A Distributed Cognition Perspective on Newcomers' Change Processes: The Management of Cognitive Uncertainty in Two Investment Banks

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This paper examines newcomers' cognitive change processes in two investment banks during their socialization. A two-year ethnographic study examines how the two banks managed the duration of junior bankers' cognitive uncertainty differently, which resulted in distinct forms of individual cognitive change and cognition at the organizational level. Red Bank reduced cognitive uncertainty such that bankers experienced it as transient. It conveyed abstract concepts so that bankers could solve problems independently using deduction. This created an individual-centric organizational cognition. To highlight situational uniqueness, Amp Bank amplified cognitive uncertainty such that bankers experienced it as persistent. This created a collective-centric organizational cognition: because demands exceeded individuals' cognitive capacity, bankers used organizational resources to solve problems inductively. A grounded theory depicts the mutual constitution of individual and organizational cognition, including the relation of these levels over time and how the same individual cognitive process operates differently in a different organizational cognitive context. It uses a distributed cognition framework to contribute to theory development on how cognition becomes diversified and specialized in organizations.●

Newcomers to organizations always have a lot to learn, and they enter a new work situation with a great deal of cognitive uncertainty. Cognitive uncertainty is a subjectively perceived state of "low prior confidence" concerning the accuracy or relevance of one's knowledge about a new situation (Trope and Liberman, 1996: 256). The object of such uncertainty is not the organization's environment (Milliken, 1987) or role requirements (Jones, 1983, 1986) but employees' expertise in relation to daily problem-solving situations. Employees who experience cognitive uncertainty perceive that they cannot effectively solve a problem because they are missing important information, have conflicting information, cannot see cause-effect relationships, sense ambiguity about available courses of action and the potential consequences, or are unable to distinguish between relevant and irrelevant information (Berlyne, 1970; Piaget, 1985; Trope and Liberman, 1996). Existing research views the reduction of cognitive uncertainty as a "fundamental need" at the individual level (Hogg and Mullin, 1999: 253; Hogg and Terry, 2000) and as an imperative of organizational design and the socialization of new employees (e.g., March and Simon, 1958; Ashford and Black, 1996).

For decades, companies have structured work practices to reduce cognitive uncertainty (Colvin, 2006). Yet some organizations do not attempt to reduce cognitive uncertainty but, rather, highlight and even intentionally create it, a trend that has been noted in the business press (Schwartz, 2005; Colvin, 2006). Examples include Apple Computer's R&D unit, which exploits employees' uncertainty for innovation (Walker, 2003), Google's "chaos by design" (Lashinsky, 2006: 86), U.S. Army officer combat training, which creates "ambiguity and uncertainty" (Wong, 2004: 17), and Xerox, where John Seely Brown's former job title was "Chief of Confusion." Such examples suggest that cognitive uncertainty reduction

is a cultural choice, rather than an imperative or a fundamental need. The organizational literature, however, provides little to help us to understand why organizations would choose not to reduce cognitive uncertainty or, even worse, to amplify it for clueless newcomers.

The historic emphasis in the organization literature on uncertainty reduction stems from the Carnegie School (e.g., March and Simon, 1958; Simon, 1976). Organizations, in this view, reduce cognitive uncertainty to simplify cognitive demands on employees. From this perspective, uncertainty amplification cannot be justified because it would overwhelm and thereby impede the effectiveness of boundedly rational decision makers. Given that both uncertainty reduction and amplification strategies are employed by successful organizations, however, a theoretical framework is needed that allows for the viability of both strategies. One possible basis for such a framework is research on distributed cognition, which can explain the success of each strategy as the result of matching mutually reinforcing types of individual and organizational cognitive processes. According to distributed cognition research, cognition is distributed in that it consists not only of an individual's mental representations—the Carnegie School's central unit of analysis—but also of interactions between people and their social and material context. Because cognition is distributed across a cognitive system with higher capacity than an individual has, uncertainty amplification is a feasible approach.

Acknowledging the importance of social interactions, traditional cognitive psychologists increasingly study cognition outside of the laboratory in real-life situations (Levine, Resnick, and Higgins, 1993), for example, exploring the cognitive processes that people use when they enter a new context (e.g., Ruble, 1994; Higgins, Loeb, and Ruble, 1995). But this research does not often investigate a context's specific conditions and their influence on cognition, perhaps in its quest to establish universally valid principles (Higgins and Kruglanski, 1996; Molden and Dweck, 2006). The resulting principles are potentially misleading to organizational researchers who apply this basic research. Resnick (1991: 1) criticized traditional cognitive psychology, in which "the social and the cognitive have engaged only peripherally, standing in a kind of figure-ground relationship to one another rather than truly interacting." This study, in contrast, focuses on the interaction between the social and the cognitive. It advances organizational research on distributed cognition, which has either focused on snapshots of distributed cognitive systems, largely neglecting individual cognition, or has depicted a one-way causality from organization to individual cognition. This study's investigation of two investment banks' contrasting approaches to managing the duration of employees' cognitive uncertainty covers a two-year period. It contributes a currently missing understanding of how individual cognition and the distributed cognitive system interact over time.

The first bank, which I call Red Bank, *red*uced cognitive uncertainty, such that bankers experienced it primarily when they entered the organization and therefore as transient. In contrast, the second bank, Amp Bank, *amp*lified it so that

bankers experienced it throughout their tenure and therefore as persistent. Both banks were highly successful, which suggests that both approaches are viable. The primary purpose of this research was to build theory to explain these differences by exploring the banks' understandings that targeting different durations of cognitive uncertainty (transient versus persistent) could result in distinct and reciprocally related types of individual and organizational cognition. The study describes the uncertainty management practices of each bank so as to examine how working under distinct durations of cognitive uncertainty changed individual cognition over a period of two years and how differences in individual cognition, in turn, constrained and enabled distinct forms of organizational cognition. Ethnographic methods are ideally suited to studying the fine-grained processes through which cognition changes (Engeström and Middleton, 1998).

A DISTRIBUTED COGNITION PERSPECTIVE

Distributed cognition research responds to anomalies in traditional cognitive psychology that bring into question its focus on the individual as the principal unit of analysis: namely, people who failed on standardized tests of a skill spontaneously exhibited it outside of the laboratory (see Laboratory of Comparative Human Cognition, 1983, for a review). For example, Micronesian navigators showed highly developed memory and inference skills at work. Yet on standardized tests of these same skills—when the wind, waves, and sky that supported cognition were absent—navigators underperformed (Gladwin, 1970; Rogoff, 1999). To account for these findings, distributed cognition researchers have reconceptualized the cognitive role of context. They assert that cognitive processes cannot be studied in abstraction from the specific contexts in which they occur (Brown, Collins, and Duguid, 1989; Brown and Duguid, 1991). Contexts consist of social practices through which participants repeatedly use artifacts, concepts, and procedures. Contexts do not merely help people work better—they not only influence decision outcomes—but their constraints fundamentally change cognition (e.g., Vygotsky, 1981; Wertsch, 1985, 1991). Different contexts present different practices, and different practices, in turn, shape cognition differently (e.g., Lave, 1988; Resnick, Pontecorvo, and Säljö, 1997). To investigate cognition, one therefore has to start with a description of the particular practices that "provide the functional matrix of and structural constraints" for skill acquisition (Cole, 1991: 410; Scribner, 1999). As newcomers acquire skills in an organization, a critical structural constraint is the organization's uncertainty management practices.

