts exert influence over the team's decisions and outcomes. Overall, findings suggest that recognizing expertise in groups is often difficult, but critical to group performance because perceived expertise tends to guide influence over group outcomes (Baumann & Bonner, 2004; Libby et al., 1987; Littlepage et al., 1995; Trotman et al., 1983).

To elaborate (Laughlin, 1980), empirical research in the expert influence stream confirms the link between team-level expertise *recognition* and subsequent performance. Numerous studies have shown that team performance depends not only on members' task ability levels but also on their collective capacity for accurately recognizing that expertise (Bottger, 1984; Libby et al., 1987; Littlepage & Silbiger, 1992; Littlepage et al., 1997). In what is often the earliest cited study linking groups' performance with their ability to identify their best member, Einhorn, Hogarth and Klemper (1977) argued that the superiority of a group decision compared to that of its best member depends on the probability of the group identifying its best member. They assert that when individuals' judgments represent different knowledge bases, the so-called "best-member strategy" can out-perform a group decision based either on simple aggregation or a negotiated outcome, but this superior performance hinges on ensuring that the group correctly determines which member it should listen to. Bottger (1984) found that the best member was rated above average in 80% of high-performing groups, but in only 54% of low-performing groups.

More recently, Littlepage et al. (1997, Study 3) demonstrated that group experience on a related task increased members' ability to recognize others' potential contributions, and that the accuracy of recognition improved performance.

Specifically, in this study the researchers had a confederate demonstrate expertise by answering a number of trivia questions correctly. Following the task, others' ratings of the confederate's expertise increased compared to his/her pre-experience scores, while the mean ratings of non-expert (naïve) subjects dropped. Regression analyses demonstrated that group experience partially mediated the link between group experience and subsequent increased performance (number of correct responses) on a similar task.

This line of research also confirms that team performance depends not only on a team's ability to identify their best member, but also on the extent that the team actually *uses* that member's input (Bottger, 1984; Hollenbeck et al., 1995; Libby et al., 1987; Stewart & Stasser, 1995). Early empirical research linking expertise utilization and performance showed that air-time dominance by non-experts resulted in poor-quality group decisions (Maier, 1963); in other words, group performance suffers when members rely on members with less expertise rather than giving the most weight to actual experts' inputs. Even when the team's decision making is concentrated in a single team member, the effectiveness of the leader in utilizing member expertise is crucial for accurate decision making. Hollenbeck et al. (Hollenbeck et al., 1995:297) introduce the term "hierarchical sensitivity" to refer to the degree to which the team leader effectively weights staff members' judgments in arriving at the team's decision. They theorize that this stage is most proximal to the final decision, and find that hierarchical sensitivity interacting with "staff validity" (i.e., the accuracy of junior team members' recommendations) is a strong predictor of overall team decision accuracy. In short, a good team outcome requires not only that lower-level members provide good advice, but also that the leader uses their input effectively.

Second, the transactive memory approach examines how a group's shared knowledge of which team members know what (i.e., its shared directory of member knowledge, or "transactive memory system") affects individual and collective performance. A variety of recent empirical studies demonstrate the importance of transactive memory systems for group performance. For example, subjects in Liang et al.'s (1995) joint training conditions assembled the radios with fewer errors, and also collectively recalled a significantly greater number of procedural steps than groups whose members trained alone. Lewis (2003) found that measures of TM systems correlated positively and significantly with performance measures across a variety of domains studied, including undergraduates working on an assembly task, graduate students conducting a semester-long group consulting project, and a field sample of work teams in technology-related companies. Austin (2003) found that the accuracy of group's TM system was associated with several measures of group performance (i.e., internal and external evaluations of group goal attainment) and Peltokorpi (2004) found that the extent of sales teams' transactive memory directories related to positive customer service outcomes. Related work on implicit knowledge sharing in groups provides further support that group memory systems can positively affect group performance. Implicit coordination of expertise in software development teams (Faraj & Sproull, 2000) and information about who knows what among MBA student teams (Rulke & Galaskiewicz, 2000) have been positively related to group performance, including both effectiveness and efficiency measures. These studies suggest that transactive memory exists in a variety of types of teams and can positively impact group performance.

In summary, both of these research streams – the expert influence approach and transactive memory approach – provide evidence that team-level expertise

recognition and utilization processes have important effects on team-level task performance.

Effects of expertise on firm-level outcomes: inter-firm relations

Firms' ability to leverage their employees' knowledge resources affects their performance (Grant, 1996; Hitt, et al., 2001) and in particular their relationships with other firms (e.g., Hitt et al., 2006; e.g., Levinthal & Fichman, 1988; Seabright, Levinthal, & Fichman, 1992). The relationship between knowledge and inter-firm outcomes is especially important in the arena of professional service firms, which are the epitome of knowledge-intensive organizations (e.g. Starbuck, 1992). Knowledge is, above all else, the essential ingredient that enables professional service firms to deliver services to their clients (e.g., Hitt, 2001; Greenwood, et al., 2005).

As defined above, expertise can be classified as either general professional expertise or client-specific expertise and both have been linked in prior research to beneficial firm-level outcomes – especially relations between professional service firms and their clients. The following sections review the theoretical and empirical associations between professional expertise and firm-level relational performance.

General professional expertise and performance

Drawing primarily on the resource-based view of the firm (Barney, 1991), human capital (i.e., knowledge embodied in professionals) has been linked to positive firm outcomes: prior research shows that firms' human capital structures enhance firm competitiveness (Sherer, 1995) and that higher average firm levels of human capital are associated with higher firm performance via effects on diversification (Hitt, et al. 2001) and internationalization (Hitt, et al. 2006). Seabright, Levinthal and Fichman (1992) focus particularly on one type of performance outcome – maintenance versus dissolution of relationships with clients – to demonstrate the importance of firms'

knowledge resources in sustaining their client base. It is important to note that all studies mentioned above linking professional expertise (or human capital) with performance have studied the effects of firm-level expertise – that is, the average level of professionals' human capital (or proxies thereof) on performance. The implicit assumption across these studies (as is common in the broader literature on the resourced-based view of the firm -- Barney, 1991; Barney & Wright, 1998) is that all firms *use* their knowledge resources equally effectively; none of this research measured the extent to which firms apply their knowledge[12].

Yet researchers have recently begun to acknowledge that merely possessing resources does not guarantee that firms create value or develop competitive advantage.

Client-specific expertise and performance

Beyond the general professional expertise described above, one particular kind of human capital that has been shown to be particularly important in affecting the longevity of client relations has been client-specific human capital, such as client-specific skills and interpersonal relationships (Danos & Eichenseher, 1982). Client-specific expertise may consist of a variety of content domains, including well-established inter-firm communication patterns, knowledge of the firm's product market to evaluate risks from currency exchange fluctuations, understanding of prior governance issues that affect data reliability, familiarity with client personnel and systems to assess risks of fraud, and so on. A critical feature of this sort of client-

[12] Note that Hitt et al. (2001) theorized and tested the performance effects of "leveraging human capital." Their use of the term "leverage" is a specific one to the literature on professional service firms, where it means the ratio of partners (senior firm members) to associates (junior firm members). While the term connotes that partners may pass along their tacit knowledge to apprenticed juniors, leverage here is a structural feature of a firm. It should not be confused with the more general term for the *application* of knowledge for a task outcome; Sirmon, Hitt and Ireland (2007: 273), for example, describe "leveraging capabilities" as "mobilizing, coordinating and deploying [capabilities]… to take advantage of specific markets' opportunities."

specific expertise is that it is typically learned through personal experience and can only emerge over time (Levinthal & Fichman, 1988). A second important aspect of client-specific expertise is that it interacts with project complexity to affect relational outcomes: the more complex a task, the more important this sort of customized, idiosyncratic knowledge is valued, ultimately with greater incentive for the firms to maintain relations (Levinthal & Fichman, 1988).

The investments that firms make in developing this sort of client-specific expertise is an example of the sort of relationship-specific investment that features in transaction cost economics (TCE) theory. Williamson (1975) developed and expanded the notion of TCE, arguing that an attachment between two actors is strengthened over time as the two parties invest in developing expertise that is peculiar to the organizations' needs. Williamson (1981: 555) concluded that "where asset specificity is great, buyer and seller will make special efforts to design an exchange that has good continuity properties." Consistent with this theorizing, Levinthal and Fichman (1988), for example, found that the duration of an auditor-client's prior relationship was significantly related to that firm's retention of the client over time; they attribute this finding to the audit firm (as a whole) developing client-specific expertise during that prior relationship. Broschak (2004) found that ties with clients are most likely to dissolve when firms lose professionals who have the most client-specific expertise.

Although no research has explicitly tested these relationships at a team level, the studies cited in the prior two sections suggest that both general professional expertise and client-specific expertise would be associated with beneficial relations between teams and clients.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Research setting

The professional services sector is a rich setting in which to investigate the team-level expertise recognition process for a number of reasons. First, professional service firms such as management consulting and accounting firms are widely viewed as the archetype of knowledge-intensive firms (Alvesson, 1993; 1995; Kipping, 1999; Kipping, 1999; Starbuck, 1992; Starbuck, 1992). Knowledge is both the finished product and the raw material. Since knowledge resides in professionals' heads, the ability to recognize individuals' expertise and use that appropriately is critical to a firm's success. Because the project team (e.g., group of consultants who interact with the client) is the primary vehicle for conducting work in these types of firms (Werr & Stjernberg, 2003), it is important to examine the process of expertise recognition and utilization at the team level.

A second interesting aspect of professional service project teams is that expertise is often highly unevenly distributed among team members. Team members typically have heterogeneous experience in terms of the problem under consideration. For example, one member may have relevant functional experience, another industry knowledge, and so on. In addition, both accounting and consulting projects typically involve a divide-and-conquer approach to data gathering and problem solving; that is, after the team clarifies the project's focus, each member typically takes responsibility for a piece of the puzzle and collects data and conducts analysis on this sub-issue. This division of labor causes further specialization within the team. Therefore, to

create an integrated product in this setting, team-level expertise recognition process is especially important.

Third, several dimensions of the team structure create an interesting test ground for studying expertise recognition and utilization processes. Unlike many task forces or ad hoc teams, consulting and accounting project teams have a formal structure, typically comprising at least one person from each level of the firm's hierarchy[13]. Because many firms use an "up-or-out" promotion system[14] that fosters an aggressive focus on performance and climbing the ladder, the hierarchy is a salient feature in these firms.

Finally, researching these project teams in consulting and accounting firms offers some practical benefits. Because projects' duration (from team origination to project completion) is often limited to several months, this setting offers the chance to follow teams throughout their entire lifecycle.

In summary, professional service firms' reliance on within-team expertise recognition and utilization makes them "extreme cases" (Starbuck, 1993) in which to study this process; studying consulting and accounting project teams offers the potential for important theoretical contributions beyond the professional service firm context.

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13 Across consulting firms there is a fairly standardized set of roles comprising the hierarchy (e.g., analyst, consultant/associate, project manager/case team leader, partner, senior partner/director); similar roles exist in the Big 4 accounting firms (e.g., trainee, assistant, assistant manager, in-charge auditor, manager, senior manager, partner/director).

14 The "up-or-out" system means that employees regularly (i.e., twice annually) undergo a formal performance evaluation; those who are judged as not capable of getting promoted to the next level in the hierarchy (up) are asked to leave the firm (out).

Research design overview

The initial phase of the field study involved longitudinal case studies of six consulting and audit teams that I conducted in order to understand in a fine-grained way how teams of professionals utilize the knowledge of their members. Four teams participated from a top-tier global management consulting firm ("ConsultCo") and two audit teams from a Big 4 accounting firm ("AuditCo")[15]. Meetings typically included only team members and were held in each firm's office, but I occasionally observed teams' interactions with clients and accompanied them to client sites. I used this study to focus my subsequent theory development on process moderators that are especially critical in the professional firm setting.

To test the hypotheses, I conducted a second phase of research at AuditCo. Over a year-long period, I had access to firm members spanning all levels of the hierarchy, across all divisions, and throughout nearly 20 regional offices. I collected performance data from actual clients, and data for constructing the dependent and independent variables from surveys of team members and their associated partners, and from archives. The strength of this survey design lies not only in the significant reduction of common source bias, but also in the use of direct measures of client impact (i.e., first-hand reports from clients themselves) instead of proxies for the outcome.

Phase 1: Case studies and background interviews

Case studies. I initially conducted case studies of professional service firm project teams to gain a detailed understanding of their knowledge processes (e.g.,

[15] To ensure confidentiality, I have disguised the names of all firms, clients and individuals.

Haas, 2006b).(Bechky, 2003; Dougherty, 1992; Haas, 2005; Haas, 2006a; Haas, 2006b; Haas & Hansen, 2007) Because I was guided by existing theory, the initial phase of my research was neither strictly exploratory nor purely theory building, in the sense of Eisenhardt (1989) [16]. Rather I used the cases to confirm the existence of anticipated contextual factors as well as identify additional potential moderators of the expertise recognition and utilization process. The purpose of the case studies was therefore more theory testing in the sense of Pinfield (1986) who studied decision making processes in a government setting. In brief, that research started with two theoretical perspectives on the topic, and through observation and interviews Pinfield was able to elaborate these theories (i.e., specify how actors' behaviors and the context affected the process) and suggest contingencies that determine when one perspective is more likely than the other. In my research, I started with two theoretical streams (groups and status characteristics) that suggest the same basic process, but used the case studies to focus my subsequent theory development on process moderators that are especially critical in the professional firm setting.

In total, I developed six in-depth case studies of client service project teams (four from ConsultCo, two from AuditCo), combining observations, interviews and archival documents. The four teams from ConsultCo served clients in the pharmaceuticals, retail, biotechnology and financial services sectors; the two audit teams from AuditCo worked in the energy and healthcare sectors.

I followed each team throughout the entirety of their project (varying from three to ten weeks), and observed at least one team meeting per week, lasting from one hour to six hours (see Table 3.1 for details). All meetings were either audio or

[16] Eisenhardt (1989: 536) writes that researchers conducting theory-building case study research "…should avoid thinking about specific relationships between variables and theories as much as possible, especially at the outset of the process."

video recorded, and I took extensive notes during the meeting to capture both verbal and nonverbal indications of the team process. Appendix 3.1 shows the initial field guide that I used to prepare for observations; based on prior research, I compiled this list of known behavioral and verbal indicators of team status and expertise-related processes.

In addition to observing teams, I collected relevant archival material (e.g., copies of teams' planning documents, reports generated for clients). Lastly, in order to understand each team's ultimate outcome with respect to clients, I interviewed key personnel (e.g., firm partners, practice area leaders) after each project was completed. Across the case studies, I observed 81 hours of team meetings and conducted 16 interviews. By triangulating my data sources in this way I expected to increase the validity of my qualitative data (Seale, 1999).

Table 3.1: Overview of Case Studies

Firm	Team	Project Duration	Number of observations	Total hours observed	Related interviews
ConsultCo	Pharma	8	12	22	3
	Retail	4	5	8	2
	Biotech	10	10	19	3
	Financial services	3	4	6	3
AuditCo	Energy	5	5	8	2
	Medical	4	5	18	3

Background interviews. To develop a fuller understanding of the teams, tasks and organizational setting, and to refine items for my survey (Phase 2, below) I conducted formal and semi-formal interviews across both ConsultCo and AuditCo. In each firm I interviewed both a "vertical slice" (i.e., one person from each level of the hierarchy) and a "horizontal slice" (i.e., human resource managers, research support

staff) of employees to collect background information for the studies. In total, I conducted 31 interviews (see Table 3.2) ranging from 30 minutes to more than an hour[17]. Appendix 3.2 includes the preliminary interview protocol used to gain a sense of the contextual issues most likely to disrupt team processes, each firm's task strategies and procedures, and success criteria. The more senior the interviewee, the more I focused on the latter issues. In later stages of interviews, I focused on more open-ended questions to determine whether I should include any additional constructs in my survey. Interviews with individuals from business function (e.g., human resources, sales) focused on topics related to their areas of expertise (e.g., promotion criteria, staffing procedures, business development focus).

Table 3.2: Background Interviews

Firm	Position	Number of interviews
ConsultCo	Global managing director	1
	Head of London office	1
	Head of staffing, UK	1
	Practice area specialist	1
	Partner	2
	Senior Manager	1
	Consultant (former)	1
	Sub-total, ConsultCo	**8**
AuditCo	Chief Operating Officer, UK	3
	Senior Partner & Director of Human Resources	2
	Head of UK Sales Team	1
	Staffing directors (2), Consulting division	2
	Head of training and development	1
	Managing Director, Audit division	2
	Audit Partner, Scotland	1
	Audit Partner, England	1
	Audit Senior Manager	1
	Audit Manager	1
	Audit Assistant Manager	1

[17] Additional interviews, not included in this total, were conducted to pilot test the survey instrument.

	Audit Assistant	1
	Managing Director, Consulting division	2
	Consulting Partner	1
	Consulting Senior Manager	1
	Consulting Senior Manager	1
	Consultant (former)	1
	Sub-total, AuditCo	**23**
TOTAL		**31**

a. Interview list does not include discussions where the primary/sole purpose was pilot testing the survey

Archival data. Across both firms I collected archival data relating to training and development of professional staff. From AuditCo, for example, I have the full set of training materials used by the consulting division from entry-level onboarding materials to partner election training. This data proved invaluable not only in ensuring that I captured relevant constructs within my surveys, but also in customizing those survey items with the language most comprehensible/familiar to respondents.

Following the completion of case studies and background interviews, I spent two months conducting preliminary analyses of the qualitative data. Chapter 4 provides an overview of key themes that resulted from the case studies and interviews. The key new finding from Phase 1 was the emergence of a contextual moderator that I had not uncovered based on theory-building from prior literature: performance pressure. Chapter 5 focuses on developing theory to incorporate this variable into a model explaining expertise recognition and utilization. In addition, I used the outcomes of the case studies and interviews to validate and refine the models I had previously developed about shared representations as moderators of the link between team-level expertise recognition and utilization.

Phase 2: Survey study

To test the resulting theory, I conducted a second phase of research at AuditCo. Over a year-long period, I had access to firm members spanning all levels of the hierarchy, across all divisions, and throughout nearly 20 regional offices.