The Management of Cognitive Uncertainty Duration

Organizations institute practices that affect the duration of cognitive uncertainty for members and, therefore, cognition. The classic work of the Carnegie School is a precursor to contemporary work on distributed cognition (Varela, Thompson, and Rosch, 1996; Taylor and Van Every, 2000) in that it describes how the human mind and organizations work together as one cognitive system. It proposes that organizations should reduce cognitive uncertainty to compensate for

bounded rationality (March and Simon, 1958). They should create an "environment of 'givens'—premises that are accepted by the subject as bases for . . . choice" (Simon, 1976: 79) and that reduce the amount of information individuals have to process. The organizational socialization literature builds on this perspective. Successful socialization entails that participants learn these givens (Van Maanen and Schein, 1979; Fisher, 1986; Chao et al., 1994). They consequently experience uncertainty as transient: it is high when participants enter organizations, change positions, or undergo an organization's strategic change (e.g., Louis, 1980; Ashford and Black, 1996; Corley and Gioia, 2004) and subsequently declines.

Cognitively, transient uncertainty entails a switch from induction (Kahneman, Slovic, and Tversky, 1982; Stanovich and West, 2000; Ferreira et al., 2006), exhibited under high cognitive uncertainty, to deduction, exhibited as uncertainty diminishes (Fiske and Taylor, 1991; Ruble, 1994; Higgins, Loeb, and Ruble, 1995). Induction starts from concrete or situation-specific data to build abstract concepts, whereas deduction starts from abstract concepts to frame concrete data (Walsh, 1995; Brewer and Harasty Feinstein, 1999). A concept is abstract when it applies across specific situations or objects. But the assumption of transient uncertainty, which is shared by the cognitive literature on life shifts (e.g., Ruble, 1994; Higgins, Loeb, and Ruble, 1995), remains untested (Acredolo and O'Connor, 1991).

Organizational researchers often apply the knowledge generated by basic cognitive science (Palmer, 2006). The Carnegie School perspective is a rare exception in that it has powerfully influenced basic cognitive psychology (Simon, 1990; Varela, Thompson, and Rosch, 1996). Much of the organizational work in this tradition, however, was done in the middle of the last century and involved hierarchical, industrial organizations. The presumably generally valid processes of cognitive change—namely, the progression from inductive to deductive cognition associated with transient uncertainty—have been derived from studying traditional organizations that reduce uncertainty. As environments have become more turbulent, however, organizations have developed new uncertainty management practices that have radically transformed patterns of communication and knowledge generation. Because human cognition is shaped by its task environment (Simon, 1990), the employees who experience these different practices are likely to manifest basic cognitive processes in new ways (Suchman, 1987). Investment banks are an ideal context for exploring new uncertainty management practices and their effect on cognition.

Investment banks are the epitome of the professional service firms that dominate today's "knowledge society" (Drucker, 1993; Covaleski et al., 1998). Through communication, their non-hierarchical, collaborative structures (Eccles and Crane, 1988) distribute cognition across a high-capacity organizational system (e.g., Weick and Roberts, 1993), so bounded rationality is less of a concern. This system, however, needs to guard against another basic human tendency, the "cognitive monster" (Bargh, 1999). The Carnegie School's cognitive

miser uses simplifying heuristics (Kahneman and Tversky, 1973) adaptively to compensate for bounded rationality. The cognitive monster overrelies on simplifying concepts and acts with high certainty even when it is not warranted (Leonard-Barton, 1992; Fransman, 1994; Bargh and Chartrand, 1999). Distributed systems need to protect themselves against such overreliance because it can disrupt communication and hence cognition (e.g., Weick, 1998). Organizational practices thus should not eliminate cognitive uncertainty but should continuously counteract natural simplification tendencies so that employees "make fewer assumptions and . . . notice more" (Weick, Sutcliffe, and Obstfeld, 1999: 95). At the heart of these arguments is the idea that individual and organizational cognition are linked in ways that are not well understood.

Individual and Organizational Cognition

Weick and Roberts' (1993) work on collective mind expands the unit of analysis in studying cognition from the individual to the interactions among multiple participants. Similarly, work on transactive memory conceptualizes cognition as a collective process by which group members divide up the encoding, storage, retrieval, and communication of information (e.g., Wegner, 1986; Moreland, 1999; Brandon and Hollingshead, 2004). While acknowledging commonly held knowledge, scholars examining distributed cognition explore how different components of a system contribute different pieces of knowledge. Their work differs from socialization research (Van Maanen, 1976; Van Maanen and Schein, 1979), classic work on group mind (LeBon, 1911; Durkheim, 1938; Fleck, 1979), and various other conceptualizations of organizational cognition as "belief-agreements" (Laukkanen, 1994), interpretive schemes (Barley, 1983; Bartunek, 1984; Daft and Weick, 1984), frames of reference (Bartunek and Franzak, 1988), and organizational knowledge structures (Lyles and Schwenk, 1992) that examine how different participants exhibit similar cognitions.

In distributed cognition research, organizational cognition is defined as the pattern of interconnections that employees establish among organizational resources, which focuses analytic attention on interactions rather than on "within-group similarity of attitudes, understanding, or language" (Weick and Roberts, 1993: 358). The focus on interactions also differs from taxonomic approaches to identifying discrete knowledge types (e.g., Leonard-Barton, 1992; Nonaka and Takeuchi, 1995), thereby potentially reifying cognition (Tsoukas, 1996; Orlikowski, 2002).

But organizational cognition not only involves interactions between different people. As Walsh and colleagues (Walsh and Ungson, 1991; Walsh, 1995) suggested, it can also include people's interactions with objects and task structures. For example, the evolving structure of a spreadsheet constitutes cues that can "tell" the person who works on it what to do next, as would the instructions of another person. This broader conceptualization is illustrated by Hutchins (1990, 1999) and Hutchins and Klausen (1996), who described how battleship navigators and aircraft pilots form one cognitive system with such diverse resources as colleagues, task

structures, and objects. When people use different organizational resources, their cognition changes in differential ways.

Cognitive change. Distributed cognition research has developed frameworks that conceptualize cognition as a distributed phenomenon, contributing much needed descriptions of "small slices of activity in complex environments" (Resnick, Pontecorvo, and Säljö, 1997: 12; Elsbach, Barr, and Hargadon, 2005). Scholars are now calling for more research on individuals in these distributed systems and how they develop expertise (Resnick, Pontecorvo, and Säljö, 1997). Existing research on expertise (e.g., Chi, Glaser, and Farr, 1988; Ericsson and Lehman, 1996), learning (e.g., Argyris and Schon, 1978; Walsh and Charalambides, 1990), managerial cognition (e.g., Lurigio and Carroll, 1985; Poole, Gray, and Gioia, 1990; Bartunek, Lacey, and Wood, 1992), and socialization (e.g., Fisher, 1986; Chao et al., 1994; Bauer, Morrison, and Callister, 1998) contributes to our understanding of how individuals change as they participate in organizations but focuses on how people internalize "mental entities" (Schatzki, 2001: 7), such as socially shared concepts. Distributed cognition researchers, instead, advocate a more relational and contextualized approach that examines how people develop attunements to cognitive resources (e.g., Resnick, 1994). This requires an analysis of what "people *do* every day to get their work done" (Orlikowski, 2002: 249, emphasis in original). Attunement refers to how people notice the information that specific resources offer and then use this contextualized information (Barab and Plucker, 2002). It is similar to the notion of information processing that underlies traditional conceptions of expertise, but it focuses relatively more on the ongoing interactions between people and resources, in addition to the manipulation of mentally represented symbols. The attunement construct is useful in exploring how newcomers learn to bring together diverse cognitive resources to complete tasks and develop expertise, including but not limited to a person's concepts.