While many scales had been drawn from prior research (see Measures section, below), I revised the standard survey items to represent a closer match with the terminology used in AuditCo. I conducted pretests of the survey with five AuditCo partners (three Audit, two Consulting), with six additional individuals across Audit and Consulting and with one intact, four-person audit team (getting feedback from the group as a whole). In addition, the Managing Directors of both the Audit and Consulting divisions and the Chief Operating Officer provided input and feedback on the surveys. Overall, this pre-testing phase confirmed that questions were comprehensible and that individuals interpreted them similarly, that respondents could complete the survey in less than 20 minutes (for a four-person team) and finally that the online functionality performed as expected.

Survey research design

The overarching research design was intended to minimize issues of same-source bias to the greatest extent possible. To this end, I collected team process data from team members, and contextual and performance data from partners responsible for the projects (but who were not involved in the day-to-day project work). I also collected some data for constructing the dependent and independent variables from archives. Finally, I collected performance data from surveys and interviews with actual clients.

Sample

My aim was to capture a sample that would realistically represent the range of tasks that AuditCo teams confront. Interviewees indicated that I would find teams representing a wide range of these factors by maximizing variance across three specific features that could be identified in advance: client governance category (i.e., publicly-listed, subsidiary of an international corporation, privately held) as an indicator of the complexity of its financial reporting requirements; client's length of relationship with AuditCo as an indicator of project uncertainty, and geographic location to ensure I capture teams from both large and small offices (where interpersonal familiarity might differ). The chief operating officer of AuditCo acted as my primary contact, and his office compiled an initial list of possible teams intended to maximize diversity across these variables. From this list, teams were contacted if they met certain logistical criteria (i.e., start date within an 8-week period, duration between 3–16 weeks, 3-10 full-time team members). After gaining consent from the lead partner for each client team, I ultimately surveyed more than 600 individuals across 104 teams representing both the audit and consulting divisions[18].

Individuals were only considered as part of the core project team if they were employees of AuditCo and spent at least 50% of their time on the project. This definition therefore excludes (1) most partners[19], (2) internal firm experts (i.e., practice specialists), (3) other firm support personnel (i.e., library researchers, secretaries), and (4) client employees who provided assistance to the team.

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[18] Two lead audit partners who had been identified by the COO declined the opportunity to participate, citing concerns in one case about client confidentiality (where the client was a government agency) and in the other case about the amount of time the surveys would require from team members. Given the high rate of participation otherwise, it is unlikely that the inclusion of these two additional teams would materially affect the results reported herein.

[19] Firm partners typically work on at least two "live" projects at any time, but have many additional responsibilities such as clientele development, firm administration, etc.

Procedure

I sent two surveys to each team member. Survey 1 included the expertise recognition variable and was sent within the team's first three days on the project. Survey 2 was administered during the team's final week on the project and asked about team members' contributions to the final client deliverable. In general, people responded within four days of receiving the survey. The final response rate (i.e., people who answered at least one survey) was 82%, for a total of 591 individuals. Respondents were 66% male, with an average age of 30 and 4.7 years experience working at AuditCo. These figures mirror closely the demographics of the overall firm, according to statistics provided by the human resource function.

For each participating team, I conducted an interview and a survey with a senior partner who was responsible for the relationship with the client, but had not been involved in the day-to-day work of the team. This data provided input for "project complexity" (control variable) and for "performance pressure" (introduced in Chapter 5), and was collected within one month of the project's completion[20].

Finally, partners for each team provided the name of up to three key contacts at the client organization for which the project had been completed[21]. Partners considered these individuals the "main" client (e.g., CFO, Financial Director or Audit Committee Chair for audit teams; Managing Director, Head of Strategy or Business Unit Vice President for consulting teams). In the end, I conducted an interview and a survey with clients for 70 teams. Data for an additional two teams was collected by a

[20] As detailed in the Measures sections in Chapter 5, the performance pressure data were also collected from team members during the project; correlations between team and partner scores confirm the reliability of partner-sourced data, which was used in analyses to minimize same-source bias.
[21] The COO's office prohibited this additional data collection with seven teams because of an ongoing audit re-tendering process with those clients; four partners declined to provide names of client contacts . These teams were excluded from analyses that required performance data.

representative of AuditCo as part of their formal client service review process[22], resulting in a total of 72 teams with complete performance data. None of the contacted clients refused to participate, but for the remaining 21 teams (i.e., 104 total, less 11 prohibited teams and 72 complete teams), logistical issues prohibited me from conducting the surveys/interviews within the four-week time frame allocated for this phase of data collection. Because these issues did not appear to be connected to the performance of the AuditCo team (e.g., main client had left firm in the intervening period or was on extended holiday; client company had entered merger discussions and individuals were overwhelmed collecting financial data), there is no reason to believe that any systematic sampling bias occurred; this possibility cannot, however, be fully ruled out.

Measures (common variables across chapters 5 and 6)

This section elaborates the measures that are common across Chapters 4 and 5. Variables that are unique to either of those chapters are detailed in the relevant Measures section with each chapter.

Expertise measures

General professional expertise. Consistent with prior measures of this construct (Hitt et al., 2006) I used three indicators of general professional expertise: level of professional/technical qualifications, organization tenure and professional tenure (i.e., number of years in accounting for auditors, in consulting for consultants). The three items were standardized separately by division, and then averaged to create a composite score for each person. Team members completed these items as part of a

[22] AuditCo periodically uses a professional agency to conduct client service reviews with core clients. The exact questions from my surveys were added to the standard protocol and data was sent to me by

larger set of demographic questions at the end of Survey 1. The individual-level general professional expertise measure was used as the basis for Accurate Recognition of Expertise variable (below); team members' scores were averaged to create a team-level measure of general professional expertise (GPE stock) as a control variable.

Client-specific expertise. AuditCo provided archival data from its timesheet database indicating how many hours each team member had booked to that particular client for each of the three fiscal years prior to the project's start. Time spent at the client is a proxy for client expertise, consistent with prior research showing that professionals learn by doing (Lowendahl, Oivind, & Fosstenlokken, 2001) and with prior research emphasizing the development of client or relationship-specific expertise dependent on time spent with a specific organization (e.g., Asanuma, 1989; Levinthal & Fichman, 1988). Although individuals may learn at different rates, this approach provides a clean measure of each person's prior opportunity to acquire client expertise. Each individual's data were summed across years and then standardized separately for audit and for accounting teams. The individual-level client-specific experience measure was used as the basis for Accurate Recognition of Expertise variable (below); team members' scores were averaged to create a team-level measure of client-specific experience (CSE stock) as a control variable.

Recognition of general expertise. This measure adapts Austin's (2003) measure of expertise recognition for field-based project teams. On survey 1, team members were asked to rate themselves and each other team member on five dimensions of expertise along a five-point scale (very little expertise to great

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AuditCo. For these three clients I did not conduct an interview.

expertise)[23]. The five dimensions were initially suggested in an interview with AuditCo's head of human resources as the core skills necessary for effective client service, and are based on the criteria that are then used for individual evaluations at the end of each project[24]. These skills have been long recognized in the accounting literature as the five core skills necessary for incoming auditors (e.g.,Johnson, 1975 – see Appendix 3.3). The heads of both the audit and consulting divisions confirmed the appropriateness of these dimensions for use at AuditCo. Measures of intermember agreement —$r_{wg(j)}$, using a uniform expected variance distribution— indicate that members shared their beliefs about each member's level of expertise (James, Demaree, & Wolf, 1984): mean $r_{wg(j)}$ was .92, median $r_{wg(j)}$ was .93. Moreover, intraclass correlations (ICCs) provided evidence for sufficient intermember reliability, ICC(1) = .29, ICC(2) = .62; $F(90, 262) = 2.62$, $p < .001$. ICC(1) indicates the percentage of variance in ratings due to team membership, whereas ICC(2) indicates the reliability of differences between team means (Bliese, 2000).

Accurate expertise recognition implies that people should rate their team members' expertise commensurate with their actual levels of expertise; in other words, those with the highest general professional expertise scores should be rated highest. To calculate this measure, I first regressed each individual's general professional expertise score on the mean expertise score provided by his team; the residual from this equation represents the individual-level deviation between that person's actual general expertise and the ratings assigned to him by his teammates. For each team, the average of the squared residuals across all team members represents the team's deviation in assessing one another's general expertise; these

[23] Asking respondents to rate themselves was intended to increase their engagement in the rating task, thereby enhancing the accuracy of their rating of coworkers (Saavedra & Kwun, 1993).

scores were multiplied by negative one so that higher scores indicate more accurate recognition by the team.

As a robustness check, I also calculated this measure as the team level correlation between members' actual expertise (their general professional expertise score, above) and the team's mean rating per member (excluding self ratings). Such a method has been used in prior research on team-level alignment between expertise recognition and utilization (Bunderson, 2003). In principle, both measures capture the degree to which individuals' ratings correspond to their team members' actual expertise. The residual-based measure captures the variance between each team member's rating and the population

Whereas the residual-based measure benefits from using the whole sample (i.e., residuals are initially calculated at the individual level and then aggregated to teams), the correlation-based measure is dependent on having a large enough N *per team* to ensure reliability. Despite these differences, correlations between the two measures (i.e., residuals-based and correlation-based) were significant and reasonably high: for recognition of general professional expertise $r = .38$ ($p < .001$), and utilization of general professional expertise $r = .41$ ($p < .001$). Tests of all hypotheses using both methods were very similar. See Appendix 5.1 (at the end of Chapter 5, page 152) for details.

It should be noted that although Berger et al. (1998) caution against using self-reports of performance expectations because status characteristics theory lacks basis for understanding how individuals verbalize these beliefs, others have shown that survey questions such as "Who has the most task ability" do tap information that must

[24] The five criteria are also the building blocks of modules used in AuditCo's foundational training program; wording on the surveys reflected descriptions used in AuditCo's training materials.

be available for group members to solve a collective problem (Driskell & Mullen, 1988). In a meta-analytic review of the literature, Driskell and Mullen (1990) found a strong and significant relationship between survey measures of expectations and subsequent behaviors. Finally, field research has confirmed a statistical link between self-reports of performance expectations with team member interaction (Cohen & Zhou, 1991) and with interpersonal influence (Bunderson, 2003). Austin (2003:870) found a high correlation (.82) between self-report ratings of expertise and objective performance on a related problem-solving task. Given this evidence, it appears justifiable to rely on the team-report measure of expertise recognition (performance expectations) in this current study.

Recognition of client-specific expertise. Parallel to the measure of recognition of general expertise, this variable was calculated by first regressing each team member's actual expertise (their client-experience score, above) on his/her mean rating from team members. The team measure is the average squared residual across all team members, reversed so that higher scores indicate more accurate recognition. Again, robustness checks using the team level correlation measure (Bunderson, 2003) confirmed the significant correlation between the two approaches ($r = .26$, $p<.05$) and the expected relationship of this measure with other variables in the model; see Appendix 5.1 for details of analyses using both measures.

Effective utilization of general /client-specific expertise. Effectively using team members' expertise means giving each individual influence over the team's end product in proportion to his/her level of ability. I adapted Bunderson's (2003) measure of intra group influence. On Survey 2 (administered during the final week of the project), respondents were asked "How would you rate yourself and each of your team members in terms of the amount of influence you have over the team's final

deliverable to the client. In other words, how much did each team member shape, direct and contribute to the team's product?" Responses were captured on a seven-point scale. Measures of intermember agreement — average $r_{wg(j)}$, using a uniform expected variance distribution was .74, median .75 — indicate that members shared their beliefs about each member's level of influence (James et al., 1984). Intraclass correlations (ICCs) suggest sufficient intermember reliability, ICC(1) = .54, ICC(2) = .83; $F(102,322) = 5.87$, $p < .001$.

Similar to the measures of expertise recognition, this measure constitutes the team-level average deviation (squared regression residual) between each member's general or client-specific expertise score and the influence score given to her/him by teammates. Robustness checks using the team level correlation measure (Bunderson, 2003) provide support for this measure, with correlations between the two measures as follows: utilization of general professional expertise r =.41 (p<.001) , and utilization of client-specific expertise r =.28 (p<.05). Appendix 5.1 provides results of analyses using both measures of expertise utilization.

In empirical research so far, expertise utilization has been operationalized in three ways: (1) outcome: by measuring (or manipulating) pre-study knowledge, and determining the extent to which that was used for the team decision or (2) process: measuring input variables (i.e., percent of time talking, number of "dominance" behaviors such as interrupting) or (3) perceptions: asking participants to rate team members' degree of influence over the final product. The latter is the only way that field studies have measured it, but it should be noted that measuring influence in this way creates the potential issues of both content validity (Nunnally, 1967) and common response bias (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003).

First, as noted by Bunderson (2003) peers' influence nominations tell us whether a given group member is *seen* as having influence in a group and not whether or how much that group member *actually does* influence group outcomes. Past research, however, demonstrates that peers' influence nominations are systematically correlated with other measures of intragroup influence. March (1956), for instance, found that peers' influence nominations correlated with both behavioral measures (initiative taking in groups: r = .59) and with attitudinal measures (perceived influence: r = .40). Similarly, Brass (1984) found that peers' influence nominations were correlated with attitudinal measures (supervisory ratings of influence: r = .70) and individual outcomes (subsequent promotions: r = .43). Given these results, it can be argued that team member nominations are a valid measurement of intrateam influence.

The second concern is that asking participants' view of both perceived expertise and perceived influence creates common response bias. Although I cannot eliminate this issue completely, the temporal design of my research (see Procedures section, above) should provide sufficient separation of these two variables to reduce common source bias (Podsakoff et al., 2003).

Control variables

I collected data for the four control variables (firm-client prior relationship, project complexity, team size, and project duration) from a variety of sources, as indicated below. I used principal components analysis with varimax rotation to assess scale reliability; items for each scale loaded onto a single factor.

Firm-client prior relationship. A professional firm's prior relationship with a client could enhance client ratings; AuditCo's total number of years' service with

each client was therefore used as a control variable in testing H1a and H1b. This data was provided by AuditCo's business development function, and audit records for all public companies were cross-checked on the FAME database of company reports (Bureau van Dijk Electronic Publishing).

Project complexity. Consistent with prior research on team knowledge processes (e.g., Lewis, 2004), I included project complexity as a control in testing all hypotheses. Partners were asked to rate three items on a 5-point scale, compared to the "average" AuditCo project/audit they had experienced. For example, "This audit [project] team has a more complex or technically challenging issue to address." Partners' scores were highly correlated with team members' perceptions of complexity ($r=.38$, $p<.001$; rated during Survey 2); to minimize same source bias, I used partners' ratings for this measure. Cronbach's alpha = .70.

Team size. Because team size is likely to affect members' ability to recognize others' expertise (Littlepage & Silbiger, 1992) and may influence client perceptions of the team's work, this variable was also included as a control in all analyses. Note that this measure captures the number of team members on the project, not the number of respondents; these two measures are highly correlated and use of the latter does not change results.

Project duration. Longer projects may give team members more time to reassess their initial view of other members' expertise and consequently to apportion influence more appropriately across team members, or give them more time to establish stronger relationships with clients. Project duration (number of months) was included as a control in all analyses.

Team performance

Client satisfaction is an appropriate measure of performance for teams in professional service firms because client service is the core work for these teams and firms. Although accounting research has identified "dissatisfaction with audit services" as a primary reason for clients switching audit firms (Bedingfield, Loeb, & Carmichael, 1974; Burton & Roberts, 1967), there are several reasons why client satisfaction is a better measure of performance than actual re-engagement (or dismissal) of the team or firm by the client. First, there are business considerations well beyond the performance of a professional service team that determine a client's willingness and ability either to re-engage that team or the associated firm. In the audit field, clients face a number of constraints to switching auditors: firing one's auditor sends a bad signal to the public, particularly capital markets (i.e., switching auditors may connote that one's accounting practices are suspect); given the consolidation of the accounting industry into four global firms, there are few alternatives if a client needs a multinational firm; and instructing a new auditor requires significant lead time and preparation. Indeed, the low rate of auditor switching, estimated at 7 -11% annually for US publicly held companies, (Williams, 2005) supports the idea that clients are reluctant to change auditors. In the consulting field, a team may be required only for specialized work; failure to reappoint that team may be dictated more by a client's needs than by the performance of the team.

Second, a client's satisfaction is a strong predictor of whether the professional firm will receive additional work, beyond the focal project – for example, either by cross-selling additional services to that client organization, by selling future work to the same client individual who changes employer, or by selling services to a new client organization via a referral from the initial client. Because diversification into

new business areas has been a primary strategy for many professional service firms (Greenwood, Suddaby, & Hinings, 2002; Greenwood & Suddaby, 2006), the ability to cross-sell additional services to both new and existing clients is fundamental to many organizations' profitability and even long-term survival.

Finally, beyond the strong conceptual justification for using client satisfaction as measure of performance, there are practical reasons as well. The low rate of auditor switching and the inability *ex ante* to predict switching behavior prior to team-level data collection means that a researcher would need to sample a very large number of teams in order to obtain data from enough teams that were dismissed by clients. Further, given the lead time necessary for switching auditors in particular, data collection would need to extend over a multi-year period.

Table 3.3 details all measures, including specific items, factor loadings and reliability measures.