Organization members can use resources more or less adaptively in attunement. In using a spreadsheet, for example, an employee can either (1) notice and act on the cues that the spreadsheet offers at each turn during the task—an instance of adaptive attunement—or (2) become distracted and ignore these potential resources, constituting an instance of maladaptive attunement. Existing research has provided snapshots of attunements, including the psychological dynamics of adaptive and maladaptive patterns (e.g., Diener and Dweck, 1978, 1980; Dweck and Leggett, 1988), and explained the more relational and contextualized type of expertise involved, compared with traditional notions of expertise (e.g., Weick and Roberts, 1993; Weick, 1998). Given the complex relationship between individual and organizational cognition, attunements are likely to change over time as individual cognition changes, and organizations will influence this change.

The contextualized approach of distributed cognition implies, however, that cognitive change cannot be studied solely in terms of how people develop attunements. As Markus, Kitayama, and Heiman (1996: 867) noted, "The person and

the social context are seen as constituting one another," and "the acquisition of skills and the opportunity to express or affirm these skills is a critical part of being a person or constructing [a self]." Because cognitive change is inseparable from change in self, the two must be studied together (Lave and Wenger, 1991). Cognitive and organizational theories have examined changes in the self-concept (e.g., Higgins, Loeb, and Ruble, 1995; Ibarra, 1999; Pratt, 2000), defined as a mental representation of one's attributes, skills, beliefs, interpersonal relations, and group memberships (Markus and Wurf, 1987; Linville and Carlston, 1994). This study, however, relies on distributed cognition research's broader conceptualization of the self, which also considers people's more fundamental, implicit theories of what it means to be a self and of how a self relates to a situation (Markus, Kitayama, and Heiman, 1996; Packer and Goicoechea, 2000). For example, a person can implicitly construe the self in terms of traits, which are relatively stable inner causes that endure across different situations (Alston, 1975; Ruble and Dweck, 1995). Alternatively, a person can construe the self in more contextualized terms, which means that one experiences the self as varying across time and situational contexts (Markus, 1977; Chiu, Hong, and Dweck, 1997). These different types of self can influence cognition differently (e.g., Wegener and Petty, 1998; Morris, Ames, and Knowles, 2001; Molden and Dweck, 2006) and will be reflected in cognitive changes over time in an organizational context. As recommended by Bauer, Morrison, and Callister (1998) and Adkins (1995), I began measurement when participants entered the organization to accurately assess the organization's influence. Understanding cognitive change is not a separate "developmental" concern but has to form the "very base" (Vygotsky, 1978: 65) of cognitive research: "it is possible to understand . . . mental processes only by understanding . . . the transitions they undergo" (Wertsch, 1991: 87).

METHODS

Research Sites

The two banks I studied, which I refer to as Amp Bank and Red Bank, are two investment banking departments in different banks that I chose to examine in more depth following a one-year study. That study, which was in addition to the two-year ethnography reported here, also included 12 other professional service firms. All firms were located in a major financial center. The preliminary study consisted of 84 interviews with professionals at all levels and 48 days of observation. Numerous informants commented on how Amp Bank "created constant uncertainty" and "tried to keep bankers alert." I chose Red Bank for maximum contrast. Among the organizations in my sample, it most strongly emphasized uncertainty reduction. For instance, one industry analyst said about Red Bank, "They are the epitome of the superstar culture. They can't use Amp Bank's creative chaos strategy. They are all about creating certainty so that bankers can command authority." Also, informants at one bank often used the other as a contrast. For example, the Red Bankers said things like, "I don't buy into Amp Bank's management-by-confusion strategy," while the Amp Bankers sneered at the

Red Bank experts, who were "frequently wrong but never in doubt." Selecting banks for maximum contrast on the independent variable (the banks' practices) was likely to produce more salient differences in the dependent variables, namely, organizational and bankers' cognition (Eisenhardt, 1989b).

Red Bank and Amp Bank were comparable on dimensions that could influence cognition. Both had comparable numbers and types of employees (more than 60 bankers each), tasks (financial advisory services), and remuneration structure (base salary plus performance-contingent bonus). They targeted the same type of client (Fortune 500 companies) and often competed for the same deals. Both were about equally successful, as judged by their standing in the league tables, which rank departments according to the number and size of completed deals. Because the banks competed for personnel, each bank matched the other's total compensation for comparably senior and successful bankers. The banks had similar hiring criteria and practices. Some of the bankers I studied had offers from both banks. The banks' internal statistics showed that a bank won over a contested recruit when it established contact first and could build loyalty. For instance, a recruiter at Red Bank said, "I always try to be the first on campus with information sessions and interviews because the most desirable candidates have competing offers and usually go with the bank they met first." This suggests that systematic sources of selecting bankers and of self-selection into the banks, such as perceived cultural fit, were less important than timing.

Participants

At both banks, I followed all the associates who entered the banks at the beginning of my observation period. Each cohort had an approximately equal number of male and female associates and consisted of more than 15 bankers. Concerned with preserving their anonymity, the banks did not allow me to indicate exact cohort sizes. All bankers were recruited from top universities. They were on average 28 years old and generally had a Master's of Business Administration. One Amp Bank associate had a law school degree, another had a medical degree. One Red Bank associate had a law degree. To protect informants' identities, I use pseudonyms in the text below.

Personal Background

Prior to this research, I worked at a Wall Street investment bank for four years, first as an analyst and then as an associate in the mergers and acquisition department, which provided me with the kind of knowledge Resnick, Pontecorvo, and Säljö (1997) deemed essential to studying distributed cognitive processes. I also worked for one year in the bank's training department, where I conducted a survey of the industry's best practices in professional development. The personal connections I gained during this process helped me gain access for the present investigation. My background in banking enabled me to attend client meetings in which bankers justified my presence as a form of quality control. Clients spoke about a bank's service on the understanding that I

would forward this information to the bank only in an aggregated form. I was not paid for my research. My personal experience increased my empathy with informants and positioned me as an in-group member, such that bankers included me in work and sometimes non-work activities and trusted me with private information. Both empathy and social inclusion were crucial for investigating cognitive change processes. As elaborated below, I chose the observer (versus the participant) as my primary research role to maintain the position of the "marginal native" (Freilich, 1970; Hammersley and Atkinson, 1997) to balance deep familiarity with the detachment necessary for intellectualizing the experience.

Data Sources

I used four overlapping data sources: overt participant and non-participant observation (about 7,000 hours); 136 formal, semi-structured interviews; informal interviews with 120 informants; and analysis of company materials. I triangulated the data obtained from these sources to improve the validity of the theory developed (Jick, 1979; Yin, 1984; Eisenhardt, 1989b). Evidence for this triangulation can be found in the data tables.

Participant and non-participant observation. I collected observational data for two years. My most intense participation was during the first year, when I observed between five and seven days a week (80–120 hours), mirroring the bankers' working week. Engeström and Middleton (1998) recommended using observational methods to study people as they repeatedly engage in organizational practices to connect change in thought empirically to task-related actions. To monitor or "shadow" informants continuously, I moved into the cubicles of traveling bankers and took notes on what the banker next to me said and did. On a chart, I noted for each banker (1) the field log page numbers on which I had recorded observations, (2) data sources I had used (e.g., continuous monitoring and informal conversations), (3) types of activities, (4) time of observation, and (5) length of observation time. I examined these charts regularly to balance these columns across bankers. I interrupted this sampling procedure to join in internal meetings, phone conversations, social functions, and training sessions.

Investment banking practices are structured around deals. I followed twelve deal teams at Amp Bank and eight deal teams at Red Bank. I asked to be assigned to all the teams that were active at the beginning of my observation period. Because deals can change their activity status or fall apart suddenly, I did not know the total number of active deal teams at any given time. Whenever the opportunity arose, I also observed additional teams of bankers. Being assigned to a team gave me an informal membership status and increased my chances of being included in meetings.