Table 3.3: Scales, Items and Reliability Measures

Items	Factor loading[c]
General professional expertise	
Level of professional /technical qualifications	n/a
Organization tenure (number years employed at [AuditCo])	
Professional tenure (number of years in accounting for auditors, in consulting for consultants)	
Client-specific expertise	
Number of hours booked working on project for the focal client in the three fiscal years prior to data collection	n/a
Firm-client prior relationship	
AuditCo's total number of years' service with focal client	n/a
Project complexity (α = .70	
This audit requires more professional judgment (i.e., forming opinions, not just gathering facts)	.88
This audit team has a more complex or technically challenging issue to address	.86
This audit demands that the ideas of all team members be shared in order to succeed	.62
Team size	
Total number of team members	n/a
Project duration	
Number of months for primary project work	n/a

a. Cronbach's alpha (α) reported from principal components analysis with varimax rotation

b. For consulting teams, "project" replaced "audit" in the items

c. n/a signals that the measure was not subjected to principal components analysis

Appendix 3.1: Field guide for PSF team observations

1. **Indicators of a transactive memory system** (behavioral proxies that indicate presence of TMS – Moreland 1999)
    a. Memory differentiation (Liang 1995) or specialization (Lewis 2003):
        i. Different responsibilities
        ii. Each team member necessary to complete project
    b. Task coordination (Liang 1995; Lewis 2003)
        i. Less need for explicit planning
        ii. Greater cooperation
        iii. Less confusion
        iv. Fewer misunderstandings
        v. No backtracking
        vi. Kept to deadlines (efficiency)
    c. Task credibility (Liang 1995; Lewis 2003)
        i. Less need to make claims of expertise
        ii. Better acceptance of procedural suggestions
        iii. Less criticism of work by others
        iv. Double-checking work [R]
    d. Brandon & Hollingshead (2004): accuracy, sharedness and validation
        i. Degree of participation by each member in TMS
2. **Shared cognition indicators**
    a. Statements that reflect group vs. individual perspective (see Liang 1995:389 to differentiate it from measures of social identity)
        i. "we" vs. "I" believe / think / know / find

b. Language – convergence on the way the problem is described

c. Content, goals & evaluation criteria

3. **Status-related behaviors**

   a. Showing deference to others of higher status

      i. TEXT: apologizing for mistakes, asking their permission, acknowledging their contribution, downplaying one's own contribution relative to theirs, supporting/backing up their comments, self-deprecating humor

      ii. ACTIONS: nodding/showing agreement, turning toward/ looking at someone

   b. Exerting dominance over others of lower status

      i. TEXT: interrupting/ overtalking, contradicting, expecting others to wait / backtrack for you, giving orders/instructions, joking about someone

      ii. ACTIONS: arriving late without apology/explanation, ignoring/ turning back on others

   c. Influence behaviors / power & prestige behaviors

      i. Performance outputs – any attempts to solve the group's problem

      ii. Action opportunities – chances to participate in group problem solving

      iii. Reward actions – positive evaluations of others' performance outputs

      iv. Influence – successfully changing others opinion following disagreement

4. Disagreement on expertise hierarchy
    a. The above status-related behaviors happening in contrast to one's standing in group
    b. Explicit reference to being over- or under-utilized on the team (e.g., asking for additional responsibilities
5. **Member interpersonal familiarity** (see Liang 1995:389 to differentiate it from measures of cohesion)
    a. Personal comments
    b. References to others' prior work / industry / client experience
6. Team member **demographics and status characteristics**
    a. Gender, race, authority position, practice affiliation
    b. Prior experience
7. How does **authority** play a role in each team member's contributions?
    a. Willingness to *publicly* accept others' opinions / *publicly* change mind based on others' input
    b. Number of contributions per authority level depending who is in the room
    c. Does the *kind* of contributions people make differ, depending who is in the room? (content vs. process; claims of expertise/knowledge; humor)
8. **Time pressure** – what are indicators that team is pressured?
    a. Observed behavioral
    b. Text
    c. Other context

Appendix 3.2: Structured interview protocol

Note: "audit" was used in interviews with audit division members; "project" was used when discussing consulting engagements.

Environmental constraints

- What three factors are most likely to cause delays during your project/audit?
- How does time pressure affect your decisions?
- Think of the last time you had a project that didn't go as well as you (or perhaps, the partner or client) had expected. What were the reasons for sub-optimal results?

Task strategies

- Would you say there is a [firm name] way of working on client projects? Can you describe it?
- How much do you use standardized frameworks or methodologies in your client work?
- What percent of the problems you face do you consider to be "novel" (as in, you've never faced them before) compared to "routine"?
- How closely do you usually follow the proposal/contract when conducting the study? If the remit changes, do you need to get agreement from the client? How would this usually happen?

Task procedures

- How often do you hold group problem-solving sessions? Do these include the partner? The client team members? Other people from the client?
- How does the team decide how to allocate work between the team members?

Who makes these decisions? How much does the initial approach tend to change during a typical project / audit?

- How do you decide when to ask the partner for help on the problem?
- To what extent would you say the typical problem solving process is actually hypothesis-driven versus emergent during the project?
- Do you attempt to get client buy-in to the ideas/proposals before formal progress reviews with the steering committee/ main client?

Success criteria

- What determines a "good" project outcome, versus a "poor" or an "excellent" one?
- How do you think the client judges a successful project?
- How would you allocate 100 points across the following categories according to their importance for "success" of a project: [1] client satisfaction, [2] benefit to the firm (i.e., reputation in the market, transferable knowledge), [3] team member satisfaction (i.e., learning, lifestyle), [4] personal benefit (i.e., reputation, learning, contacts)

Project outcomes

- What does the typical "final product" for the client look like (is it a report, a discussion, etc)?

Appendix 3.3: Core expertise dimensions for accounting tasks

Johnson (1975), published in the *Journal of Accountancy* – a study of the core skills needed to make partner across a set of top tier accounting firms. The dimensions are very similar to those used by AuditCo for training and pre-partner evaluations.

Core accounting skills (Johnson, 1975)	**Items used in the present study**
1. Technical skills	1. Identifying, assessing and managing risk areas
2. Decision making	2. Identifying opportunities to improve client's business
3. Oral & written communications	3. High impact, professional communication skills (written and oral)
4. Leadership & supervision	4. Effective & efficient project management
5. Client relations	5. Building strong relationships with clients

CHAPTER 4: SHARED REPRESENTATIONS AND EXPERTISE UTILIZATION

The groups literature has long proposed that groups in which members come to a common understanding of the problem tend to make more effective decisions (e.g., Cannon-Bowers, Salas, & Converse, 1993; Hirokawa, 1985; van Ginkel & van Knippenberg, 2008), with smoother team processes and higher performance (Cannon-Bowers, Salas, & Converse, 1993; e.g., Edwards et al., 2006; Gouran & Hirokawa, 2003; Gouran & Hirokawa, 2003; Mathieu et al., 2005; Stout, Cannon-Bowers, Salas, & Milanovich, 1999). Each team member develops a mental model, which is an organized knowledge structure that allows individuals to predict and explain the relationship between components in their environment (e.g., Rouse & Morris, 1986); these mental representations or "psychological maps" (Ellis, 2006) aid people's understanding of how their own and teammates' characteristics and responsibilities fit with their task. Researchers have suggested that *shared* (i.e., overlapping and consistent) representations account for beneficial effects on team process and performance by enabling smoother coordination, greater efficiency and ultimately higher performance (Mathieu et al., 2005)[25]. A shared representation is "…any task/situation-relevant concept… that is shared by most or all of the group members." (Tindale, Smith, Thomas, Filkins, & Sheffey, 1996:84), and can include societal and group norms, learned rules, specific goals or information processing objectives, understandings of the task, or framings of the problem, as well as verbal or mathematical systems for solving the problem (Tindale, Smith, Thomas, Filkins, & Sheffey, 1996).

Summarizing across this array of shared representations, Cannon-Bowers and Salas (2001) suggest that "what is shared" falls into four broad categories: (1) knowledge of team mates, (2) task-specific knowledge, (3) task-related knowledge and (4) attitudes / beliefs. The final category is the broadest, and captures very general (not task-related) beliefs, values and attitudes of the team members; the impact of such high-level cognitive structures (e.g., cultural values) is beyond the scope of this dissertation that focuses specifically on expertise recognition and utilization in project teams. The remainder of this chapter develops theory linking the other three categories of shared representations to the team-level expertise recognition and utilization.

The first type of shared representation considered in this chapter – shared team representations – involves team members' perceptions of one another's specific attributes, such as knowledge, skills, strengths and weaknesses (Cannon-Bowers, Salas, & Converse, 1993; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Prior work has shown that the accuracy and the similarity of teams' mental models each exhibit significant and positive relationships with team performance (Edwards et al., 2006; Ellis, 2006; Mathieu et al., 2000). This chapter extends prior work by elaborating specific linking mechanisms through which shared team representations would affect team-level expertise utilization, itself a precursor to performance.

This chapter then focuses on the two subsets of shared representations that comprise socially shared knowledge about the task: *task-specific knowledge* concerns specified procedures, sequences, actions and strategies necessary to complete a particular task and *task-related knowledge* involves more generalizable, higher-level

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[25] The terms "mental model" and "shared representation" generally refer to the same construct and are typically used interchangeably in the literature. For simplicity, this paper uses only the latter term.

processes for the way work is accomplished (i.e., what constitutes effective team work: Rentsch & Hall, 1994). Following other researchers in this field (Klimoski & Mohammed, 1994; Levine & Moreland, 1991; Mathieu et al., 2000) and based on the rationale that they have similar effects on group process (as detailed below), both task-specific and task-related knowledge are considered jointly under the term "shared task representations." These include models of both the task content (what the team is working on and how to accomplish it) and goals (what are the objectives). When members hold common beliefs of what they are doing, where they are going, and how to get there, they generally also agree on how to evaluate their results. This chapter argues that shared task representations are important facilitators of the link between expertise recognition and utilization because they enable the expert to communicate more effectively and efficiently with other team members, and because they allow listeners and decision makers to understand experts' input and relate it more closely to the task at hand.

Shared team representations: Agreement on expertise hierarchy

Aside from the content of the shared representation (i.e., team- or task-focused) discussed above, another distinction between categories of representations concerns the nature of sharedness (e.g., Mohammed, Klimoski, & Rentsch, 2000; Smith-Jentsch, Mathieu, & Kraiger, 2005). One way to consider sharedness is *similarity*, which means that the mental representations are similar and overlapping. Research suggests that similarity enhances efficient team coordination (e.g., Mathieu et al., 2000), in part by allowing team members to anticipate others' behaviors and needs and adjust their own responses accordingly (Rico et al., 2008). Another characteristic of shared representations is *accuracy* – the extent to which the representations truly

reflect reality. Accuracy of shared representations has been linked to team effectiveness, such as high quality decision making (e.g. Edwards et al., 2006; Ellis, 2006).

Responding to calls for research measuring both similarity and accuracy of shared representations (Cannon-Bowers & Salas, 2001; Cooke et al., 2003) recent work in this tradition has found that the accuracy and the similarity of teams' mental models are distinct constructs that each exhibit significant and positive relationships with team performance (Edwards et al., 2006; Ellis, 2006; Mathieu et al., 2000). These scholars and others (e.g., Rico et al., 2008) suggest that further empirical work is important to uncover the ways in which multiple dimensions, including accuracy and similarity, affect the actual use of knowledge by teams to resolve particular issues in situ.

This section of my dissertation focuses on the interplay of accuracy and similarity, and their effects on expertise utilization in project teams. In particular, the way I define expertise recognition (i.e., the relationship between actual and perceived expertise rated by team members [for details, see page 69]) is a direct measure of the *accuracy* of each team's perception of their members' expertise. Consistent with Webber et al.'s (2000) distinction between consistency and consensus in mental models, I conceptualize *similarity* of team representations as the extent to which team members hold a consistent view of their teammates' expertise – "the similarity of rank orderings of judges' target ratings… irrespective of whether the scores are the same" (Webber et al., 2000:311). This construct thus parallels the idea from status characteristics theory and the small groups literature concerning "agreement on the expertise hierarchy," which necessarily considers relative rankings instead of specific scores.

Research from status characteristics theory and the small groups literature suggests that a team's agreement on the expertise hierarchy (i.e., the consistency of their shared team representations) is likely to impact the way the team uses members' expertise. By integrating these two research streams, I draw out three mechanisms through which shared team representations may affect the team-level expertise utilization process: legitimacy, conflict and divergent thinking.

Legitimacy

As more fully discussed in the literature review, legitimacy is the outcome of a process of social construction, by which cultural accounts from a larger social framework are used to support the existence of a social entity such as a status hierarchy (Berger et al., 1998). Status characteristics theory asserts that legitimacy allows an actor with recognized expertise to become influential within the group (Ridgeway & Berger, 1988), much as legitimacy affects the relationship between an actor's potential power and his ability to use it. Berger et al. (1998) suggest that the order between actors is legitimated if expectations become normatively prescriptive, relevant, and have collective support. They assume that collective support means both unanimity of agreement and the "presumption of consensus" (p. 383). That is, they expect not only that all group members hold the same referential structure (i.e., expected link between expertise hierarchy and influence), but also that each actor believes that all other group members agree with him or her. They write (1988:214), "It is this anticipated collective and behavioral validation which gives a legitimate order its normative moral quality." Actors' expectations for resulting influence according to the expertise hierarchy are thus "augmented from simple anticipations of what will occur to expectations of what *should* occur" based on collective support

(1988:213, emphasis original). Therefore, expressed disagreement on the status hierarchy indicates that such consensus does not exist and undermines the assumed relation between expertise and influence. At the extreme, even one person's dissent would thus delegitimize the status order, because the group starts with the presumption of consensus.

Therefore, even if some (or even most) team members initially recognize others' actual expertise, a lack of shared representations about the expertise hierarchy will diminish the legitimacy of those perceptions, possibly leading teams to allocate influence over the task in a way that is discordant with the initial expertise ranking. In contrast, shared representations about team members' ranking on the expertise hierarchy are likely to enhance the correspondence between recognizing and using team experts.

Conflict

Disagreement on the status hierarchy is likely to moderate the effects of expertise recognition on influence by generating higher levels of relational conflict within groups. As explained above, disagreement on the expertise hierarchy signals a lack of legitimacy for the current structure and undermines its stability. When status orders are unstable, conflict is more likely to become manifest (Zelditch & Walker, 1984) as low-status actors challenge their superiors. Ravlin, Thomas & Ilsev (2000) build on this concept to argue that disagreement on the status hierarchy will not only lead to increased levels of felt conflict via its affect on personal legitimacy, but will also increase the degree to which felt conflict becomes manifest in group processes. The authors draw on social categorization theory (Tajfel & Turner, 1986) to reason that status conflicts undermine high-status actors' sense of personal legitimacy. This

threat to their ego and self-identity is the basis for interpersonal rivalry, and the reason why disagreement on the team hierarchy leads to relational, rather than task, conflict. As disagreement on the expertise hierarchy is an indication that team members hold dissimilar values, this work parallels findings in the conflict literature showing that value incongruence heightens relational conflict within teams (Jehn, Chadwick, & Thatcher, 1997; Jehn, Northcraft, & Neale, 1999).

Relational conflict has been shown to have detrimental effects on team processes, leading members to withdraw from cooperative behaviors and decreasing opportunities for coordination (Jehn, 1994; 1995; Jehn et al., 1997). Further, Simons and Peterson (2000) summarized the conflict literature by noting the detrimental effects of relational conflict on the group's information processing capabilities. Members spend their time and energy focusing on each other rather than on the task at hand, thereby limiting their cognitive capabilities (Jehn & Mannix, 2001). Relational conflict also lowers cognitive functioning by increasing members' stress and anxiety levels (Staw, Sandelands, & Dutton, 1981). Thus, relational conflict would be expected to decrease team expertise utilization both by discouraging members from contributing substantively and by lowering the team's information processing capabilities. Relational conflict is thus expected to be a key mechanism through which disagreement on the expertise hierarchy has detrimental effects on both the team's motivation and ability to utilize member expertise. Therefore, even if team members are initially accurate in recognizing one another's expertise, their use of those experts might not correspond to these initial perceptions. The link between expertise recognition and utilization is thus weakened.

To summarize, both proposed mechanisms – legitimacy and conflict – underpin a rationale suggesting that agreement on the expertise hierarchy is beneficial, whereas a lack of agreement between members erodes the effectiveness of a team's expertise utilization. That is, agreement on the expertise hierarchy, conceptualized as low variance between members' ranking of each other's expertise (see Measures, below), is predicted to strengthen the relationship between average team-level expertise recognition and utilization. In contrast, disagreement about the expertise hierarchy is likely to lead to relational conflict, in turn lowering both member motivation to contribute and decision maker ability to accept influence, even from an expert. Both these mechanisms suggest that low agreement is detrimental to teams, because it will interfere with a team making the best use of recognized experts; higher agreement on the expertise hierarchy enhances the link between recognizing and using expertise.

H4.1: Agreement on the expertise hierarchy moderates the relationship between the recognition and utilization of expertise, such that the greater the agreement, the higher the relationship between expertise recognition and utilization.

Divergent thinking

Research by Nemeth and colleagues (Nemeth, 1986; 1995; Nemeth & Wachtler, 1983) on minority influence within a team provides another approach for considering the effect of shared team representations on expertise utilization. In contrast to the conflict mechanism above, which suggests that disagreement has negative effects on cognitive processing, minority influence within a team may be a mechanism through which disagreement has positive effects. As detailed in the literature review, Nemeth's research shows that persistent exposure to minority views fosters greater

thinking about a subject, in turn leading to higher ability to understand the issue. Where there is a conflict between views, people not only devote greater attention, but also exert higher cognitive effort to resolve the conflict. People exposed to minority views also attend to more aspects about the situation and re-examine their initial premises, stimulated partly by their initial assumptions that the minority view is wrong. This research suggests that the greater the difference between the minority and majority views, the more likely it is that exposure to a minority view will prompt a rethinking. In contrast, persistent exposure to majority views leads to unreflective acceptance of the prevailing opinion.

Applying these findings to the expertise utilization process suggests that disagreement about the expertise hierarchy may benefit teams by prompting team members to consider carefully their own views on how to weight others' inputs. By stimulating divergent thinking, disagreement on the status hierarchy may act as a cognitive mechanism that allows team members to understand better the nature of expertise and how it relates to the solution. In other words, disagreement leads to divergent thinking, in turn affecting members' willingness to accept influence from one member versus another, irrespective of the extent to which they had initially evaluated someone as an expert. To the extent that this re-examination leads to greater influence from actual experts, then dissent is likely to increase the effectiveness of the team's expertise utilization[26]. In contrast, when the team members (act as if they)

26 It should be noted that Nemeth's work has focused on minority views about a particular topic for which the group needs to make a decision, rather than on views about how to combine inputs for the decision. In the present context, the extent of agreement concerns the issue of *who is an expert at that topic*, regardless of whether the experts' content-related opinions converge or not.

agree about the expertise hierarchy, it likely leads to an automatic acceptance of input from initially higher-rated team members, regardless of their actual expertise.

To be clear, this effect of disagreement on the expertise hierarchy is not proposed to act as a moderator of the link between the accuracy of initial expertise recognition and the effectiveness of subsequent expertise utilization. No matter how (in)accurately a team had *initially* rated each member in relation to his/her true expertise, disagreement should prompt team members to reconsider the extent to which each member ought to contribute – in the same way that exposure to minority views prompts individuals to reconsider their initial premises about an issue (Nemeth, 1986). Instead of their initial performance expectations (i.e., expertise ratings) serving as the basis on which to allocate influence (either consciously or not), members would then use these revised notions of experts as the standard for divvying intra-team influence[27]. Disagreement, via the mechanism of divergent thinking, would thus have a direct effect on teams' effective utilization of expertise.

H4.2: Disagreement on the status hierarchy increases teams' effective utilization of expertise.

Interpersonal familiarity

If teams fail to develop shared team representations, it means that at least some of the members disagree with the way others on the team have mentally ranked others based on expertise. The more that this sort of dissent is openly expressed the more it has the potential to be noticed by team members and to affect their attitudes and

[27] As suggested here, disagreement on the expertise hierarchy might lead team members' to re-evaluate each other's competence, leading to more accurate expertise recognition, which in turn enhances expertise utilization.

behaviors. To some degree, open expression is dependent upon members' familiarity with one another. Specifically, interpersonal familiarity should lessen concern about social acceptance, leading to lower conformity and higher willingness to express alternative perspectives and judgments (Asch, 1956; Nemeth, 1986). We could thus expect familiar group members to be more willing to show that they do not agree with teammates' perceptions of one another's expertise. For example, they could state directly that they disagree with others (e.g., telling the project manager they expect to take on greater responsibility than was initially assigned), or they could indicate their disagreement through behaviors (e.g., failing to defer to someone who others deem an expert).

In contrast, when unfamiliar group members face an interactive task, they are likely to be as concerned with social acceptance as with task performance (Schacter, 1959; Deutsch, 1949) and will therefore be highly sensitive to social cues within the group (Sherif, 1936; for review, see Levine & Moreland, 1991, 1999). Unfamiliar group members might behave like other group members, regardless of their private beliefs to avoid social-norm violations (Davis, 1973); in such a situation, it would be harder to detect disagreement within the group.

If familiarity makes disagreement on the expertise hierarchy more apparent, it is likely to undermine the legitimacy of the ranking and may generate greater relationship conflict, both of which may weaken the relationship between expertise recognition and utilization, as argued above (H4.1). Any detrimental effects of disagreement would therefore be stronger.

H4.3: Team member familiarity and disagreement on the status hierarchy interact to moderate the relationship between expertise

recognition and utilization, such that the greater the familiarity, the stronger the negative impact of disagreement on the relationship between expertise recognition and utilization.

Having examined shared team representations, we turn now to the second kind of shared representations – those concerning the task.

Shared task representations as moderator of expertise recognition and utilization

Shared representations enable the expert to communicate more effectively and efficiently with other team members, allowing them to overcome common obstacles that otherwise limit experts' intragroup influence. Team members who possess some level of expertise must overcome interpretive barriers that prevent less-expert others from understanding their contributions. In general, people are not very good at taking each other's perspectives, which makes it difficult for them to integrate one another's contributions (Heath & Staudenmayer, 2000). One role of shared representations is to provide a conceptual framework for describing, explaining and predicting reality; shared representations thus form the basis for a group's knowledge of the task (Rouse & Morris, 1986). Knowledge is not simply an accumulation of facts, but the organization of those facts (Cannon-Bowers, Salas, & Converse, 1993; Rouse & Morris, 1986). Shared representations thus provide a structure for turning miscellaneous information into knowledge, which in turn serves as a basis for interpreting information, integrating it into a cohesive framework, and utilizing it (Klimoski & Mohammed, 1994; Rouse & Morris, 1986).

It follows that only when members develop a task representation shared by the whole team can they effectively communicate their expertise so that all others can interpret their inputs. For example, in a task where a group must collectively decide

which of three job candidates to hire (Peterson, 2001), group members may have different ideas about what criteria are most important in filling the vacant post. One person may think that financial acumen is the most important factor, while another may believe that strategic perspective is the most important qualification. These different criteria lead to different goals – one person focusing on applicants' financial experience with another seeking evidence of strategic thinking. Without a shared task representation, the information they share with each other in pursuit of their respective goals will seem irrelevant to the other. Even though they have information that provides them with some level of expertise, they are unable to communicate it effectively.

Beyond the communication problems related to interpretation, team members are often ineffective or unwilling to share their uniquely held information with the rest of the team (Stasser & Titus, 1985), as noted above (Stasser & Titus, 1987; Wittenbaum & Stasser, 1996). Because shared representations allow team members to relate seemingly disparate information to their task in a coordinated way, it can encourage them to share unique information that otherwise might appear irrelevant to the group task. In an example from professional firms, a team member might have unique knowledge about the client's IT system; a shared representation of the group's task might allow her to understand how this knowledge relates to their task of redesigning the marketing organization, for instance, making her more open to sharing this information with teammates. The withholding of information by all team members means that the group is more likely to reach a sub-optimal decision (Peterson, 2001). In contrast, when team members share a common understanding of the goals of the task, they may be better positioned to see how apparently unconnected pieces of information fit together, in turn making them more likely to

share such information. In this way, shared representations are likely to enhance the sharing, and thus the utilization, of expertise.

Shared task representations may also enable experts to structure more efficiently their interactions with team decision makers, thereby increasing their influence over the outcome. Research has shown that when team members share common task representations, it enables them to coordinate action more efficiently because they have a common knowledge base that allows them to decide what behaviors are appropriate at what times (Cannon-Bowers, Salas, & Converse, 1993; Weick & Roberts, 1993). This means that an expert who shares a common understanding of the task will likely be able to participate more readily and more appropriately (at least as viewed by the decision maker) than team members whose task view is different from the decision maker's. A phrase often used by project managers on consulting teams is, "Don't come to me with problems, come to me with solutions." Of course, if consultants' conception of what they are trying to solve is different from the manager's, their solution is unlikely to carry much weight. To ground this in an actual example, a partner from one firm's executive remuneration practice said,

> "There is a [Firm X] model in the sense of a methodology and a way of valuing…. [Firm X] has job evaluation and [Firm X] believes its own system and therefore one of the things we will do when we look at exec remuneration is look at job size and we will use job size to inform how we do market comparisons. Starting job evaluation was based on empirical data to begin with, and you could see a correlation between job size and pay."

In this firm, a team member who understands this view of the task could influence the group's decision over a particular executive's appropriate pay scale by providing

evidence of that person's level of responsibilities, number of direct reports, etc. In contrast, someone who does not share this view (say, a recent hire from a different firm) may believe that remuneration should be based on different factors (i.e., wage differentials with lower-echelon employees), and conduct analyses germane to these comparisons. The subsequent interactions between this second team member and the project manager are likely to be unproductive, resulting in lower levels of influence for this individual than for the team member who approaches the manager with job size analyses.

In addition to the advantage that shared task representations bring to the expert, they create a parallel benefit for listeners. Specifically, they allow listeners and decision makers to understand experts' input and relate it more closely to the task at hand. Shared representations related to particular aspects of a group's task can facilitate problem definition, leading to superior group decision making (Walsh, Henderson, & Deighton, 1988) and well-coordinated group interaction (Bettenhausen & Murnighan, 1985). Orasanu (1990) finds that shared situation models aid problem definition; by assuring that all participants are solving the same problem, these collective definitions help exploit the cognitive capacity of the whole. Effective expertise utilization further requires that decision makers appropriately combine inputs, which involves recognizing the similarity between apparently disparate ideas. When people recognize this similarity, they will be able to integrate it into their own conceptualization of the task (Schon, 1983). Given that professionals typically acquire their client-specific knowledge through hands-on experience, unless each member of the team has had similar prior experience, they are unlikely to share such knowledge; when teammates offer their client-specific expertise, a common understanding of the

task will help listeners to relate this knowledge to the team's current task, thereby using the knowledge effectively.

Given the benefits that shared task representations bring to both the expert in terms of being willing and able to communicate her ideas, and to her teammates in being able to relate those ideas to the task, it follows that shared task representations will enable teams to develop a stronger link between recognizing and using their resident expertise.

H4.4. Shared task representations moderate the relationship between expertise recognition and utilization, such that the greater the sharedness of task representations the stronger the relationship between expertise recognition and utilization of expertise.

Should we expect the same magnitude of shared representations' moderating effects on both kinds of expertise? Drawing on research from the distributed knowledge approach in small groups research, we can reason that shared representations will have a greater impact on the utilization of client-specific expertise than of general professional expertise. (For a review of these two types of expertise, please see pages 10- 12). It is essential to realize that client-specific expertise is far less likely to be widely shared among team members than is general professional expertise. Whereas professionals acquire the latter partly from standardized training programs and certification courses, client-specific expertise is by definition idiosyncratic to a particular organization and will have been acquired only by those professionals who previously worked directly with that client. Indeed, much of the tacit knowledge acquired through hands-on experience is likely to be unique to an individual team member.

Prior research shows that unique information, once mentioned, is more likely than common information to be ignored by the group (Larson et al., 1996; Stasser et al., 1989). When teams develop shared task representations, it allows them to take unique information and related it readily to their task and their own knowledge; these linkages provide a source of credibility and validation, thereby overcoming some of the detriments otherwise associated with unique knowledge. This reasoning suggests that shared task representations would be highly valuable in facilitating the link between the recognition and utilization of client-specific expertise.

In contrast, without the social validation of information that occurs for shared information, members use other social cues to determine the source's credibility for unique information (Stasser & Titus, 2003). The longer organizational tenure and greater seniority typically associated with general professional experts are likely to serve as the sort of social cues that team members will use to judge them as more competent (Ridgeway et al., 1985; Shelly et al., 1999). Because group members are already more inclined to repeat, accept and remember information contributed by the recognized expert (Stewart & Stasser, 1995), the sharing of task representations might provide only marginal incremental benefit.

Together this reasoning suggests the following prediction:

H4.5. The enhancing effects of shared task representations on the relationship between recognition and utilization will be stronger for client-specific expertise than for general professional expertise.

Research design & methodology

As detailed in Chapter 3 (see pages 69 - 72), I conducted survey research of 104 audit and consulting teams in a Big 4 professional service firm. The research was designed to minimize common source bias by temporally separating (i.e., on surveys at the beginning versus end of each team's project) the independent and dependent variables (Podsakoff et al., 2003). Capturing measures from open-ended and multiple-choice survey questions and using different aggregation techniques (e.g., Kendall's W, mean squared residuals) should also help to alleviate some bias in the model.

Measures

Chapter 3 provides details on measures of the following variables, which are common across this chapter and the next:

- Recognition and utilization of general /client-specific expertise (see page 72)
- Controls – project complexity, team size and project duration (see page 78)

Agreement on the expertise hierarchy. Each individual's set of expertise ratings for his/her complete team[28] was converted from a continuous measure to an ordinal scale (i.e., ranking). Team-level agreement on the expertise hierarchy was calculated using Kendall's Coefficient of Concordance (W), which is a nonparametric statistical test of the agreement among sets of rankings (Kendall, 1955; Lewis &

[28] Members' self-ratings were included in this measure for both conceptual and empirical reasons. First, individuals' self perceptions can be expected to influence both the legitimacy of the hierarchy as well as the conflict within the group – two of the mechanisms through which agreement on the expertise hierarchy is posited to affect the relationship between expertise recognition and utilization. Second, use of both self and other ratings is justifiable if they are appropriately correlated; in the present dataset, self and other ratings were significantly correlated ($r=.65$, $p<.001$); in any case,

Johnson, 1971). *W* is scaled from 0 (no agreement) to 1 (complete agreement) W ranged from .13 to 1 (mean = .73, SD = .21).

Familiarity. On survey 1, team members were asked to rate each other team member based on how many months they had previously worked together on two types of professional engagements: prior client work ("FAMIL_EXT") and prior internal firm work (i.e., training programs, internal projects; "FAMIL_INT"). Both were rated along a five-point scale (1=no prior experience together;2=<2 months;3=3 = 2-6 months;4=4 = 6 – 12 months;5=more than one year). Intraclass correlations (ICCs) suggest sufficient inter-member reliability for both sets of ratings: For FAMIL_EXT, ICC(1) = .23, ICC(2) = .87; $F(104, 2193) = 7.60$, $p < .001$; for FAMIL_INT, ICC(1) = .19, ICC(2) = .83; $F(104, 2029) = 5.76$, $p < .001$. Correlation between the two sets is .69 (p<.001). Because both kinds of prior shared work experience can lead to increased knowledge of coworkers' skills, it is important to capture both dimensions; the two sets of individual scores were averaged to create a single familiarity score per team[29].

Shared task representations. Three items on Survey 2 measured team members' perceptions of the degree to which they shared a common task understanding: "We all understand exactly what issues the client has asked us to address," "We are all clear on the metrics that the client will use to determine how good a job we have done on the audit/project," and "We agree on what is outside the scope of this audit/project." Cronbach's alpha = .75; the items jointly explained 66% of variance. The items were averaged to create a single scale. This measure was then

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Kendall's W (including self ratings) is a more conservative test of the model than is W' (excluding self ratings) (Jones, 1959).

[29] Analyses using either the FAMIL_EXT or FAMIL_INT score alone produced very similar results as the combined score.

mean-centered, and the interaction term computed as the product of this centered variable and the centered expertise recognition variable, in accordance with standard practice for interaction terms (Aiken & West, 1991).

To test the reliability of the shared task representations scale, I developed an alternative measure to capture the degree of sharedness among team members' task representations, based on qualitative data collected from open-ended survey questions on Survey 1. Specifically, the question asked, "In your own words, please describe your team's objective in completing this project / audit. What are the TOP 3 THINGS it will take to achieve this goal?" Individual responses were coded by themes (e.g., identifying efficiency gains, delivery of interim milestones, client engagement/buy-in). For each team[30], the number of common themes was summed and divided by the number of respondents in order to capture the degree to which their understanding of the task is shared. Scores ranged from 0.7 to 3.0. The correlation between this team-level qualitative measure and the scale based on three survey items (above) was .78 ($p<.001$), indicating that both measures likely tap into similar constructs.

Results and robustness checks

Table 4.1 shows the correlations and descriptive statistics for all variables. Of note, the two types of shared representations – team and task – are not significantly correlated with one another, suggesting that they capture two distinct constructs.

[30] Only teams where at least three respondents completed this open-ended question (N = 70) were included in this robustness check.

Table 4.1: Means, Standard Deviations and Correlations

	Mean	S.D.	N	1	2	3	4	5	6	7	8	9
1. Project complexity	3.92	0.74	91									
2. Team size	7.30	3.42	104	.18								
3. Project duration	2.26	0.95	96	.06	.11							
4. Shared team representations (Agreement on expertise hierarchy)	.73	0.21	90	.04	-.17	.15						
5. Familiarity	2.0	.80	102	0.04	-0.07	-0.04	0.12					
6. Shared task representations	3.62	0.47	91	-0.05	-0.09	0.01	-0.05	0.30**				
7. Team recognition of general professional expertise	-0.45	0.38	97	.11	.11	-.07	-.02	-0.06	0.04			
8. Team recognition of client-specific expertise	-0.68	0.47	93	-.03	.21*	-.06	.29**	-0.17	-0.02	.36**		
9. Effective utilization of general professional expertise	-1.72	1.63	100	.03	.17	-.14	.02	0.05	-0.15	.31**	.25*	
10. Effective utilization of client-specific expertise	-2.12	1.75	94	.07	.17	-.18	.18	-0.08	-0.14	.14	.29**	.68**

** $p < 0.01$ (2-tailed); *$p < 0.05$ (2-tailed).

Hypothesis 4.1 predicted an enhancing effect of shared team representations on the link between expertise recognition and utilization. To test it, I ran separate hierarchical OLS regression models for general professional expertise and client-specific expertise, entering the control variables and main effect for expertise recognition in step 1 (Models 1 and 4), the main effect for agreement in step 2 (Models 2 and 5) and the interaction term in step 3 (Models 3 and 6). Table 4.2 shows that shared team representations has unexpectedly opposite effects on the utilization of general professional expertise versus client-specific expertise. Specifically, agreement on the expertise hierarchy *diminishes* the link between recognition and utilization of general professional expertise ($\beta = -.26$, $p<.01$), contradicting H4.1. In contrast, agreement on the expertise hierarchy *enhances* the link between recognition and utilization of client-specific expertise ($\beta = .42$, $p<.01$), supporting H4.1. It should be noted that although expertise recognition has the expected positive significant effect on the utilization of client-specific expertise (Model 4), the strength and significance level of this predictor drops when agreement is added to the equation (Model 5), likely due to multicollinearity between the two constructs ($r=.29$, $p<.01$).

Table 4.2: Results of OLS Regression Analyses Predicting Moderating Effects of Agreement on Expertise Hierarchy (H4.1)

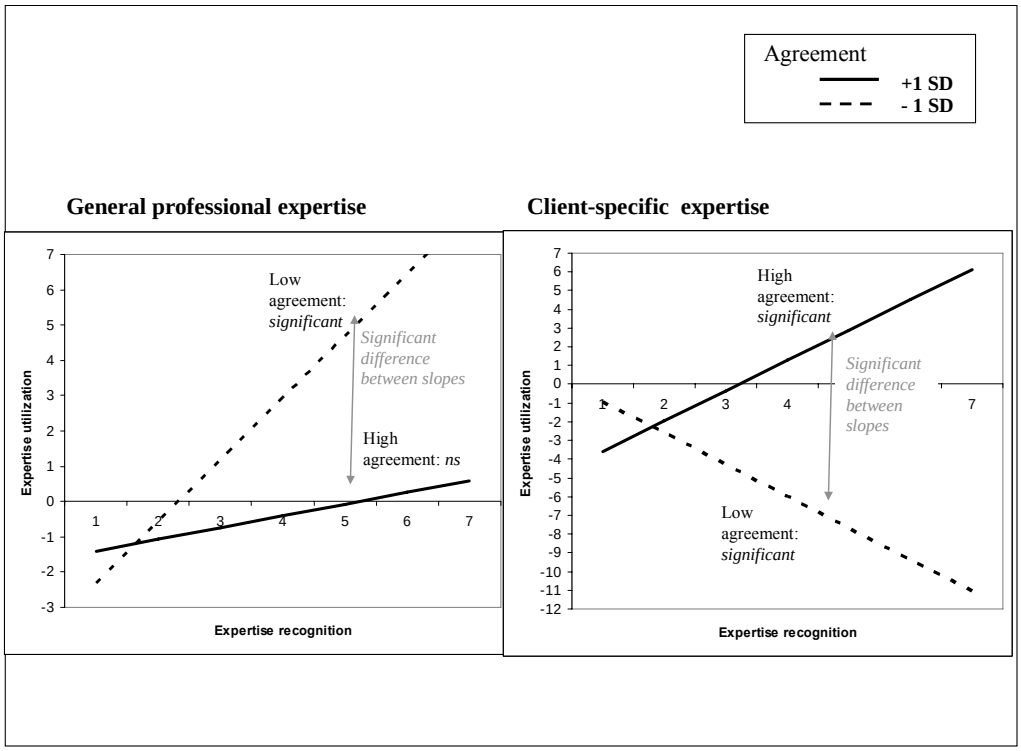
	General professional expertise			Client-specific expertise		
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Project complexity	-0.09	-0.08	-0.10	0.14	.13	0.13
Team size	-0.05	-0.07	-0.07	0.12	.16	0.14
Project duration	0.01	0.03	0.02	-0.13	-.16	-0.10
Recognition of expertise	0.39***	0.39***	0.35***	0.23**	.17	0.10
Agreement on expertise hierarchy		0.12	0.11		-.15	-0.16
Interaction term (Recognition x Agreement)			-0.27**			0.34***
Adjusted R2	.11	.11	.17**	.07	.08	.18
Δ R2		.01	.07**		.02	.10***
F	3.32**	2.90***	3.67	2.56**	2.39**	3.70***

Standardized coefficients are shown; N = 78 (models 1,2); N=77 (models 3,4)
*** p<.01; ** p<.05; * p<.10

To aid interpretation, I graphed the interactions (Aiken & West, 1991), as shown in Figure 4.1. The slope for high levels of agreement is significantly different than zero for the effect on client-specific expertise, but not significant for general professional expertise. In other words, shared team representations enhance utilization of recognized client-specific experts, but do not affect how much teams use their general experts. Disagreement (i.e., low agreement), however, significantly affects the link between recognizing and utilizing both kinds of expertise – but in opposite directions. As expected from Hypothesis 4.1, when teams lack consensus about the expertise hierarchy, they fail to use client-specific experts effectively; surprisingly, though, lack of consensus enhances the degree to which teams use members who are seen as general experts. These results suggest that perhaps general expertise is the default when the team lacks agreement about the client-specific

expertise hierarchy. The discussion section delves further into this point.