I moved between two research roles: (1) observer as a participant and (2) participant as an observer (Junker, 1960). As an observer, I participated passively in events, merely taking notes. As a participant, I completed such tasks as spreadsheet analyses but still retained the role of an observer in that I took notes on these experiences and reflected on

them. I participated when my informants asked me to. I was able to create a similar mix of my activities in the two banks. Helping my informants further facilitated gaining their trust. Moving between roles also allowed me to collect different types of data about the same phenomenon. For example, as a participant, I could ask detailed questions about work processes that would have been too disruptive coming from an observer. Although my presence could have influenced my informants' behavior, I believe that the bankers' fast-paced and demanding work deflected attention from my research role. These high demands and my almost daily presence over the period of two years would have made it difficult for the bankers to alter their behavior systematically. Also, my informants said that they were often so overwhelmed by their socialization that they found it useful to talk to me because I could relate to their experience. Because they worried about their image with colleagues, they preferred to talk to me because I was obliged to keep information confidential. Together, this suggests that I observed relatively genuine experiences.

Semi-structured, formal interviews. I conducted 136 formal interviews, lasting between 30 and 45 minutes. The banks allowed me to interview each banker formally only once during my observation period. I therefore conducted these interviews during the study's second year, when I had developed clearer categories of themes. I interviewed 60 bankers at Amp Bank and 48 bankers at Red Bank, including the associates I followed, the senior bankers who interacted with these associates and who could explain the extent to which associates exhibited cultural features, and bankers with managerial responsibilities, who could discern broader patterns. In the remaining 28 interviews, I followed up repeatedly with several bankers from the focal deal teams during their free time to avoid breaching my agreement with the banks. For each bank, I included one incoming undergraduate ("analyst"), one incoming associate, and one incumbent vice president (VP) in these repeated interviews. I also repeatedly interviewed one Red Bank director who had started with the bank as an analyst. The Appendix provides the interview protocol. Because the banks did not permit me to tape the interviews, I relied on detailed notes that I wrote during the interview and then completed from memory immediately after each conversation.

Informal interviews. I conducted informal interviews with more than 120 informants, including Amp Bank and Red Bank employees and clients, employees of other investment banks, and industry experts. I selected informants based on the evolving needs of the research. The informal interviews with associates, conducted at least once a month, focused on their learning and change processes.

Documents. I had access to comparable types and quantities of documents at both banks. I gathered relevant administrative materials, including recruiting and training manuals. These documents provided information about the banks' distinct socialization practices. I also studied the associates' work products, which mostly consisted of client presentation books, and the repeated rounds of feedback they received on

these. This feedback gave insight both into the cognitive processes associates used and how these processes changed over time.

Analysis

As I collected data from all the sources, I regularly scanned them for themes. I summarized units of texts with labels that were as broad as possible, preferring my informants' own labels. To qualify as a theme, labels had to be used frequently (Miles and Huberman, 1994) and had to explain dynamics that my informants considered important (Glaser and Strauss, 1967). When I discovered a theme, such as "task-orientation" or "superstars," I focused my research on this theme to formulate a working definition that reflected how my informants were using it. This partly involved asking bankers with whom I was friendly to code data for me and explain their ratings.

I also sorted data by banker. The first step was "local integration" (Weiss, 1994) to facilitate a within-case analysis (Eisenhardt, 1989b). I sorted all the material on a particular banker into one folder. I noted the source of the information (i.e., interview, informal conversations, or observation) to be able to triangulate. After having focused on a theme-based level, this local integration provided a more holistic understanding of an individual's experiences. For each banker, I used diagrams and evidence tables to track cognition on a monthly basis. For a more "inclusive integration" (Weiss, 1994), I compared and contrasted data on a small number of people to formulate a mini-theory of what was going on during a given time. I then investigated other participants in light of these mini-theories.

To understand the data at a more abstract level and to position it in the theoretical literature, I wrote memos about themes and mini-theories (Locke, 2001). I used tables to visually represent evidence from multiple sources and to avoid elaborating a promising theory solely on logical versus empirical grounds (Glaser, 1978). I checked emerging theories with my informants to ensure that these interpretations represented their experiences. Two senior bankers at each bank provided feedback on versions of this article. As recommended by Strauss and Corbin (1996) and Miles and Huberman (1994), I iterated between data and theory until I had an explanation that best accounted for all data. I terminated my observation time once I reached theoretical saturation.

FINDINGS

Both banks believed that it was important to manage their bankers' cognitive uncertainty but did so in different ways. Through practices that included staffing, role definition, feedback, and training, Red Bank reduced cognitive uncertainty, such that bankers experienced it as transient. It conveyed abstract concepts so that bankers could classify situations into general categories, using a deductive form of cognition. Because of this expert knowledge, bankers could work relatively independently, which resulted in an individual-centric form of organizational cognition. To make bankers aware of situational uniqueness, Amp Bank used the same set of prac-

tices to amplify cognitive uncertainty, such that bankers experienced it as persistent. Unsure of how their existing concepts applied to new situations, Amp Bankers had to use inductive cognition and draw on organizational resources to solve problems, which resulted in a collective-centric form of organizational cognition. Despite dramatic differences, both banks' approaches to managing cognitive uncertainty were successful because each type of organizational cognition capitalized on the strengths of and compensated for the weaknesses of the corresponding form of individual cognition. A developmental account shows how individuals came to be the kinds of persons that matched the needs of the organizational cognitive forms into which bankers were socialized.

The Banks' Uncertainty Management Practices

The banks influenced cognitive uncertainty for bankers by structuring differently three important practices: staffing, role definitions, and feedback, as shown in table 1. When asked an open-ended question about factors that were critical for a bank's performance, 34 out of 38 senior Red Bank informants (i.e., VPs, directors, and managing directors, or MDs) mentioned the reduction of cognitive uncertainty. For example, they said that banks fail when bankers "are overwhelmed with the information they get or the tasks they have to do," "aren't given clear goals or directives," and "do not get the training they need to know how to do their job." Red Bank consequently provided bankers with relatively abstract concepts, such as expert knowledge, norms, and goals, to focus the bankers' attention and guide decisions.

When asked the same open-ended question, informants at Amp Bank said that banks fail when "people think of themselves as experts and don't realize that their knowledge doesn't apply to a new situation," "bankers develop these recipes for how to do things and forget that each situation is different," and "people put too much faith into what they think to be true." Out of 42 senior bankers interviewed, 37 made reference to something resembling uncertainty amplification. For example, they said that banks succeed when they can "continuously remind people of how little they know" and "create the 'insecure overachiever,' someone who compulsively doubts what they know all the time." Because Amp

Table 1

Two Approaches to Managing Uncertainty

Practice	Reduce: Red Bank	Amplify: Amp Bank
Staffing	Based on bankers' personal expertise Bankers are "superstars"	Based on bankers' availability Bankers are "fungible"
Roles	Predetermined roles on each deal Titles on business cards Roles associated with specific tasks and behavioral norms	Deemphasize roles No titles on business cards Fluid relation between roles and tasks Norms difficult to infer

Feedback	360-degree feedback with limited number of
	   categories; focus on quantitative information
	Senior bankers: Primarily revenue goals
		Detailed and concrete 360-degree feedback;
		   focus on qualitative information
		Senior bankers: Ongoing feedback, no predeter-
		   mined goals

Bank believed that pre-formed concepts could encourage undue certainty, it deemphasized conveying abstract concepts. But it did not only refrain from reducing uncertainty. It also actively created uncertainty to counteract people's natural tendency to over-rely on abstract concepts, forcing bankers to attend to a comparatively broad range of information without clear guidelines. None of the Red Bank informants mentioned anything resembling uncertainty amplification in their responses, and none of the Amp Bank informants mentioned anything like uncertainty reduction. Table 2 summarizes the evidence for the different practices from the various sources of data.