Figure 4.1: Shared team representations (Agreement on the Expertise Hierarchy) – Moderating Effects of Expertise Utilization



Hypothesis 4.2 predicted a main effect for disagreement on the expertise hierarchy on expertise utilization. For this analysis, each team's agreement score (scaled on a 0 to 1 basis) was subtracted from 1 to represent *disagreement*. Again, I tested the effect of disagreement separately for general professional expertise and client-specific expertise, entering the same three control variables in step 1 (project complexity, team size and project duration), and disagreement in step 2. Disagreement was not significantly related to the utilization of general professional expertise. It was, however, positively related to the utilization of client-specific expertise at a marginally significant level ($\beta = .21$, $p<.065$). Hypothesis 4.2 is thus partially supported. Details are provided in Table 4.3

Table 4.3: Results of OLS Regression Analyses for Disagreement on the Expertise Hierarchy: Main Effect on Expertise Utilization (H4.2)

	General professional expertise		Client-specific expertise	
Variable	Model 1	Model 2	Model 3	Model 4
Project complexity	0.01	0.00	0.13	0.11
Team size	0.15	0.17	0.17	0.20*
Project duration	-0.16	-0.17	-0.14	-0.17
Disagreement on expertise hierarchy		0.07		0.21*
Adjusted R2	.02	.01	.04	.07
Δ R2		.00		.04*
F	1.45	1.18	2.00	2.42*

Standardized coefficients are shown; N = 79 (models 1,2); N=77 (models 3,4)
*** p<.01; ** p<.05; * p<.10

Hypothesis H4.3 predicted that interpersonal familiarity would strengthen the negative effects of disagreement on the link between expertise recognition and utilization[31]. Said another way, high disagreement would be expected to lead to even lower expertise utilization in familiar teams. The hypothesis was tested separately for general professional expertise and client-specific expertise, and results are shown in Table 4.4. The 3-way interaction was not statistically significant for general professional expertise (see Model 2) nor did the addition of the variable explain significantly more of the variance in expertise utilization.

In contrast, for client-specific expertise, the 3-way interaction term is positive and significant (see Model 4), and the addition of the 3-way interaction term explains a greater proportion (additional 4%) of variance in expertise utilization (adjusted R^2 = .21 vs. .17, p<.05). These results thus contradict Hypothesis H4.3. Figure 4.2 shows both the models. Implications and explanations follow in the discussion section,

[31] Note that to test the effects on *disagreement* (rather than agreement, as in H5.1), the team scores for agreement (scaled 0 to 1) were subtracted from 1 to capture *disagreement*.

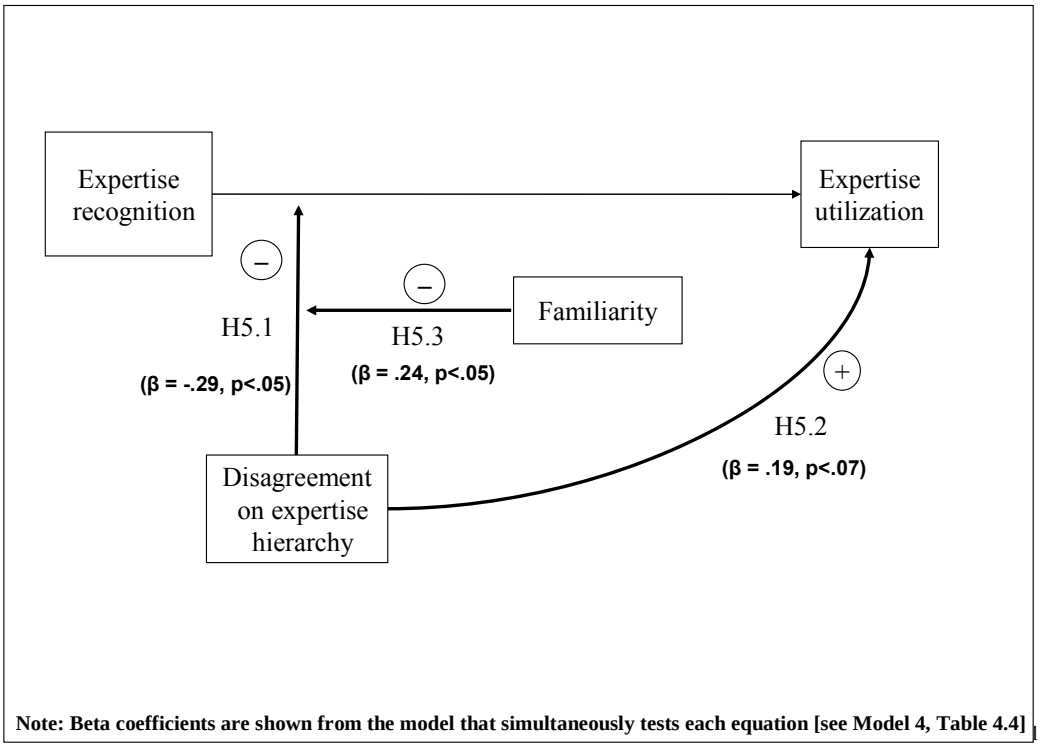
below.

Table 4.4: Results of OLS Regression Analyses Predicting Effects of 3-way Interaction (Recognition, Disagreement & Familiarity) on Expertise Utilization (H4.3)

	General professional expertise		Client-specific expertise	
Variable	Model 1	Model 2	Model 3	Model 4
Project complexity	-0.11	-0.14	0.16	0.14
Team size	-0.09	-0.09	0.13	0.13
Project duration	0.03	0.02	-0.09	-0.06
Recognition of expertise	0.38***	0.34***	0.03	0.01
Disagreement on expertise hierarchy	-0.13	-0.14	0.17	0.19*
Familiarity	-0.06	-0.09	-0.05	-0.09
Recognition x Disagreement	0.28**	0.30**	-0.34***	-0.29**
Recognition x Familiarity	-0.14	0.01	-0.13	-0.17
Disagreement x Familiarity	-0.02	-0.03	0.07	0.07
3-way interaction term (Recognition x Disagreement x Familiarity)		-.21		0.24**
Adjusted R2	.16	.17	.17	.21
Δ R2		.01		.05**
F	2.57**	2.52***	2.73***	3.04***

Standardized coefficients are shown; N = 77 (models 1,2); N=76 (models 3,4)
*** p<.01; ** p<.05; * p<.10

Figure 4.2: Effects of Recognition, Disagreement and Familiarity on Utilization of Client-specific Expertise



Hypotheses 4.4 predicted that shared task representations would strengthen the relationship between expertise recognition and utilization. To test the prediction, I ran separate hierarchical OLS regression models for general professional expertise and client-specific expertise, entering the control variables and main effects in step 1 (Models 1 and 3) and the interaction term in step 2 (Models 2 and 4) as shown in Table 4.5. Counter to expectations, the interaction term for general professional expertise and shared task representations is significant and negative ($\beta = -.44$, $p<.01$; see Model 2), while the interaction term for client-specific expertise and shared representations is significant and positive ($\beta = .31$, $p<.01$; see Model 4). The full models explain 18% of variance in the utilization of general professional expertise,

and 17% for client-specific expertise. The hypothesis is supported, but only for client-specific expertise.

Table 4.5: Results of OLS Regression Analyses Predicting Moderating Effects of Shared Task Representations on Link Between Expertise Recognition and Utilization (H4.4, H4.5)

	General professional expertise		Client-specific expertise	
Variable	Model 1	Model 2 (H4.4)	Model 3	Model 4 (H4.5)
Project complexity	-.04	.03	.12	.13
Team size	-.03	-.06	.13	.08
Project duration	.03	.01	-.13	-.10
Recognition of expertise	.34**	.11	.23**	.26**
Shared task representations	-.10	-.22*	-.17	-.10
Interaction term		-.44***		.31***
Adjusted R2	.06	.18	.09	.17
Δ R2	--	.12***	--	.09***
F	2.07*	3.94***	2.65**	3.85***

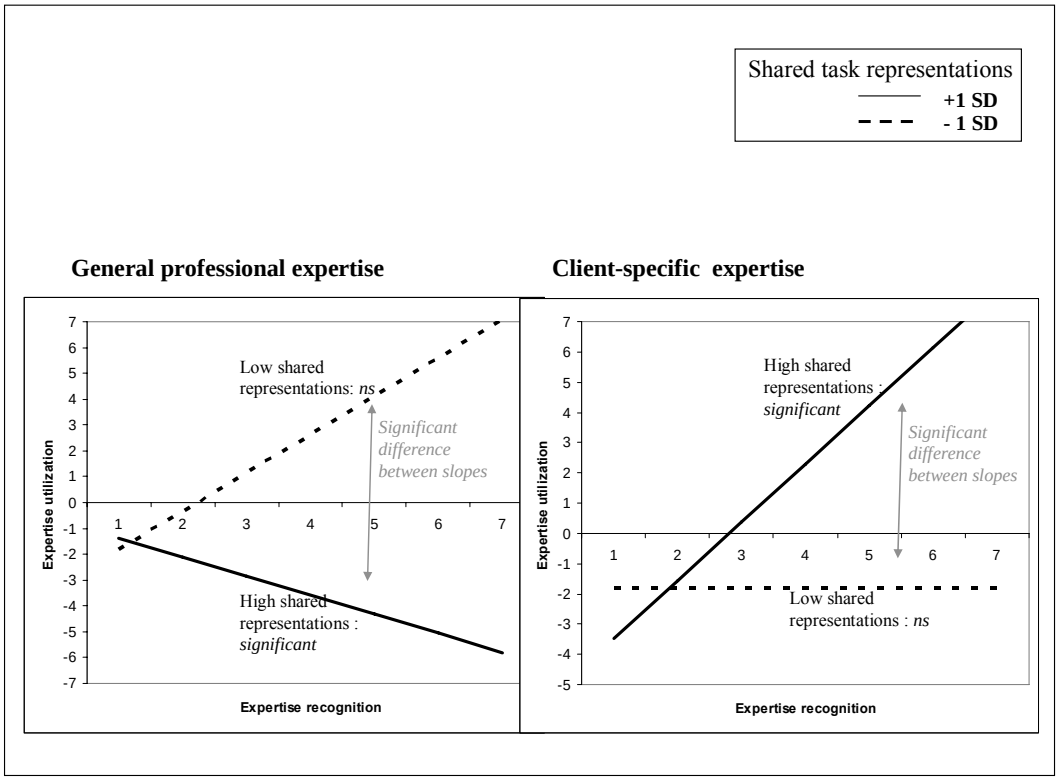
Standardized coefficients are shown; N = 84
*** p<.01; ** p<.05; * p<.10

Hypothesis 4.5 predicted that the positive moderating effects of shared task representations would be stronger for client-specific expertise than for general professional expertise. That is, the moderating effects were expected to be positive in both cases, but significantly stronger for client-specific expertise. In fact, the interaction term is positive and significant for client-specific expertise and *negative* and significant for general professional expertise. The results thus suggest that the moderating effect of shared task representations is even more pronounced and different for the two types of expertise than had been predicted *a priori*.

Using Aiken & West's (1991) method for graphing interactions, Figure 4.3 shows the contrast in moderation effects for shared representations on the link between recognizing and utilizing general versus client- specific expertise.

Examination of these graphic results yields further insight into the effects of shared task representations on expertise recognition and utilization. When teams share a high level of understanding about their task, they apportion influence over the end product based on members' perceived levels of client-specific expertise (i.e., the relationship between expertise recognition and utilization is stronger for client-specific expertise in this condition); without this level of understanding, however, there is little relationship between recognizing and using client-specific expertise. In contrast, when teams *fail* to share a high level of understanding about their task, however, they turn to the expertise of general professional experts (i.e., the relationship between expertise recognition and utilization is stronger for general professional expertise in this condition); teams with high levels of shared task representations do not align influence with perceived general professional expertise.

Figure 4.3: Moderating Effects of Shared Task Representations on Expertise Utilization



As a robustness check, I re-ran the regression analyses with the measure of shared task representations based on qualitative data from the open-ended survey responses. The advantage of this model is that it minimizes both common method bias (i.e., by using qualitative rather than scaled-response measures) and common source bias (i.e., by using a moderator measured at Time 1 and outcome variable measured at Time 2). Table 4.6 shows that the model using alternative measures of shared task representations replicates the results of the model using scale measures: all previously significant relationships remain significant in the same direction. The full models explain 26% of variance in the utilization of general professional expertise, and 18% for client-specific expertise.

Table 4.6: Robustness Check – Moderating Effects of Shared Representations on Link Between Expertise Recognition and Utilization, Using Measures Drawn from Qualitative Data (H4.4, H4.5)

	General professional expertise		Client-specific expertise	
Variable	Model 1	Model 2 (H4.4)	Model 3	Model 4 (H4.5)
Project complexity	-.19	-.20*	-.05	-.04
Team size	-.02	-.03	.19	.16
Project duration	.06	.07	-.21*	-.21*
Recognition of expertise	.51***	.36**	.30**	.33**
QUALITATIVE measure of shared task representations	-.22*	-.25**	-.13	-.10
Interaction term		-.26*		.21*
Adjusted R2	.23	.26	.15	.18
Δ R2	--	.04*	--	.04*
F	4.63**	4.51**	3.18**	3.27**

Standardized coefficients are shown; N = 62
*** p<.01; ** p<.05; * p<.10

Discussion & conclusion

This chapter begins to build a contingency model of expertise recognition and utilization in project teams, examining the effects of two different kinds of shared representations – shared team representations, which concern how each member's amount of expertise compares to others' (i.e., agreement on the expertise hierarchy) and shared task representations, which involve team members' beliefs about the task content and goals. Interestingly, both kinds of shared representations appear to have opposite effects on team-level usage of general professional expertise compared to client-specific expertise.

In particular, both kinds of shared representations are shown to have beneficial impact on the link between recognizing and utilizing client-specific expertise. When teams develop shared beliefs of their members' relative expertise they are more likely to use effectively the experts that they accurately recognized; the same benefits occur when they create a collective understanding of their task. When teams fail to have a consensus about their members' expertise hierarchy – in other words, when they disagree about each person's relative competence – it significantly decreases the link between recognizing and utilizing client-specific expertise. This latter result makes sense: client-specific expertise is typically hard to detect and it may be the case that junior, low-status team members are the ones with the highest levels of client-related knowledge. Allocating influence to client-specific experts may be more risky than allowing senior, high-status actors to make the most contributions. Only if everyone on the team agrees that the one with client-specific expertise is at the top of the ranking will it seem safe to defer to that person. If there is disagreement on the team about who can contribute how much to the team effort, then it is not surprising that

the team would default to using high status members – typically those with higher levels of general professional expertise.

This explanation may account for the cross-over pattern shown in the data. The graphs (Figures 4.1 and 4.3) across both types of shared representations suggests that teams are making trade-offs between experts: when they use client-specific expertise they fail to use general professional expertise and vice versa.

This idea has important implication for interpreting the effects of shared representations on the utilization of general professional expertise. Neither type of shared representations enhances the link between recognizing and utilizing general professional expertise. While the effect of shared team representations on general professional expertise utilization is non-significant, the effect of shared task representations is negative – counter to predictions. It may be the case that shared task representations have a greater impact on usage of client-specific expertise; because teams are making an implicit trade-off, when the usage of client-specific experts increases, the usage of general professional experts decreases. Further investigation of these results could be fruitful by analyzing sub-sets of teams where both types of expertise are aligned (i.e., the same individual is highest on both types) versus those teams where there is a low intra-individual correlation between the two kinds of expertise.

The role of disagreement on the expertise hierarchy warrants additional discussion. On the one hand, it dampens the link between recognition and utilization of client-specific expertise (hypothesis 4.1), yet on the other, it directly (if weakly) enhances expertise utilization (hypothesis 4.2). These countervailing effects remain when tested simultaneously. How can this be explained? One possibility is that disagreement on the expertise hierarchy benefits primarily those teams that were

initially poorest at recognizing their experts. For these teams, team members' expressing that they disagree with others about who is truly the expert may prompt a reexamination of whose influence to accept. Ultimately, it would cause a reshuffling of the initial expertise hierarchy. My data does not capture this effect because I measure expertise recognition only at the very beginning of a project. Future research that examines the shift in expertise rankings over time would be useful to test this explanation.

One especially surprising result in this chapter is that familiarity reversed the moderating effects of disagreement on the link between recognizing and utilizing client-specific expertise. I had predicted that familiarity would make latent disagreement more apparent, thereby strengthening its negative effects on expertise utilization. Instead, I found that a 3-way interaction (recognition x disagreement x familiarity) had a positive effect on expertise utilization. One explanation may be that for teams in which members know each other well, they tend to rely on those whom they perceive as experts, regardless of whether or not disagreement exists. Familiarity thus overrides concerns about legitimacy. Another way to think about this situation is that people are cognitive misers (Fiske & Taylor, 1991): the more people believe that they know each other well, the less motivated they are to re-examine whether or not to defer to a teammate; instead, they rely on their initial expertise ranking. Future research could shed additional insight into the findings by taking into account *which team members* disagreed with the group. We know that both perceived expertise (Stewart & Stasser, 1995) and status (Hollander, 1958) bolster a minority's credibility, making a group more likely to acceptance the input of individuals whose opinions deviate from the majority (Wood et al., 1994).