Table 2

Evidence of Uncertainty Reduction and Uncertainty Amplification Practices

Practices	Formal interviews	Informal interviews	Observation	Documents
		Red Bank: Reduced uncertainty		
Explicit guidelines, abstract concepts, focusing of attention	"The more you help people focus their attention on specific goals, the better their performance." (MD)	"A lot of people look at investment banking and think that it is organic and everything. But there is a lot of structure. . . . One way you notice this structure is if you unintentionally violate it, overstep your bounds to a VP or do the job of an analyst. Those are interesting experiences." (Associate)	Bankers had personal development plans that guided what kinds of deal experiences they sought out.	During VP training, bankers received detailed checklists on how to sell.
	"We emphasize continuity in staffing. We want people to build and capitalize on their expertise." (Director)	"There is freedom in structure. . . . We tell our people what we expect from them—what markets to go into, how much revenue to bring in. And that frees them to worry about what they know best, namely, executing deals." (MD)	When a staffer received a new deal, he or she first checked the computer to see who had relevant deal experience.	Training material was designed to "simplify your daily decisions."
		Amp Bank: Amplified uncertainty		
Withholding guidelines, counteracting abstract concept formation, broadening attention	"Our most catastrophic problems came about because people thought they were the experts. They thought they knew what was going on even though the market had changed. . . . What we do around here has to do with dispelling these illusions." (MD)	"Bankers don't get revenue goals because as soon as you have a goal you start strategizing and lose sight of things. But there was a time when they were intentionally given completely outlandish 'stretch' goals, supposedly to shake up people's thinking about what was possible and even to come to the realization that goals are sometimes not very meaningful in this kind of setting." (Trainer)	Amp Bank decided to discontinue formal banker training because "recipes are dangerous in our business." (Presentation at staff meeting)	Findings from internal study: "It is in the nature of experts to become overconfident. . . . Training and incentives are not sufficient to keep overconfidence in check. . . . Checks must be designed into the work process."
	"One of the reasons why we staff bankers fungibly is to keep them on their toes, to think in fresh ways." (Director)	"Sure, we have leadership. It kind of works by vacuum. People do what needs to get done. And Joe [department head] leaves you alone."(VP)	Bankers stayed at foreign offices "so that they don't take one way of doing things for granted." (MD)	Training focused on inconsistencies: "Make swift, practical decisions and carefully analyze all available information."

Red Bank: Staffing. Bankers at Red Bank worked on projects that matched their expertise. For example, when the bank received a healthcare sell-side mandate, it staffed it with bankers with experience in both the healthcare industry and sell-side assignments. This was an important part of the bank's business model. As one director said, "We sell the knowledge of our superstars." A VP elaborated, "Our pitch books always highlight banker biographies. You get the deal if you have individuals with strong expertise." For instance, one biotech chief executive officer (CEO) called Red Bank after he read an interview with Gary, a biotech expert, and said, "You don't even have to pitch to me. Just tell me that Gary works on this and I'll give you my business." Red Bank's staffing practice reduced cognitive uncertainty because bankers only had to master a limited domain of knowledge. For example, one VP said, "This business is so complex and so dynamic that you just have to specialize. It is impossible for one person to be an expert at more than one small area." A director noted, "The client is buying *my* expertise. I am not only expected to read out of a book that the team has produced. I am supposed to have answers and to speak with confidence and authority. You can only do that if you can draw on a deep knowledge base." The staffing approach thus enhanced bankers' confidence, thereby reducing uncertainty.

Red Bank: Roles. Each banker had a predetermined role on deal teams that depended on the banker's title. As one MD noted, roles reduced cognitive uncertainty because they signaled required courses of actions: "We don't have people telling us what to do. But everyone knows what they are supposed to do on a deal and what they can expect from others because we have explicit roles." One associate explicitly criticized another team member for overstepping the bounds of this rule: "Everything that has to do with managing this deal goes through me, just like everything that has to do with modeling and word-processing automatically ends up with Joe [the analyst]. That's how things work around here. . . . We have a term here for people like Joe, we call them the 'managing analyst.'" As this excerpt illustrates, roles were not only associated with a division of labor but also with behavioral norms. Norms are abstract summaries of appropriate types of behavior in generic types of situations. The associate complained about Joe, who had neglected financial modeling tasks to give advice on how to manage deals, like a managing director. The derogatory term "managing analyst" signified that Joe had not only devoted attention to the wrong tasks but also behaved in an inappropriately presumptuous way. Business cards indicated bankers' titles, and bankers introduced themselves with titles, partly for reasons relating to uncertainty reduction. As a VP explained, "It helps set expectations. Otherwise things can get very disorienting and discouraging—especially for junior bankers—when clients call with requests they can't handle and it makes them feel and look bad when they cannot respond to a client." A senior title invited treatment that corresponded to the banker's status. For instance, one MD said, "The more senior clients think you are, the less often they'll challenge

you." Senior titles thus reduced cognitive uncertainty by pre-empting a client's probing behavior.

Red Bank: Feedback. Bankers were evaluated yearly through a 360-degree feedback process (see Burton, 1998, for detail on a similar process). For each review criterion, such as "diligence," the form provided space for comments and a quantitative scale consisting of three boxes, which were labeled area for development, meets standards, and exceeds standards. One MD commented on the review form:

> I think our competitors are more sophisticated on this. They rank people on more items and make finer distinctions, letting you rate someone on a scale between one and six, for example. Here you either meet the standard or you don't. It's that simple. I think people here are uncomfortable with qualitative assessments. Even with this simple system, you'd think that people take the numbers as a rough guide and look more at what people actually said about a banker. What you find instead is that in review meetings, you hear people make distinctions between someone who averaged 2.7 on an item, as compared to someone who averaged 2.2 on an item, as if this difference reflected some kind of reality.

This quotation evidences Red Bank's orientation toward abstract concepts, such as rating numbers that generalize across the specific situations in which bankers behaved more or less diligently. The review form did not solicit qualitative evidence, which could have provided context-specific detail. It also suggests that bankers recognized the potential problems with such an orientation, which include mistaking a concept for the more complex reality it summarized.

A VP described the structure of the typical review meeting: "They tell you in one sentence each what your strengths and weaknesses are. . . . If there are major problems, they might make suggestions for improvement. For example, some bankers were sent to remedial corporate finance training." A "strength" or "weakness" represents an abstract summary of all the concrete instances in which a banker behaved in a particular way and encouraged bankers to construe their performance in such abstract ways. Most bankers valued this structured process because it reduced the uncertainty that evaluations could induce. For example, one VP said, "I like our system because it does not leave you hanging, letting you figure things out for yourself. You get clear and specific guidance." Even though bankers perceived this guidance as helpful, it was still fairly general in that it did not take the situation of particular bankers into account. For example, associates who scored low on analytic capabilities were given corporate finance training; associates who were lacking certain types of knowledge were told to seek out projects that provided this knowledge.

For senior bankers, however, feedback was less important than the revenue they generated: "People still give you your yearly feedback. It just becomes less important. I would just be stunned to see them fire a major rainmaker just because he wasn't popular. We have lots of big, abrasive egos around here who get away with pissing people off because they bring in revenues" (Red Bank VP). The feedback process at Red Bank reduced uncertainty because bankers were orient-

ed toward relatively few—and, with seniority, increasingly fewer—evaluation categories. Moreover, bankers preferred to construe these categories in quantitative ways, avoiding messy, qualitative data. The situation was different at Amp Bank.

Amp Bank: Staffing. Bankers at Amp Bank were staffed by availability rather than expertise. Clients' requests for a specific banker were usually declined with the comment, "Our bankers are fungible." When one banker went on vacation or was overloaded, other bankers substituted seamlessly. Unexpected substitutions onto unfamiliar projects created persistent uncertainty for bankers at all levels. For instance, one VP said about this staffing practice, "It is truly humbling. You never feel like you have all the answers." In contrast, a Red Bank VP noted that this practice was "unthinkable" at Red Bank: "It just doesn't work that way. You can't replicate what your colleague knows at the drop of the hat." A fourth-year Amp Bank associate explained the cognitive uncertainty that this staffing practice caused in the form of unfamiliar tasks and unclear client expectations:

I have been staffed on this sell-side project. This is the bread and butter of our department and the client probably expects that I have done hundreds of these. But I haven't. . . . So first I need to figure out what needs to get done before the first meeting. . . . I also don't know what to expect from the meeting, what kinds of concerns or objections clients typically have.

This quotation exemplifies how even bankers who had been with the bank for years continued to be placed on projects for which they lacked experience.

Amp Bank's client presentations did not feature bankers' biographies but focused on the bank's resources. This practice often caused uncertainty in the form of contentious interactions with clients, ranging from tough questions about bankers' experience to outright hostility. For example, in one pitch I witnessed, the client's CEO exploded at the young Amp Bank team:

What is this? The high school science project team? I have a grand-daughter who is older than you are. . . . My ass is on the line here and this is the best that you can come up with? You know what this is? [*pointing to a stack of business cards in front of him*]. These are business cards from other bankers I am dealing with [*reading off the name of the bank and the bankers' titles*]: . . . Head of Investment Banking, . . . Head of Sales and Trading, . . . Head of Global Corporate Finance. These banks send in their superstars, their most experienced bankers. I want the same kind of attention from Amp Bank.

The bank's staffing practice meant that bankers often had to deal with situations for which they had not yet formed concepts they could apply, either because they were inexperienced or because the situations were inherently unpredictable.

Amp Bank: Roles. Amp Bank deemphasized roles. Business cards only mentioned bankers' names and contact information; no title was given. Bankers also rarely introduced themselves by title. One VP said, "We don't use titles because they fixate the client on the banker and the banker's status.

What we want the client to focus on are the resources of this organization." A senior associate said, "I don't even know what that means to say 'I am an associate.' That has no information value for the client. All the client wants to know is who is doing what for me." Roles thus were less meaningful at Amp Bank than at Red Bank. Bankers in a comparable role had similar basic tasks at both banks, but those at Amp Bank up to the director level could also be assigned additional tasks that would typically be a more senior banker's responsibility. For example, one associate said, "I sometimes lead small deals, which at other banks is left to VPs." Another associate explained with some exasperation how this more fluid relationship between roles and tasks caused cognitive uncertainty: "I have been here for four years now, and I am still on edge with every new project because the one thing I can count on is that there will be surprises about what I have to do."

Informants at Amp Bank believed that the bank was "a very confusing place to figure out in terms of what the norms are." Associates complained that they could not even find out what constituted acceptable work hours. As one said,

I know that this ain't going to be eight-hour days. But, I mean, can you at least give me some guidelines beyond that? Sometimes people work around the clock for weeks in a row, seven days a week. But then people also sometimes come to work at 1:00 P.M., go to the gym during all hours of the day, sometimes they don't show up at all because they just decided that they had been working too hard and are taking a day off, and then there is this warehouse sale when people are just out the door and come back later with huge shopping bags, walking right by Joe [the head of the department].

When associates asked senior colleagues about norms, such as acceptable work hours, they usually heard that "it all depends on the deal. When there is work, you get it done, if not, get out of here." This answer was unsatisfactory to the associates because it failed to reduce their uncertainty. "They are basically saying, 'You go figure it out for yourself.' So I never really know what to do," complained one associate. This is representative of how norms at Amp Bank prioritized the concrete demands of a specific situation. They differed from the more abstract norms at Red Bank where, for example, bankers followed the norm of staying until 12 every night even when they did not have pressing work.

Amp Bank: Feedback. Amp Bank's 360-degree feedback process emphasized qualitative information, asking bankers to include concrete examples and narratives. The following conversation pertained to a VP's review process:

VP: It mostly consisted of him [a director] reading from what people wrote about me and that's about it.

Researcher: Did he interpret this information for you?

VP: No, that's not the style around here. It's: "here are all the facts you can handle. Deal with it." . . . I had to make sense of this myself.

Researcher: Did you receive a quantitative score?

VP [*laughing*]: God, no! That would make things too easy, wouldn't it?

Researcher: Any suggestions for improvement?
VP: No.

The director thus left it to the VP to process the review information through induction. Bankers often complained about the resulting uncertainty and pressed for "specific takeaways" and "actionable suggestions." One MD's response to such requests is characteristic: "I just don't see the point in creating an illusory world of certainty. People have to learn to be comfortable with incomplete information, to sift through lots of data and figure out for themselves what matters and what doesn't. . . . That's at the heart of being a great banker."

Specific recommendations were also rare, because Amp Bank relied on other feedback mechanisms. For example, while senior bankers at Red Bank were reviewed quarterly against revenue goals, one Amp Bank director listed the many dimensions on which Amp bankers received regular, sometimes weekly, feedback:

Revenues here are important. So you'll hear about that, including what you brought in and what you missed. But we also measure people on a gazillion other dimensions that have to do with cost and that our competitors don't measure people on: how much junior banker time you use up on a deal, the cost of producing client books, including whether you used expensive color copies or not. And then you have to write down on a weekly basis how much time you allocate to different industries and types of projects.

This excerpt illustrates how senior Amp bankers received feedback that was more detailed, more frequent, and encompassed more dimensions than their Red Bank counterparts. Also, the senior Amp bankers did not receive specific goals but were trusted to self-adjust. As an MD explained, "We do not tell people what goals they should achieve because the person closest to the situation knows best what is possible. We just constantly feed people with all available information." This quotation shows how the bank prioritized the inductive gathering of situation-specific information, as opposed to a more deductive application of abstract guidelines to a situation. The chief operating officer (COO) elaborated why the bank refrained from giving bankers guidelines:

Whenever you give people criteria, they work up to them and lose sight of the big picture. If you only reward people for the revenues they bring in by year end, you are bound to create "people eaters." People start allocating resources to deals that could be used more productively on other deals. . . . So you can't make people only focus on one thing and only at one point in time. They have to look at everything and they have to do that constantly. It keeps you on your toes.

This ongoing feedback process amplified uncertainty because bankers had to attend to increasingly more information without explicit decision guidelines. For example, one VP commented, "Sometimes I do wish there was more guidance. Slugging through this stuff can be overwhelming and continues to be a source of endless frustration and even aversion but, hey, it also does its job and keeps everyone from becoming complacent."

Because Red Bank gave its bankers the knowledge they needed to do their job independently, they had less need to draw on other organizational resources, as compared to the Amp Bankers, who were often missing relevant knowledge. These different individual-level cognitive orientations were reflected in distinct organizational cognitive patterns.

Organizational Cognition

Research on distributed cognition suggests that organizations differ in how they disperse cognition; they can rely relatively more on individual or collective cognition (Weick and Roberts, 1993). Also, industry analysts consider these different emphases as one important dimension along which banks differ (e.g., Sorkin, 2006). For example, Evercore Partners, Greenhill, Lazard, and Merrill Lynch follow an individual-centric "superstar" system; Citigroup, Goldman Sachs, and J.P. Morgan Chase exemplify a more collective-centric approach. Red Bank and Amp Bank exhibited contrasting ways of managing uncertainty, which entailed distinct types of organizational cognition. Red Bank was characterized by individual-centric organizational cognition and Amp Bank by collective-centric organizational cognition. Table 3 summarizes the evidence.