Contributions

In summary, this chapter deepens our understanding of team-level knowledge processes by showing how team members' shared representations concerning both their teammates and their task can moderate the link between expertise recognition and utilization. I further highlight how status dynamics – the assumptions about others' competence based on their position – can influence the way these factors interact.

In addition, this chapter addresses recent calls for theoretical and empirical exploration of shared representations in the following ways: (1) by examining the link between shared representations and the actual use of knowledge by teams (e.g., Rico et al., 2008), (2) by including measures of both accuracy and sharedness (e.g., Cooke et al., 2003; Rico et al., 2008), and (3) by distinguishing between team-related and task-related representations (e.g., Edwards et al., 2006).

CHAPTER 5: THE EFFECTS OF PERFORMANCE PRESSURE ON EXPERTISE UTILIZATION AND PERFORMANCE

This chapter takes a multi-disciplinary approach to develop theory explaining how status dynamics in teams affect members' use of each other's distinct knowledge, ultimately leading to differential performance outcomes. The multi-faceted and tacit nature of professional expertise (e.g., Greenwood, et al, 2005) combined with the hierarchical structure of most professional service firms (Maister, 1993) suggests that using expertise is not a straightforward proposition for many teams. In particular, I identify performance pressure as a critical factor that influences team members' willingness and ability to use each other's expertise to develop an integrated team outcome. I integrate prior findings from status characteristics theory literature to explain how performance pressure differentially affects particular group sub-processes concerning expertise recognition and utilization. Beyond existing theory, I also draw on insights from an initial phase of qualitative work to develop richer, contextually grounded theory in the domain of knowledge-intensive firms. I test the resulting hypotheses on a sample of 82 accounting and consulting project teams from a Big 4 audit firm, using surveys and interviews conducted with each team's actual client to understand performance outcomes.

Drawing on research from the fields of inter-firm relations (e.g., Levinthal and Fichman, 1988) and groups research (e.g., Baumann & Bonner, 2004; Littlepage et al., 1995) I further propose how expertise utilization processes relate to client-rated performance. By relating group process to client-rated performance, my research brings a novel perspective to the study of inter-firm relations: whereas existing literature has shown that high levels of human capital help to maintain positive client

relations (e.g., Seabright, Levinthal & Fichman, 1992), I predict that the appropriate utilization of human capital (i.e., team members' expertise) contributes significantly to this outcome, over and above the mere presence of knowledge.

I find both qualitative and quantitative evidence to demonstrate that teams facing performance pressure tend to default to high-status members at the expense of using team members with deep knowledge of the client, with detrimental effects on team performance. In other words, the more important the project, the less effective the team: performance pressure results in teams reverting to less effective ways of divvying up influence over their end product, in turn leading to lower performance ratings for the whole team.

Expertise utilization

To make the most of their collective expertise – that is, to use expertise in order to enhance group performance outcomes – teams must weight each member's input to team problem solving or decision making in proportion to his or her task-relevant knowledge (Hollenbeck et al., 1995; Stewart & Stasser, 1995). Early empirical research linking expertise utilization and performance showed that dominance by non-experts resulted in poor-quality group decisions (Maier, 1963); or as Libby, Trotman and Zimmer (1987:84) summarize their findings, "...the ability to actually weight judgments based on relative expertise is a significant determinant of group performance." These findings have been corroborated by recent work showing both the detrimental effects of giving less-expert members too much influence over the group's outcome (Durham et al., 2000) and the positive effects of weighting member inputs in proportion to their actual expertise (Hollenbeck et al., 1995). Consistent with prior findings, I refer to *effective utilization* of expertise as a team's

use of each member's input in accordance with his/her actual ability; the converse, ineffective utilization, is therefore any deviation from this optimal relationship.

As suggested above, a fundamental assumption in many studies linking expertise recognition with beneficial outcomes is that an accurate understanding of teammates' expertise translates into performance because team members actually *use* one another's expertise. A range of empirical findings, however, suggest that the link between team members' recognizing and then actually using others' expertise can be highly problematic. Even when groups accurately identify their members' expertise, they tend not to apportion influence over their outcome in direct proportion to those known levels of members' expertise (e.g., Littlepage et al., 1995; Baumann and Bonner, 2004). The question thus remains,: Why do teams fail to use their members' recognized expertise effectively? Are there features of knowledge-intensive organizations, or of professional service firms in particular, that cause teams to over- or under-utilize members who are known to possess task-relevant knowledge?

Performance pressure as a moderator of expertise utilization

An especially salient feature of professional firms is the human resource practice widely known as the "up or out" system (Maister, 1982; Metzger, 1973). Employees are brought in at the bottom rungs of the hierarchy; they are expected either to progress "up" the hierarchy or will be dismissed "out" of the organization if they fail to get promoted (Sherer & Lee, 2002). Professionals know that they are competing with their peers in a "tournament" (Galanter & Palay, 1991) to become a partner in the firm. One consultant described the "continuous pressure cooker" environment by saying, "On every team I look around and wonder which of us will

still be around to handle next year's audit. Guaranteed, someone'll be gone. I only hope it's not me."

Performance pressure is a kind of stress experienced by team members who know that their work is subject to intense scrutiny and that lapses may lead to undesirable consequences affecting members' well-being (e.g., Ellis, 2006; Kahn & Byosiere, 1992). Ellis (2006) found that task groups experienced significant stress when their work was video-recorded, ostensibly to enable authorities to detect errors and use this information to punish low-performing teams. Team members in my case studies appeared to have similar reactions to being closely monitored. For example, one consultant remarked to her peer, "It was all fine till he [the manager] started quizzing me – last night by myself I knew every cell in the model, but then today he starts in on 'what's this mean' and 'what's that doing' and suddenly it all fell apart in my head. I must have looked like an idiot." Given that the failure of a single project can start a downward trajectory, ultimately leading to dismissal, it is not surprising that many professionals interpret performance pressure as a threat to their career prospects.

The threat rigidity literature provides an important theoretical basis for understanding the effects of such pressures on team process. In the seminal piece of research in this stream, Staw, Sandelands and Dutton (1981) argue that when teams face environmental conditions that indicate potentially negative consequences, it leads to reduced cognitive processing and a constriction of control. Individuals facing threats tend to revert to default processes and rely on obvious but not peripheral cues.

What, then, are the likely implications of performance pressure on teams within professional service firms? Answering this question requires an understanding of the "default" processes in such firms; status characteristics theory helps to develop this

understanding. In general, a group's status hierarchy reflects members' expectations about one another's task competencies and directly affects the degree to which individuals receive (and capitalize on) opportunities for involvement and influence in group decision-making processes (Berger et al., 1977; Ridgeway & Berger, 1986): high status members are given (and demand) greater influence over the group's process and outcome, whereas low status members have less influence in the group. A significant body of work demonstrates a team's default process tends to be relatively greater reliance on high-status members and less reliance on low-status members (for a meta-analytic review of research, see Driskell & Mullen, 1990). Especially in a professional firm that uses the up-or-out promotion system, indicators of professional expertise overlap significantly with indicators of high status: those at the top of the hierarchy are generally the ones with the longest organizational and professional tenure and often have the most professional training[32]. Performance pressure, which leads teams to fall back on their default processes, is thus likely to enhance teams' propensity to use relatively more the expertise of those who are recognized as being higher in general professional expertise and less so the expertise of team members who are seen as possessing less general professional expertise. Consistent with prior findings in status characteristics theory (e.g., Ridgeway & Berger, 1986) I suggest that influence should align with perceived expertise; the novel prediction here is that performance pressure *enhances* the effect for teams' utilization of general professional expertise.

Hypothesis 5.1: Performance pressure will moderate the link between teams' recognition and effective utilization of general

[32] Prior research has used seniority, qualifications and industry experience as status indicators (e.g., Bunderson, 2003) and as a measure of human capital (e.g., Hitt et al., 2006).

professional experts, such that teams experiencing high pressure have a *stronger* association between recognizing and effectively using members who are high in general professional expertise

Client-specific expertise may also signal status in a professional firm, based on two theoretical mechanisms. First, an actor's own status is a direct function, in part, of that actor's affiliates (e.g. Podolny & Phillips, 1996). Through prior experience with a client, a team member is likely to have developed relationships and some degree of trust (i.e., social capital –Nahapiet & Ghoshal, 1998) with client individuals; to the extent that the team member can leverage this social capital to gain access to high status clients, his/her own status is elevated. Second, status characteristics theory suggests that status cues may become salient in a group to the extent that they discriminate the actors (Berger et al., 1977; Humphreys & Berger, 1981). As research shows that even the most junior members of the accounting profession recognize the importance of one's ability to maintain client relations (Johnson, 1975), all team members should recognize that repeat experience at a client is a valued characteristic. Unless all team members have similar levels of prior experience at that focal client organization, client-specific expertise may differentiate those with higher levels and serve as a salient status cue. Through both affiliation and discrimination, then, client-specific expertise is a potential source of status.

Although both types of expertise are potentially sources of status, there are two reasons why general professional expertise would be a stronger status cue than client-specific expertise: transferability and observability. First, the benefits (in terms of status and knowledge) of general professional expertise are likely to transfer across client projects. According to the "burden of proof" assumption in status characteristics theory (Berger et al., 1977; Berger et al., 1980), group members will apply status

characteristics and status advantages from prior situations to new ones unless something (or someone) explicitly disassociates the characteristic from the new task. Therefore, because high-ranking team members likely have high status generally in the organization, this status is expected to carry from one project to the next quite automatically; in contrast, any status derived from client-specific expertise will only transfer to new projects if the same team members are on the new project. This reasoning is consistent with findings from small groups research, showing that even if groups are aware of members' expertise based on prior good performance, they are only likely to use that expertise subsequently if they expect that the same knowledge and skills are necessary for the new task (Littlepage et al., 1997). Given that client-specific expertise is by definition applicable strictly to one specific client, it will have little if any transfer value to new client projects. Both the status and groups literature suggest, then, that knowledge utilization is likely to be closely aligned to general professional expertise but more variable for client-specific expertise.

Observability is the second reason why general professional expertise might be a stronger status cue (i.e., predictor of one's knowledge use in a group) than client-specific expertise. Indicators of client-specific expertise are much harder for team members to detect – especially if it is junior members who hold significant amounts of client-specific knowledge. Likewise, if individuals gained client experience when their current team members were not present (i.e., as part of a different previous team), others might be completely unaware that they hold the relevant expertise. Even when teams initially realize who holds client-specific expertise (e.g., they discussed each member's prior experience levels at that client as part of their kick-off meeting), the pressure experienced during a project can alter team processes of assigning work and allocating influence. As one mid-level auditor commented, "It's

always pretty clear who's the boss, but in the heat of the battle it's sometimes hard to remember which of those other guys [pointing to the junior members of the team in the next office] knows his way around here [the client offices]." This quote illustrates that seniority, which typically correlates with hierarchical position in an up-or-out firm, is what sociologist Hughes (1945:357) called a "master status-determining trait [that] tends to overpower, in most crucial situations, any other characteristic which might run counter to it." Given that teams confronted by threatening conditions are likely to reduce cognitive functioning and rely more on obvious than peripheral cues (e.g., Staw et al., 1981), professional teams facing this sort of performance pressure are likely to rely on team members whose expertise is top-of-mind and easily recalled without any sort of verification – in other words, those more tenured team members who clearly hold higher levels of general professional expertise.

Even at the best of times, people typically behave like "cognitive misers"; that is, they are limited in their capacity to process information, so they take shortcuts whenever possible (Fiske & Taylor, 1991). When under pressure, this effect is likely to become even stronger as a result of threat rigidity effects (Staw et al., 1981). Because team members are likely to devote attention to higher status team members (i.e., those typically with higher levels of general professional expertise), they are consequently likely to pay relatively less attention to lower status team members – even when those members have important client-specific expertise. By implication, when teams are under pressure, their use of client-specific experts is likely to be less effective.

Hypothesis 5.2: Performance pressure will moderate the link between teams' recognition and effective utilization of client specific experts, such that teams experiencing high pressure have a *weaker*

association between recognizing and effectively using members who are high in client-specific expertise

Expertise utilization and performance

Firms' ability to leverage their knowledge resources affects their relationships with other firms (e.g., Hitt et al., 2006; Seabright et al., 1992). The relationship between knowledge and inter-firm outcomes is especially important in the arena of professional service firms, which are the epitome of knowledge-intensive organizations (e.g. Starbuck, 1992). Knowledge is, above all else, the essential ingredient that enables professional service firms to deliver services to their clients (e.g., Greenwood, Li, Prakash, & Deephouse, 2005; Hitt et al., 2001).

Human capital, in the form of professionals' explicit and tacit knowledge, has been linked to positive client service outcomes: prior research shows that firms' human capital structures enhance firm competitiveness (Sherer, 1995) and that higher average firm levels of human capital are associated with higher firm performance via effects on diversification (Hitt, et al. 2001) and internationalization (Hitt, et al. 2006). The construct of *general professional expertise*, as defined in this dissertation is consistent with the conceptualization of such human capital as used in the inter-firm relations literature – that is, a broad set of professional competencies that is transferable across clients, industries and geographies.

Client-specific expertise, the skills and interpersonal relationships that are associated with a particular client (Danos & Eichenseher, 1982), have also been shown to be particularly beneficial for achieving client-service outcomes. Client-specific expertise is a particular form of human asset specificity (Williamson, 1979), which refers to know-how accumulated by parties as they interact throughout their

relationships; it includes the kinds of skills and expertise that are developed through learning-by-doing (Williamson, 1975). Experience in working together allows the parties to communicate more effectively and efficiently, facilitates cooperation, and allows suppliers to customize their products for their exchange partners (Barringer & Harrison, 2000; Dyer & Singh, 1998; Kotabe, Martin, & Domoto, 2003). Dyer (1996) finds that when an exchange relationship is characterized by greater human asset specificity, both the quality of products supplied and speed with which the firms innovate is higher.

In the realm of professional service firms, Levinthal and Fichman (1988) found that the extent to which an audit firm developed client-specific expertise was significantly related to that firm's retention of clients over time. They note that increased client-specific expertise within the auditing context is likely to translate into greater efficiency (e.g., time savings both for auditors who do not need to learn new systems and for clients who do not need to explain their systems) and effectiveness (e.g., deeper understanding of the client's product market allows more accurate forecasting). At the individual level, Broschak (2004) found that ties with clients are most likely to dissolve when firms lose professionals who have the most client-specific expertise. Although no research has explicitly tested these relationships at a team level, Levinthal and Fichman's (1988) and Broschak's (2004) research suggests that client- specific expertise would be associated with positive relations between teams and clients.

It is important to note that all of these cited studies conceptualize and measure human capital (at the firm or individual level) in terms of amounts – assuming implicitly that the *presence* of knowledge translates into the *application* of that expertise for competitive advantage and performance benefits. This assumption has

been questioned in the more recent literature linking human capital with client-related outcomes, reflecting a broader trend in the literature on the resource-based view of the firm (Barney, Wright, & Ketchen Jr., 2001; Sirmon, Hitt, & Ireland, 2007). In arguing for the association between knowledge resources and competitive advantage some researchers have recently acknowledged that firms must leverage, not just possess, knowledge resources in order to attract and retain international clients (Haas & Hansen, 2005).

This argument also has parallels at the group level. Beyond the knowledge resources available to a group based on their members' collective expertise, prior research suggests that group process will have a strong effect on whether that knowledge actually translates into higher performance. Numerous studies have shown that team performance depends not only on members' task ability levels but also on their collective capacity for accurately recognizing that expertise (Bottger, 1984; Libby et al., 1987; Littlepage & Silbiger, 1992; Littlepage et al., 1997). Shared group experience not only enhances members' ability to accurately recognize one another's expertise (e.g. Liang et al., 1995) but also directly effects members' propensity to apply members' expertise (Littlepage et al., 1997) and makes it likely that group members will accept the correct solution proposed by a member (Laughlin & Hollingshead, 1995). Furthermore, we know that team performance depends on the extent that the team actually uses that member's input (e.g., Bunderson, 2003; Stewart & Stasser, 1995).

Yet it is not just indiscriminate application of all team members' inputs that leads to performance benefits, but the effective utilization of the true experts' knowledge. This means that each person's influence over the outcome should be commensurate with his/her expertise. Over-reliance on non-experts (and as a

corollary, relative discounting of experts) means that knowledge valuable for the task is disregarded. Less obvious, perhaps, is the idea that over-reliance, even on experts, can be costly for team effectiveness: to take the extreme case, concentrating influence in a single expert indicates that every other team member's inputs would be ignored. Not only would their expertise fail to benefit the immediate group outcome, but also their lack of voice in the process is likely to de-motivate the ignored team members and lead them to hoard valuable information in future instances (Kim & Mauborgne, 1998). This situation is particularly relevant for a divisible task where all team members have carried out some of the work and where less-expert team members are expected to develop their abilities through hands-on experience, as is the case in many professional service teams. It is also important to note that the relationship between the application of expert knowledge and the performance benefits may not be as straightforward in professional firms. As Greenwood, et al. (2005:663) suggest, in professional firms "the outputs are intangible applications of complex knowledge, making it difficult for consumers to weigh the relative competence of suppliers." Understanding how expertise utilization relates to the development and maintenance of client relations thus remains an open – but important – question.

For the purposes of this chapter, I conceptualize client relations as the outcome more proximal to client service teams: client satisfaction. There are several reasons for doing so. First, client satisfaction is an important precursor to client retention (Bedingfield et al., 1974); indeed recent analyses show that clients use satisfaction more than alternative factors (i.e., trust) to determine repurchase intentions (Rosenbaum, Massiah, & Jackson., 2006) . Second, although many studies of professional firms use client retention as a performance outcome, client satisfaction is a cleaner, more proximal measure of a particular *team's* performance than

retention: numerous considerations well beyond the performance of a professional service team determine a client's willingness and ability either to re-engage that team or the associated firm. In the audit field, clients face a number of constraints to switching auditors: firing one's auditor sends a bad signal to the public, particularly capital markets (Weil, 2006); given the consolidation of the accounting industry into four global firms, there are few alternatives if a client needs a multinational firm; and instructing a new auditor requires significant lead time and preparation. In the consulting field, a team may be required only for specialized work; failure to reappoint that team may be dictated more by a client's needs than by the performance of the team. Finally, a client's satisfaction is a strong predictor of whether the professional firm will receive additional work beyond the focal project – for example, either by cross-selling additional services to that client organization, by selling future work to the same client individual who changes employer, or by selling services to a new client organization via a referral from the initial client. Because diversification into new business areas has been a primary strategy for many professional service firms (Greenwood et al., 2002; Greenwood & Suddaby, 2006), the ability to cross-sell additional services to both new and existing clients is fundamental to many organizations' profitability and even long-term survival.