Red Bank was concerned about the problem of bounded rationality. Practices that reduced uncertainty prevented individuals from being overloaded with information. This cognitive support made it possible for the bank to use individual-centric organizational cognition. Bankers had to rely on their personal resources. Even though they were supported by organizational resources such as input from other departments, individual bankers were expected to have the answers to a client's situation by drawing on their own knowledge. The detrimental effect of banker attrition is evidence for this individual-centrism. When one superstar left, clients and colleagues often followed because they believed that the bank could not fill the resulting knowledge gap. One associate explained, "When Mike leaves, he takes along a huge chunk of our industry expertise. I do not believe that we can hold our position in the league tables without him." Red Bank sought to counteract at the organizational level the uncertainty it thus unwittingly created. For example, compared with Amp Bank, Red Bank was more likely to offer salary guarantees, perks like big offices, and "impressive sounding titles just to coddle our superstars and make them stay as long as *we* want them to" (Red Bank director).

The Amp bankers were supposed to solve clients' problems by interacting ad hoc with organizational resources. For instance, a director said, "Individual bankers here know that they do not and are not supposed to have all the answers." Because the bank relied less on individual bankers, it was less concerned about bounded rationality. Practices that amplified uncertainty counteracted bankers' tendencies to over-rely on their own resources and encouraged reliance on social resources. One piece of evidence for this collective-centric organizational cognition was that the bank was relatively unaffected by attrition. For example, one client explained, "I have seen how this machine operates. It is

Table 3

Evidence of Individual-centric and Collective-centric Organizational Cognition

Formal interviews	Informal interviews	Observation	Documents
	Red Bank: Individual-centric organizational cognition		
"When the environment is that complex, you cannot rely on an organization. Organizations are simply not agile enough. You need to rely on really smart, brilliant individual minds." (Director)	Frequent reference to individual brains to explain organizational outcomes: "He is the brain behind the derivatives effort."	When two senior bankers left, the bank had to exit a lucrative market and shut down a business group.	Excerpt from strategy report: "Our brand is tied to our superstars. Ask our clients who Red Bank is and they will list some of the most influential bankers in the industry."
"I hate to use clichés. But we hire athletes. Our assets do ride the elevator every night." (Director)	"People here are originals. We attract clients because of our strong personalities." (Associate)	In client meetings, a senior banker stressed personal attributes: "You want me by your side because I am known to fight for the last cent."	When senior bankers left, the financial press speculated about the fate of a given business unit.
	Amp Bank: Collective-centric organizational cognition		
"I can confidently say that this is the only place . . . where it is as natural for people to talk to their colleagues as it is to take the next breath." (Director)	Frequent use of metaphors that portray bankers as merely gathering information for the organization, while thinking is attributed to the organization: "We are the arms and the legs of this organization."	In client meetings, bankers deemphasized bankers' attributes: "Think of it [the deal process] like one of these sausage machines. I think of myself as putting things into the machine . . . which inexorably grinds toward the end. When you hire Amp Bank your deal will get done, independently of what any one of us does or doesn't do."	Excerpt from internal presentation: "We discourage our bankers from talking to the press. . . . We sell the services of an organization, not that of individuals."
"Even very junior bankers can take on very complicated projects because they have access to the firm's resources." (MD)	"In every other place, they tell you to talk to your colleagues or reward you when you do it. Here you don't have any other choice if you want to get the job done." (Director)	On a typical deal, Amp Bank had more frequent brainstorming meetings than Red Bank (average of 4 versus 2). Brainstorming meeting: bankers invited bankers outside the team to give input on a client presentation.	Industry survey showed that clients retained confidence in the bank even when it lost several senior bankers.

more like an ant hill or like a dragon. When one head gets cut off, seven other heads fill that place without a hitch." Similarly, the bank's internal data and an industry survey showed that clients and colleagues rarely followed departing bankers. The differences in organizational cognition at the two banks also affected how junior bankers' cognition changed as they became socialized through their work at the banks.

Change in Bankers' Cognition

The data show that participation in the banks' different practices changed the focal associates' cognition as they learned. In both banks, a distinct cognitive style emerged, evidencing a preference for a particular way of thinking (Kühnen, Hannover, and Schubert, 2001; Molden, Plaks, and Dweck, 2006). As shown in the comparison in table 4, practices began to diverge even in introductory training, affecting the

Table 4

Comparison of Changes in Bankers' Cognition and Self in Two Banks

	Red Bank	Amp Bank
	First six months	
Introductory training	Focus on banker's role Clear categories, detailed behavioral guidelines Defined competence trajectory, linked to roles Designated mentor ("buddy")	Focus on bank's resources Fuzzy, phenomenological information, fewer guidelines Weak link between assignments and competence Bankers needed to find resources
Uncertainty	Transient	Persistent
Self	Trait-based (not used to judge behaviors due to newcomer status)	Trait-based
Cognition	Deductive and trait-oriented Focus on learning	Deductive and trait-oriented Focus on performance of self
Attunement	Mostly adaptive	Mostly maladaptive
	After six months	
Uncertainty	Transient	Persistent
Self	Trait-based	Contextualized
Cognition	Deductive and trait-oriented Focus on performance of self	Inductive and task-oriented Focus on task processes
Attunement	When low cognitive uncertainty: Adaptive When high cognitive uncertainty: Maladaptive	Mostly adaptive

cognitive change processes for junior bankers. The Red bankers developed a deductive cognitive style: they encoded situations and people, including the self, in terms of abstract concepts. Red bankers construed the self in terms of traits and made decisions partly with the goal to be a particular kind of person. After about six months, when the official learning period was over, bankers were supposed to be experts and to deduce solutions from their prior knowledge. This means that bankers were more attuned to their personal mental resources as opposed to social resources; they preferred to rely on their own concepts. When unfamiliar situations exceeded the bankers' prior knowledge, their trait-based self was threatened. The cognitive distraction of this threat disconnected bankers from others and from the unique aspects of situations. It thereby weakened the connections among the bank's resources, further reinforcing individual-centric organizational cognition.

Amp Bank's uncertainty-amplifying practices challenged the trait-based self that bankers exhibited at entry. As a result, the Amp bankers evidenced the same threat-related pattern as the Red bankers, but earlier in the cycle. After about six months, bankers did not experience the self in terms of stable traits (e.g., "I am a merger specialist"), but in more situation-specific or contextualized terms (e.g., "I can help you complete this cash-flow analysis"). Failure therefore did not threaten major aspects of the self. Amp bankers' cognitive style changed from deductive to inductive. They encoded situations and people at a more concrete level with the goal of identifying the most appropriate organizational resources. This heightened attunement to the bank's resources strengthened its collective-centric organizational cognition.

Deductive and inductive cognition. Table 5 summarizes the evidence for the distinct cognitive styles the associates