In short, prior research in the groups literature suggests that teams can expect an increase in task performance when they accurately recognize members' expertise, and when they allocate influence over their outcomes to those who are believed to have the suitable technical expertise (i.e., when they utilize members' expertise appropriately). Extending this work to the domain of knowledge intensive firms applying tacit knowledge to enhance subjective relational outcomes, and integrating

prior findings that both general professional expertise and client-specific expertise are important for maintaining strong client relations, I predict the following:

Hypothesis 5.3a: Teams that more effectively utilize their members' general professional expertise will have higher client satisfaction

Hypothesis 5.3b: Teams that more effectively utilize their members' client-specific expertise will have higher client satisfaction

Is it possible to predict which of these two types of expertise will be more important for client satisfaction? Insights from both the interfirm relations literature and the services marketing literature suggest that client-specific expertise will link more strongly with client satisfaction than will general professional expertise for two primary reasons: higher quality and closer alignment of expectations. First, research across industries has shown the enhanced benefits to firms through developing interfirm relationship-specific assets (Dyer & Singh, 1998). These advantages accrue to both parties in an exchange relationship (i.e., supplier and customer Kotabe, et al., 2003), with the customer receiving higher quality goods or services that are more customized to their specific needs. Naturally, general professional expertise is necessary for delivering quality service, but professional service firms publicly acknowledge the added importance of client-specific expertise in generating customized solutions. For example, Deloitte's website announces, "Multifunctional teams representing each of our service areas create client specific solutions that add value across an organization." (Deloitte, 2006)[33].

Second, from the services marketing literature we know that clients are likely to rate their professional service experience more positively the smaller the gap

[33] Deloitte Touche Tohmatsu (DTT) is one of the "Big 4" global accounting firms, presently offering a wide range of professional services (e.g., consulting, tax advice, mergers and acquisition services) beyond the traditional audit.

between their own and the providers' perceptions of (1) client expectations and (2) client experiences (Brown & Swartz, 1989). Again, while team members with high levels of general professional expertise are likely to help their team to understand what clients want overall, those with high levels of client-specific expertise are more able to help their team to perceive accurately what that *particular* client expects and the extent to which they feel they have been well-served. These more accurate perceptions are partly a function of the client-specific experts developing a shared language with the client, thereby reducing communication errors (Dyer & Singh, 1998) and enhancing communications flow during both the negotiation and the service delivery phase (Asanuma, 1989). Taken together, these reasons suggest the following:

> **Hypothesis 5.4: Effective utilization of client-specific expertise will have stronger effects on client satisfaction than effective utilization of general professional expertise**

Research design & methodology

Data were collected from surveys of consulting and audit teams, partners and clients for 72 teams as described in Chapter 3, above. To review briefly, Survey 1 (sent within the team's first three days on the project) included the expertise recognition variable and Survey 2 (sent during the team's final week on the project) included the expertise utilization variable. Partners completed a survey and interview within one month of the project's completion and they provided the name of up to three key contacts at the client organization for which the project had been completed. I collected performance data from actual clients, who completed their survey and interview within approximately ten weeks of the project's completion. A strength of

this survey design lies not only in the significant reduction of common source bias, but also in the use of direct measures of client impact (i.e., first-hand reports from clients themselves) instead of proxies for the outcome.

Measures

Chapter 3 provides details on measures of the following variables, which are common across this chapter and the next:

- Recognition and utilization of general /client-specific expertise (see page 72)
- Controls (project complexity, team size and project duration) (see page 78)

Dependent variable – team performance

Performance data was collected from surveys of clients for 72 teams as described above and included three items such as, "The client was 100% satisfied with the outcome of this audit"; "Based on this project's outcome (i.e., quality, robustness, timeliness, met expectations), the client will almost certainly engage [AuditCo] for future audits"; "Based on their satisfaction with this year's audit, the client is very likely to recommend [AuditCo] to other companies."). The items loaded onto a single factor ($\alpha = .82$) and the items jointly explained 74% of variance using principal components analysis with varimax rotation.

Moderator – performance pressure

Each team's partner provided ratings on a 5-point scale for three items indicating the level of pressure that the team faced, each from an important source: the firm's leaders, the client and the project manager. For example, "Success on this project will significantly affect the (Senior) Manager's prospects for advancement

within AuditCo." Cronbach's alpha = .66; the items jointly explained 60% of variance. I used principal components analysis with varimax rotation to assess scale reliability; items for each scale loaded onto a single factor. Correlations between partners' and teams' responses (rated during Survey 2) to these items confirmed that team members did perceive the performance pressure (r=.63, p<.001), but to minimize same-source bias the partner scores were used in analyses reported below.

Table 5.1 details these measures, including specific items, factor loadings and reliability measures.

Table 5.1: Scales, Items and Reliability Measures

Items	Factor loading[c]
Performance pressure (α = .66)	
Success on this audit will significantly affect the (Senior) Manager's prospects for advancement within [AuditCo]	.80
This audit has a lot of visibility with senior members of [AuditCo]'s client service team	.79
Future engagements with this client depend on the client's satisfaction with this audit	.72
Team performance (α = .82)	
Based on their satisfaction with this year's audit, the client is very likely to recommend [AuditCo] to other companies	.87
Based on this audit's outcome (i.e., quality, robustness, timeliness, met expectations), the client will almost certainly engage [AuditCo] for future audits	.86
The client was 100% satisfied with the outcome of this audit	.84

a. Cronbach's alpha (α) reported from principal components analysis with varimax rotation
b. For consulting teams, "project" replaced "audit" in the items
c. n/a signals that the measure was not subjected to principal components analysis

Results and robustness checks

Table 5.2 shows descriptive statistics and correlations for all variables in the model. A number of significant correlations provide some evidence of convergent validity for expertise variables used in this chapter. First, the average level of general professional expertise falls as the size of the team increases; this negative correlation would be expected because larger teams are typically more highly "leveraged" (Sherer, 1995). Expertise recognition is positively associated with team size, as prior research finds (Littlepage & Silbiger, 1992). Importantly, teams' recognition of each kind of expertise is significantly correlated with their utilization of that expertise, as would be expected from prior literature (Bunderson, 2003). Performance pressure exhibits an unexpectedly high correlation with performance; for this reason, I also include performance pressure in the models testing performance outcomes, and I explore this relationship in further detail in the post-hoc analyses reported below.

Table 5.2: Means, Standard Deviations and Correlations

	Mean	s.d.	N	1	2	3	4	5	6	7	8	9	10	11
1. Prior relationship	4.85	5.04	101											
2. Project complexity	3.92	0.75	91	.03										
3. Team size	7.35	2.52	96	.05	.18									
4. Project duration	2.26	0.95	104	.03	.06	.11								
5. Average team-level general professional expertise [a]	.034	0.51	104	.04	.08	-.28**	.09							
6. Average team-level client-specific expertise [a]	-.04	0.37	104	-.11	.32**	.10	.10	.14						
7. Performance pressure	3.85	0.87	91	-.01	.57**	.11	.11	.05	.51**					
8. Team recognition of general professional expertise	-.45	0.38	97	-.14	.11	.12	-.07	-.07	.11	.04				
9. Team recognition of client-specific expertise	-.68	0.47	93	-.01	-.03	.23*	-.06	-.14	.25*	.02	.34**			
10. Effective utilization of general professional expertise	-1.72	1.63	100	-.06	.03	.18	-.14	-.02	.03	.10	.31**	.24*		
11. Effective utilization of client-specific expertise	-2.12	1.75	94	-.04	.08	.18	-.18	-.11	.11	.17	.10	.27**	.68**	
12. Client satisfaction	3.96	0.62	72	-.18	.23	-.04	-.03	.01	.28*	.60**	-.01	-.05	.10	.32**

a = standardized scores

** $p < 0.01$ (2-tailed); *$p < 0.05$ (2-tailed).

Hypothesis 5.1 predicted that performance pressure would moderate the relationship between teams' recognizing and using general professional expertise. Table 5.3 shows results for tests of this moderation effect using hierarchical regression analyses. Model 1 tests the controls alone. Model 2 adds the main effects; as expected, teams' *recognition* of general professional expertise is a precursor to their *use* of such expertise. Model 3 provides strong support for hypothesis 5.1, with performance pressure moderating the link between recognition and utilization of general expertise ($\beta = .23$, $p<.05$).

Hypothesis 5.2 predicted that performance pressure would weaken the relationship between teams' recognizing and using client-specific expertise. Table 5.3 shows results, with Model 4 adding controls only. As with general professional expertise, teams' recognition of client-specific expertise is a strong precursor to their use of such expertise (see Model 5). Model 6 shows the moderation effects of performance pressure on utilization of client-specific expertise: performance pressure decreases the relationship between recognition and utilization of client-specific expertise ($\beta = -.23$, $p<.05$). H5.2 is supported.

Table 5.3: Results of OLS Regression Analyses Predicting Effects of Performance Pressure on Expertise Utilization (H5.1, H5.2)

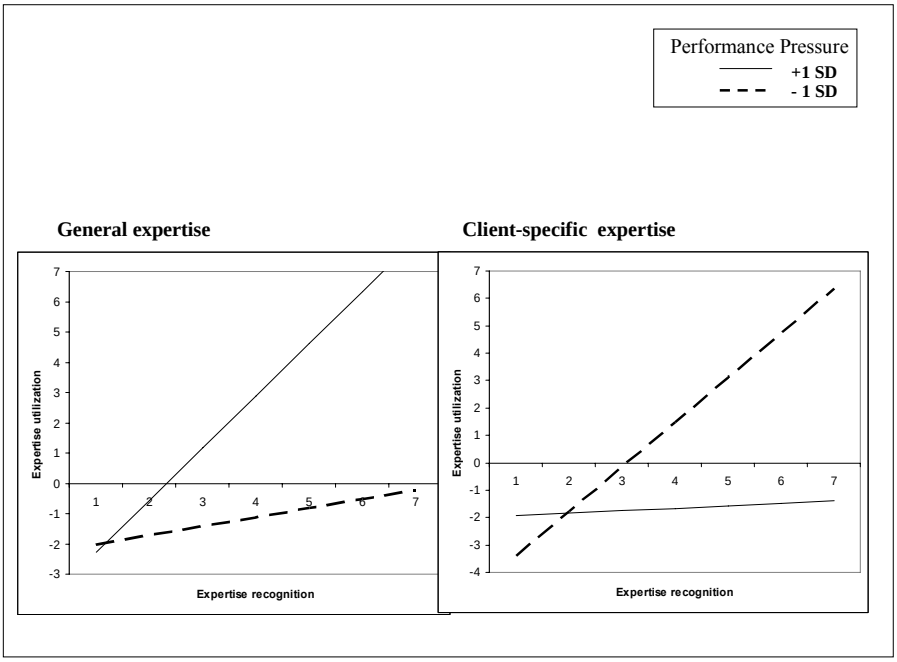
	Utilization of general professional expertise			Utilization of client-specific expertise		
Variable	Model 1	Model 2	Model 3 (H5.1)	Model 4	Model 5	Model 6 (H5.2)
General professional expertise	.04	.10	.13	-.03	-.01	.02
Client-specific expertise	-.00	-.08	-.14	.11	-.04	.02
Project complexity	-.02	-.06	-.07	.09	.03	.10
Team size	.03	.00	.00	.19	.15	.11
Project duration	.00	.03	.03	-.14	-.13	-.11
Expertise recognition		.34***	.31***		.21*	.23**
Performance pressure		.08	.17		.20	.12
Interaction: recognition x pressure			.23**			-.23**
Adjusted R^2	-.06	.03	.07	.03	.06	.09
ΔR^2		.11	.05		.05	.04
F	.03	1.36	1.75*	1.44	1.70	2.03**

Standardized coefficients are shown *** p<.001; * p<.01; ** p<.05; ‡ p<.10;

Using Aiken & West's (1991) method for graphing interactions, Figure 5.1 shows the contrast in moderation effects of performance pressure on the link between recognizing and utilizing general versus client- specific expertise. Examination of these figures suggests that under low stress, a strong association exists between teams' recognition and utilization of general professional expertise, but a weak one exists for client-specific expertise. In other words, when they are not stressed, teams will turn to client-specific experts in proportion to their perceived level of expertise. Under stress, however, teams pay much greater attention to high-status members who are high in general professional expertise – the relationship between expertise recognition and utilization for general professional experts is much higher when

teams are under high performance pressure. In that same situation, there is very little relationship between team's teams' recognition and utilization of client-specific expertise.

Figure 5.1: Moderation Effects of Performance Pressure on Expertise Utilization



Hypotheses 5.3 predicted that teams' effective utilization of their members' general professional expertise (H5.3a) or client-specific experience (H5.3b) would be associated with higher client satisfaction. As shown in Table 5.4 (Model 2), effective utilization of general expertise is not significantly associated with performance, whereas the utilization of members' client-specific expertise (Model 3) is strongly and positively linked to performance ($\beta = .26$, $p<.05$). Together the variables explain 14% of variance in teams' performance. H5.3b, but not H5.3a, thus receives support. Finally, Model 4 tests the joint effects of utilizing general professional expertise and client-specific expertise on performance. As hypothesized in H5.4, utilization of client-specific expertise($\beta = .36$, $p<.05$) has significantly stronger effects on

performance than the utilization of general professional expertise (β = -.19, not significant)[34].

Table 5.4: Results of OLS Regression Analyses Predicting Performance (H1a, H1b)

Variable	Model 1 (controls)	Model 2 (H1a)	Model 3 (H1b)	Model 4 (joint)
Prior relationship	-.13	-.11	-.11	-.12
Project complexity	.23*	.23	.19	.18
Team size	-.06	-.09	-.12	-.10
Project duration	-.05	-.03	-.02	-.04
Average team-level general professional expertise	-.14	-.13	-.11	-.11
Average team-level client-specific expertise	.28**	.28**	.26*	.25*
Team utilization of general professional expertise		.11		-.18
Team utilization of client-specific expertise			.26**	.40**
Adjusted R^2	.09	.09	.14	.14
ΔR^2 (versus Model 1)	--	.01	.06	.08
F	2.00*	1.806	2.45**	2.26**

Standardized coefficients are shown
* p<.10; ** p<.05; *** p<.01

Given the unanticipated correlation of performance pressure with performance, I re-ran each of the analyses testing hypotheses 5.3a, 5.3b and 5.4 with performance pressure as an additional independent variable. Table 5.5 shows that these analyses produce a similar pattern of results, with support for H5.3b and H5.4, but not for H5.3a. In all models, performance pressure was a positive and significant predictor of team performance. The only other important difference between models

[34] As a robustness check, I repeated these analyses using the team's report of performance pressure (from Time 1) instead of the measure from the partner survey (collected after the project was complete). All results were replicated in that the beta coefficients produced the same sign, but without significant p values. This pattern of weaker results derives, perhaps, from that team's lack of perceived performance pressure early in the study. Overall, the team mean for performance pressure was 3.4 (SD .75) whereas the partner rating averaged 3.9 (SD .87).

excluding versus including performance pressure as a predictor of performance is the loss of significance for one control variable: team client-specific expertise levels. This result is not surprising, given the correlation reported earlier between performance pressure and team client-specific expertise levels.

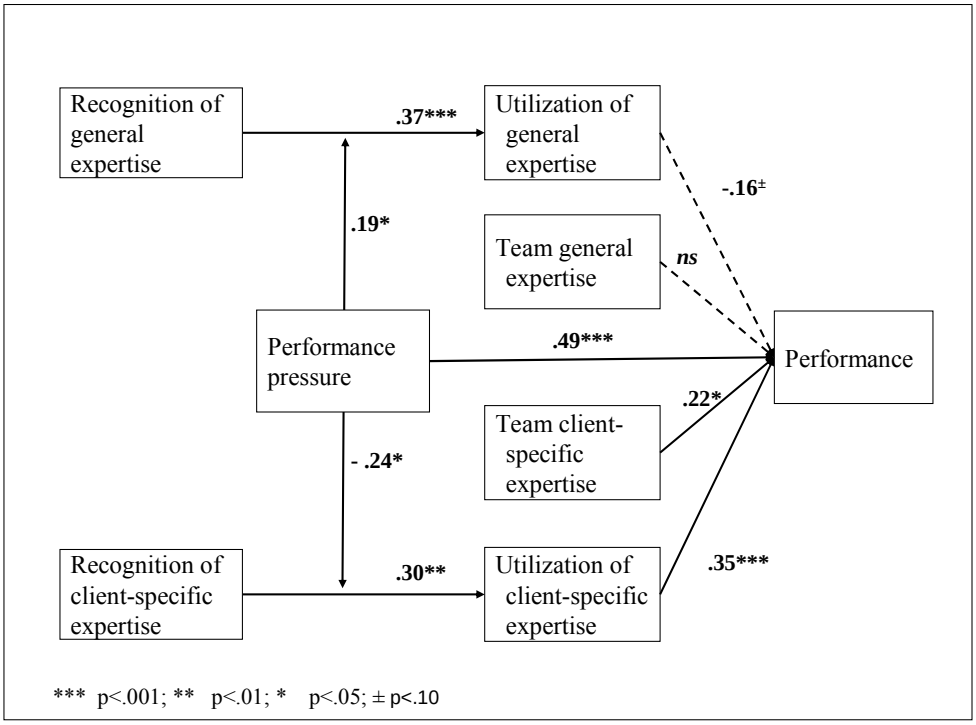
Table 5.5: Results of OLS Regression Analyses Predicting Performance (H5.3. H5.4) with the addition of Performance Pressure as a Predictor

Variable	Model 1 (controls)	Model 2 (H5.3a)	Model 3 (H5.3b)	Model 4 (H5.4)
Prior relationship	-.04	-.03	-.03	-.04
Project complexity	-.01	-.01	-.03	-.05
Team size	-.01	-.03	-.06	-.05
Project duration	-.07	-.06	-.05	-.06
Average team-level general professional expertise	-.06	-.06	-.04	-.04
Average team-level client-specific expertise	.04	.04	.03	.02
Performance pressure	.56***	.55***	.53***	.53***
Team utilization of general professional expertise		.08		-.19
Team utilization of client-specific expertise			.22*	.36**
Adjusted R^2	.25	.25	.29	.29
ΔR^2 (versus Model 1)	--	.01	.04*	.06*
F	3.92**	3.44**	4.08**	3.78**

Standardized coefficients are shown
*** p<.01; ** p<.05; * p<.10;

Finally, because I tested each of the hypotheses in separate regression equations, one important robustness check for the model is to determine whether the relationships hold when estimated simultaneously. To do so, I constructed a path model and ran the estimations using Amos 6.0 (Arbuckle, 2003). Results replicated as expected: all previously significant relationships retained their significance in the path model, with coefficients of the same sign as in prior separate regression analyses. Figure 5.2 shows these results.

Figure 5.2: Path Model of Expertise Utilization and Performance



Discussion & conclusion

Knowledge-intensive businesses, including professional service firms, are an increasingly important part of the world's economy. Because many of these firms rely on project teams to deliver major business objectives, understanding factors that affect teams' ability to use expertise to deliver knowledge-based outcomes is a critical

issue for both theory and practice. This research addresses the relatively under-developed issue of why teams fail to use their knowledge resources effectively, even after they have correctly identified which team members hold that expertise.

My results call out a paradox in the situation: performance pressure leads teams to rely on those members with greater general professional expertise, not necessarily the experts who have client-specific experience. But as reliance on only those with client-specific expertise increases client-rated performance, it means that the most important projects (i.e., those whose outcomes really affect clients' propensity to re-engage the firm) may be the ones with dysfunctional team processes. One audit client from the publishing industry offered an example of this sort of problem. The day-to-day manager on the AuditCo audit team had worked on the two prior years' audits, gaining a great deal of knowledge about the intricacies of accounting for royalties. This year, however, a new senior manager was assigned to the client in AuditCo's anticipation that the client might re-tender the audit. The finance director described his frustration that the senior manager (Mike) increasingly pushed the junior one (Clive) aside as the audit progressed, saying "Clive was the guy who knew the ins and outs of our business, but along came the new guy who wanted face time with me and the [audit] committee. Every time we asked him a question he'd have to go off and probably ask Clive. The more we asked questions, the worse it got. I'm not sure we really were going to put it up [for re-tender] but now I'm pretty sure." This example illustrates how performance pressures can lead to under-utilization of members with client-specific expertise when higher-authority team members are present.

It is worthwhile to note that, consistent with my theorizing, performance pressures do not have a significant main effect on expertise utilization, either for

general professional expertise or client-specific expertise. Instead, pressure moderates the link between expertise recognition and utilization. In other words, teams facing increased pressure rely more on those they *initially* recognized as experts, particularly those members with easily identifiable and salient expertise (i.e., general professional expertise). If performance pressures were simply a motivating factor that prompted teams to do their work as effectively as possible, we should expect to see a main effect of pressure on the use of experts with both general and client-specific expertise; no such results emerged. These findings are therefore consistent with threat rigidity theory approach, suggesting that teams interpret performance pressure as having potentially negative consequences, leading them to reduce cognitive processing and rely on their default processes.

By developing a model linking team-level processes of expertise utilization with outcomes in the form of client satisfaction, this chapter also contributes a novel perspective to literature on inter-firm relations. Certainly the level of expertise, as captured in the human capital approach (e.g., Hitt, et al., 2001), is important for developing and maintaining client relationships. In examining micro-processes of client relationship development, however, I argue that the simple availability of expertise as it exists within teams cannot fully explain differences in relational outcomes; rather my findings demonstrate that the appropriate application of team members' knowledge determines clients' satisfaction and ultimately their decision to re-engage the professional firm.

Certain limitations of this study should be noted. First is the survey sample from within a single firm; although the relatively large number of teams and inclusion of both audit and consulting projects should ameliorate the problem to some degree, generalizability remains an issue. Second, there is no practical way to determine

which team members in fact are the "true" experts. Unlike experimental settings where expertise can be manipulated, field research such as this study relies on collecting data that can best approximate actual expertise. In this chapter, the strength of the measures lies in part on their objectivity (such as hours charged to the client for prior work), but relies on the assumption that these measures on average translate into higher levels of expertise.

Despite these limitations, this research advances prior work in several ways. First, the research provides an initial view of one theoretically and contextually grounded variable that is expected to influence the effectiveness of knowledge integration within project teams. It thus complements the small but growing body of research examining moderators of expertise recognition and utilization processes (e.g., Bunderson, 2003; Littlepage et al., 1997; Moreland & Argote, 2003).

Second, unlike much of the prior research in the area of small groups (e.g., Baumann & Bonner, 2004) I argue that expertise utilization is not an automatic outcome of recognition. Particularly in real-world project teams, a number of factors are likely to influence members' willingness and ability to use others' input when developing a collective outcome. As these findings show, the degree to which a team experiences performance pressure is a major influence on members' ability to use others' expertise resources effectively. By analyzing expertise recognition and expertise utilization as two separate variables, this research aims to show why the process is most fruitfully examined as two distinct stages. This research advances Grant's (1996) idea that effective knowledge integration requires both accessing and harnessing diverse knowledge sources; it shows that firms seeking competitive advantage through knowledge will need to focus on factors that affect not only recognition but also utilization.

In linking expertise utilization with client-rated performance outcomes, this research also advances our understanding of client-firm relations. Prior research, which has captured aggregate professional expertise through various firm-level proxies, demonstrated the importance of such resources for inter-firm relations. By examining the micro-processes of team-level expertise recognition and utilization, however, this research allows us to understand circumstances that determine how and when human capital will help firms to develop and deepen these relationships. This chapter's third contribution therefore is the novel perspective that team processes are important to inter-firm relations; it is not just the presence but also the utilization of expertise that matters. Such an approach is consistent with recent theorizing in the resource-based view (RBV) of the firm, recognizing that to realize value, firms must exploit – not merely possess – their resources (Sirmon et al., 2007). Given the relative lack of formal theory explaining how managers/firms transform resources to create value (Haas & Hansen, 2005; Priem, 2001), the present chapter's focus on team process presents an important jumping-off point for examining this level of analysis within the RBV literature.

Project teams are an increasingly important feature of today's business world, with many organizations relying on them as a way to gain flexibility, adaptive capabilities and competitive know-how (Child & McGrath, 2001; Earley & Gibson, 2002) in a complex, unpredictable and globalized business environment. In addition, project teams are the primary organizing unit for accomplishing day-to-day work in many professional service firms (Werr & Stjernberg, 2003), which are themselves exerting ever greater influence over economies and societies of developed and developing countries (Blackstone, 1997). Understanding ways to make project teams more effective is thus a crucial question facing practitioners and theorists alike.

Appendix 5.1: Robustness checks using alternative measures of expertise

Table 5.6(A): Results of OLS Regression Analyses Predicting Client Relations (H1) Using Alternative Measures of General Professional Expertise and Client-Specific Expertise

Variable	Model 1 (controls)	Model 2 (H1a)	Model 3 (H1b)
Prior relationship	-.20	-.14	-.06
Project complexity	.27*	.21	.15
Team size	-.01	-.06	-.12
Project duration	-.03	-.08	-.06
Average team-level general professional expertise	-.12	-.09	-.05
Average team-level client-specific expertise	.29*	.31**	.34***
Team utilization of general professional expertise		.15	
Team utilization of client-specific expertise			.48***
Adjusted R^2	.07	.08	.30
ΔR^2		.02	.21
F	1.74	1.63	4.78***

Standardized coefficients are shown ;* p<.10; ** p<.05; *** p<.01

Table 5.7(A):Results of OLS Regression Analyses Predicting Expertise Utilization (H2a, H2b) Using Alternative Measures of General Professional Expertise and Client-Specific Expertise

	Utilization of general professional expertise			Utilization of client-specific expertise		
Variable	Model 1	Model 2	Model 3 (H2a)	Model 4	Model 5	Model 6 (H2b)
General professional expertise	-.23*	-.14	-.11	-.18	-.06	-.05
Client-specific expertise	-.16	-.16	-.15	-.06	-.19	-.21
Project complexity	-.01	-.11	-.12	.12	.21	.20
Team size	.02	.03	.01	.11	.02	.04
Project duration	.05	.14	.11	-.00	.03	.01
Expertise recognition		.46***	.46***		.47***	.47***
Performance pressure		.10	.17		-.01	-.02
Interaction: recognition x pressure			.21*			-.08
Adjusted R^2	0.05	.24	.27	0.01	.18	.17
ΔR^2		.19	.04		.18	.01
F	1.83	4.39***	4.46***	1.14	3.48***	3.11***

Standardized coefficients are shown; * p<.10; ** p<.05; *** p<.01

CHAPTER 6: CONCLUSION

Project teams are an increasingly important feature of today's business world. More and more, organizations rely on them as a way to gain flexibility, adaptive capabilities and competitive know-how (Child & McGrath, 2001; Earley & Gibson, 2002) in a complex, unpredictable and globalized business environment. In addition, project teams are the primary organizing unit for accomplishing day-to-day work in many professional service firms (Werr & Stjernberg, 2003), which are themselves exerting ever greater influence over economies and societies of developed and developing countries (Blackstone, 1997). Understanding ways to make project teams more effective is thus a crucial question facing practitioners and theorists alike.

Member expertise has long been recognized as an important resource that can greatly affect team performance (McGrath, 1984), but only to the extent that it is recognized (Littlepage et al., 1997) and used to accomplish the team's objective (Hollenbeck et al., 1995; Stewart & Stasser, 1995). While past research in the groups tradition underscores the importance and difficulty of identifying and utilizing member expertise, we still know relatively little about how these processes function in actual project teams. Because these project teams are nested within an organizational system, there are a variety of individual, group and contextual factors (Ilgen, 1999; McGrath, Arrow, & Berdahl, 2000) that may influence their ability and willingness to weight appropriately the input of even recognized experts. Yet a core assumption across much of the micro-sociology and small groups research is that expertise recognition leads automatically to utilization. In other words, despite knowing that all sorts of factors could interfere with people's willingness or ability to contribute their knowledge or to tap into other's knowledge, researchers have tended to assume that team members will automatically defer to recognized experts.

By questioning this fundamental assumption in the literature, my dissertation opens for examination the *conditions* under which teams do and do not effectively use their members' knowledge. I demonstrate that teams sometimes *fail* to use their members' expertise, even after they have accurately recognized "who knows what." Further, by teasing out the differences between using two types of expertise – one that is typically associated with high-status individuals and one that is status-neutral – my results suggest that status dynamics in teams play a crucial role in affecting the extent to which expertise is used or ignored.

By drawing on ideas about collective cognition, in particular team-level shared representation about their team and task, I develop theory to explain *why* some teams are better than others at allocating decision making and problem solving influence in accordance with each team member's relevant expertise. Results from a field study of more than 100 project teams suggest that when teams hold a consistent view of each other's relative competencies (i.e., agree on the expertise hierarchy) and a shared understanding of their collective task, they are more effective at using expertise that is not necessarily associated with high-status individuals. I reason that allocating influence to these sorts of experts may be more risky than allowing senior, high-status actors to make the most contributions. Only if everyone on the team agrees that the one with hard-to-detect expertise is at the top of the ranking will it seem safe to defer to that person. If there's disagreement on the team about who can contribute how much to the team effort, then it's not surprising that the team would default to using high status members.

A similar process appears to be at work when teams come under pressure to perform. I find that teams experiencing high levels of performance pressure (i.e., intense scrutiny with potentially negative consequences for poor performance) tend to

use the expertise of high-status members while becoming less effective at using team members with deep client knowledge. I reason that performance pressure creates threat rigidity effects in teams, meaning that they reduce cognitive processing and use default processes; turning to high-status team members is their default.

Theoretical contributions

My dissertation advances theory in several major ways. First, I demonstrate that teams do not automatically defer to their resident experts, as is assumed (explicitly or implicitly) in both status characteristics theory and much of the small groups research (e.g., Baumann & Bonner, 2004). This line of theorizing is in the spirit of McGuire's (1973: 452) "accounting for exceptions": although my findings confirm prior research suggesting that expertise recognition is *typically* related to expertise utilization, examining the conditions when this relationship does *not* hold true deepens our understanding of the process. Further, beyond establishing that expertise utilization is not an automatic outcome of recognition, I develop and test theory to begin explaining *why* this process breaks down. I show how both team factors (shared representations) and task factors (performance pressure) moderate the relationship between expertise recognition and utilization, and I identify mechanisms through which these factors either hinder or facilitate the process. I further highlight how status dynamics – the assumptions about others' competence based on their position – can influence the way these factors interact. There are implications for two major streams of research.

Implications for the status literature. Although two decades ago Markovsky (1988:357) suggested that contextual factors "may strongly affect status organizing processes", little work has been done to understand these factors. A couple of recent

field studies indicate that characteristics of the team (i.e., power centralization – Bunderson, 2003) or task (i.e., amount of external knowledge required –Haas, 2005) are important factors in the process, yet our understanding of the interplay between context, status and performance remains limited.

In particular, one of the five fundamental assumptions in status characteristics theory is the "basic expectations assumption" positing that an actor's influence in a group is a direct, continuous function of the other members' expectations for his or her performance, relative to other group members (Berger et al., 1980). In other words, the theory suggests that the degree to which individuals receive (and capitalize on) opportunities for involvement and influence in group decision making processes is determined solely by their teammates' evaluations of their competition. To date, this fundamental assumption has limited researchers in this tradition from considering other factors that might intervene or influence the link between performance expectations and behavioral outcomes. By revealing that expertise recognition (i.e., expectations for another's performance) is sometimes only weakly related to expertise utilization (i.e., the extent to which that individual is allowed to influence group outcomes), the results suggest that status characteristics theory could make critical advances by relaxing the basic expectations assumption and testing boundary conditions and modifiers.

Implications for the groups literature. Much of the existing literature on expertise recognition and utilization in groups tends to view the process as a "coordination" problem (Wittenbaum, Vaughan, & Stasser, 1998) – that is, developing an understanding of the task and members' relevant knowledge (e.g., Liang et al., 1995) and combining knowledge inputs to complete a group task (Wittenbaum, Vaughan, & Stasser, 1998). Subjects in these studies selectively utilize

others' knowledge conditional on knowing "who knows what"; because the typical experimental paradigm uses ad hoc groups intentionally to minimize prior interpersonal familiarity and status barriers (Littlepage et al., 1997), it is primarily knowledge of the task at hand that determines whose expertise the group relies upon. By design, then, this line of research tends to rule out the distinction between recognition and utilization of knowledge. It thus addresses scholars' calls to examine moderators of expertise recognition and utilization processes (e.g., Bunderson, 2003; Littlepage et al., 1997; Moreland & Argote, 2003).

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In addition, by relating group expertise processes to client-rated performance, my research brings a novel perspective to the study of inter-firm relations. Whereas existing literature has shown that high levels of human capital help to maintain positive client relations, I show that the appropriate *utilization* of team members' expertise contributes significantly to this outcome, over and above the mere *presence* of knowledge. This research advances Grant's (1996) idea that effective knowledge integration requires both accessing and harnessing diverse knowledge sources; it shows that firms seeking competitive advantage through knowledge will need to focus on factors that affect not only recognition but also utilization.

Implications for the inter-firm relations literature. Prior research in the tradition of the inter-firm relations literature (e.g., Broschak, 2004; Levinthal & Fichman, 1988) has demonstrated the importance of knowledge-based resources for the creation and maintenance of inter-firm relations. Typical for work in the strategy realm, this prior research takes the firm (or industry) as the level of analysis, measuring knowledge using proxies at an aggregate level (i.e., number of partners with a law degree from a high-prestige school – Hitt et al., 2006). Because my

dissertation examines the *micro-processes* of team-level expertise recognition and utilization, however, it provides a deeper understanding of circumstances that determine how and when human capital will help firms to develop and deepen these relationships. A further theoretical contribution of this dissertation is thus the novel perspective that team processes are important to inter-firm relations because it is not just the *presence* but also the *utilization* of expertise that matters. Such an approach is consistent with recent theorizing in the resource-based view (RBV) of the firm, recognizing that to realize value, firms must exploit – not merely possess – their resources (Haas, 2006; Haas & Hansen, 2005; Sirmon et al., 2007). Given the relative lack of formal theory explaining how managers/firms transform resources to create value (Priem, 2001), this dissertation's focus on team process presents an important jumping-off point for examining this level of analysis within the RBV literature in order to develop theoretical explanations about how resources can used to create value.

Implications for managerial practice

Beyond the theoretical implications, this dissertation raises important issues for managerial practice. First and foremost, it highlights that managers cannot assume that teams will automatically use the expertise of their members. Many of today's professional service firms, for example, spend a great deal of resources on the staffing process to ensure that project teams have the right mix and level of experts assigned to them. Many firms have also implemented a formal kick-off process for new projects, including an exercise or planned discussion aimed at allowing each person to reveal his/her relevant expertise. The results in my dissertation reveal, however, that teams often fail to use their teammates' knowledge effectively – even if they

accurately understand each other's expertise. Critically for firms, I have found that the kind of expertise that is least likely to be used effectively is client-specific expertise – the type that is most strongly linked to higher performance. These findings imply that firms and managers must pay greater attention to factors that affect members' willingness and ability to use others' expertise, and my dissertation points to a few specific measures that could facilitate more effective usage of team experts.

First managers need to ensure that team members agree on each other's relative competence. Whereas teams' kick-off discussions tend now to focus on revealing who knows what, an additional step that aims to generate consensus about the expertise ranking could facilitate the usage of experts. Similarly, managers should help teams develop a shared understanding of their task (including both the content and the goals) in order to facilitate the usage of client-specific expertise. In particular, team members need to share a common view of the issues they need to address, the metrics on which their performance will be evaluated and the scope of their project. These steps seems especially important in teams where the person(s) with high levels of client-specific expertise is lower status or more junior; in such teams, the client-specific expert is likely to be ignored unless her teammates generally agree that she is an expert.

Finally, managers need to be aware that performance pressure can diminish the effectiveness of teams' expertise utilization. When teams experience performance pressure – the perception that they are under intense scrutiny from superiors (i.e., managers, partners or clients) and might suffer undesirable consequences for poor performance – they tend to default to using high-status team members at the expense of effectively using client-specific experts. Because client-specific expertise is vital

to performance (as judged by the teams' actual clients), it is essential that managers take steps to mitigate the effects of performance pressure on their teams – for example by creating an environment of psychological safety (Edmondson, 1999) where people are encouraged to seek help and take calculated risks such as tapping into the expertise of even lower-status team members.

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