Table 5

Evidence of Deductive and Inductive Cognition Processes

Processes	Formal interviews	Informal interviews	Observation	Documents
		Red Bank: Deductive cognition		
Abstract encoding, top-down processing	"When you first start out, every deal looks different. But once you get to my level, you see that there are a handful of different deal types and your experience tells you what type of solution goes with what type of deal." (MD)	"For Joe you always have to calculate the following eight ratios on deal comparisons. For Gwen, you only do these six. And for Stuart, he likes these 10. . . . It doesn't matter what the deal is. (Associate)	Deal teams evaluated their leaders depending on how effective their "strategy" and "vision" were.	Analysis of client presentations by 10 senior bankers: Books for the same type of deal were often changed only minimally for a different client, such as updated for new interest rates.
	"Your experience is always the best predictor. Even with something as random as the weather you are best off when you expect that tomorrow is somewhat like today." (VP)	"This place is big on spelling things out for you. On every deal, everyone knows exactly what to do in advance. Not the artful chaos they have at Amp Bank." (Associate)	During client presentations, bankers often guided clients through a presentation book. Clients selected from solutions the bankers brought in, versus inductively influencing these ideas.	Speech at VP training: "Each senior banker has a personal style. You can see this like fingerprints on everything they do. If there is a roomful of people and someone comes up with a solution and I don't see who said it—I can tell you just because I know how each one of them thinks."
		Amp Bank: Inductive cognition		
Concrete encoding, bottom-up processing	"What you think holds true one day can radically change the next. Securities that move together today won't have any connection tomorrow and, instead, completely unrelated securities might move together. You just can't make assumptions." (MD)	"I learned how to listen closely because I had to. . . . When I come out of that client meeting, I have to reproduce this information in exact detail to get the input I need." (Associate)	When clients asked a team for its strategy, the bankers sometimes replied that their strategy was not to have one but to analyze each new event and respond accordingly.	Business plan for a new group said, "Four areas are likely to be profitable. . . . Recommended approach: Enter all four to learn how each works. Extensive data collection. . . . Monthly analysis of data and re-evaluation of actions."
	"This is more like an ant hill. People cluster around market opportunity. . . . And then at some point we looked back and saw: 'Gee, we have a health care strategy.'" (Director)	"The teams are dynamic as hell. You give them something and they bring you back the right answer for that particular problem at that point in time. No cookie-cutters here." (Amp Bank client)	During client presentations, bankers sometimes came in with rudimentary material (e.g., spreadsheets) and developed solutions from conversations with clients	Analysis of client presentations by 10 senior bankers: Formats and content differed substantively, reflecting situation demands. For example, a poster was used for a client in the media industry, who wanted to see creativity.

developed at the two banks. Red bankers learned to base solutions to new problems on past experience, deductively using abstract encoding and top-down processing, so that "everyone knows exactly what to do." Amp bankers,

however, learned to consider each situation as new and respond accordingly, inductively encoding concrete details of the new situation and using bottom-up processing. As an MD said, "You just can't make assumptions." The training for new associates at Red Bank, in contrast, was designed to increase their experience so that they *could* make assumptions in new situations.

Red Bank: First six months. Red Bank's introductory training lasted for five weeks. Bankers listened to speakers from morning to about six at night. Evenings consisted of social events, such as cocktail parties, dinners, or dancing, during which newcomers mingled with current employees. One Red Bank associate described the training:

We had about eight days in which professors from [local business schools] came in and gave a remedial overview of corporate finance and accounting so that the poets among us could catch up to the finance types. . . . For the rest of the time, we basically listened to different speakers, some junior but mostly senior bankers, who gave us their perspective on what it takes to be a great associate.

As this quotation indicates, introductory training conveyed role-relevant knowledge, including quantitative skills and knowledge about norms. For example, bankers were told that "we have a hard-charging work ethic," that "it just looks bad if you leave at 10 or 11 in the night while everyone else is still there," and that associates should at least stay until midnight. Another associate further described the training: "And then we had people from human resources come in, wagging the finger at us and telling us what we can and cannot spend money on. There are rules for everything, the hotels you stay in, the restaurants you can eat in. I mean, frankly, it got to be a bit ridiculous at times with rules about how much you could spend on wine for your client." Training thus encouraged bankers to recognize general types of situations in which clearly specified types of behaviors were appropriate (e.g., stay at least until midnight), independent of a situation's unique attributes (e.g., whether there is work or not).

On the job, bankers were matched with a "big buddy." Big buddies trained their "little buddies" in the generic types of skills that an associate's role comprised, such as various types of financial analysis. Roles outlined a competence trajectory. Bankers thus knew what they needed to learn and could control their learning. For instance, one associate showed me a list with such tasks as "common stock comparison" and "leveraged buy-out analysis," explaining, "Jeff is my big buddy. On the first day, we sat down and put together a list of all the things I should be learning during the next six months. When I feel that I know how to do something by myself, I cross it off the list. If I am not staffed on deals where I can learn these tasks, Jeff will sit down with me and teach me." Big buddies let associates watch them doing tasks and let associates do increasingly more of the task. One associate commented, "We have a great system for getting people up to speed here. I have never spun my wheels for long." Bankers at Red Bank therefore experi-

enced training as "challenging" but not as confusing or over-whelming.

After about one month on the job, bankers exhibited a trait-based self, which involves implicitly interpreting one's attributes as traits. Associated with a trait-based self are the beliefs that behavior (1) reflects an underlying trait (Nisbett and Ross, 1980; Gilbert and Jones, 1986; Jones, 1990), (2) can be predicted from knowing a person's traits (Kunda and Nisbett, 1986; Ross and Nisbett, 1991), and (3) is consistent across different situations (Kunda and Nisbett, 1986). Bankers first showed more concern for their socially relevant attributes partly because incumbents often teased newcomers. For example, one associate recalled the mockery when he wore an olive-green suit: "Hey, look at Jim. Jim got a job in advertising," and "I'd say he is making a bid for the Frankfurt office." Looking back, Jim said, "Before that, I never really thought that much about what to wear, as long as it is a suit, shirt, and tie and as long as it is clean. I have definitely become more thoughtful since then about how to present myself. In this job you have to think about what your clothes say about you because that is the reality of how people look at you." This excerpt illustrates how bankers learned by experiencing uncertainty as transient. Teasing introduced uncertainty by challenging Jim's functional view of attire. He consequently learned that attire also identifies one as a socially recognizable kind of person and applied this learning to new situations.

Sensitized to self-relevant issues, associates started to talk about how a wide range of choices positioned bankers as possessing socially relevant traits. These choices included how bankers dressed ("Rolex is for traders," "Bankers wear Hermès ties"), how their cubicle looked ("You do want it messy so that people see you are busy. But if it is too cluttered, they'll think you can't handle the work"), and where they ate ("If you don't eat at your desk, you clearly don't have enough to do"). Bankers encoded (Fiske and Taylor, 1991) such choices. These examples illustrate how bankers switched from the inductive encoding of information at the concrete level of the specific activity—"I am eating at my desk"—to encoding it at the level of the underlying traits that motivate the behavior—"Eating at my desk means being a hard-working kind of person." This self-relevant encoding is abstract because it summarizes a person's behavior across diverse solutions.

When uncertainty is transient, people need to exert less cognitive effort over time because they can apply familiar concepts. They consequently have more cognitive capacity for a task that is inherently important to people, namely, drawing self-relevant conclusions. Therefore, when newcomers transition out of uncertainty, they naturally shift toward a self-focus (Ruble, 1994; Higgins, Loeb, and Ruble, 1995). Red Bank facilitated this progression and made it more likely that bankers would experience the self in terms of traits. For example, newcomers who witnessed how clients and colleagues followed departing bankers inferred that bankers possess traits, such as charisma ("He gets the deal because people are just awed by his personality"), that cause organi-

zational outcomes. Bankers thus learned a trait-based construal of persons partly from observing the consequences of the bank's individual-centric organizational cognition. The 360-degree review process also influenced how bankers experienced the self. For example, one associate said,

When I heard about this review and saw the form, I thought "*O-h m-y g-o-d.*" Just the fact that *everyone* you are dealing with gets a chance to say something about you *to your boss.* I think it is only natural for us to obsess about this when we talk to people. I know I do. And they probably want us to. I keep thinking whether this person will now think that I have a "good attitude," "strong interpersonal skills," and whether I have "personal presence."

This excerpt illustrates how the review process caused bankers to take the organization's standpoint on the self. Self-standpoints are one aspect of the self. Similar to the construct of an image, they are defined as a point of view "from which a person can be judged that reflect . . . a set of attitudes, opinions, or values" (Higgins, 1996: 1071). A person can represent and evaluate self-related attributes, such as traits, either from his or her own standpoint or from the perspective of significant others, such as peers or authority figures (cf. Cooley, 1902; Mead, 1932; Moretti and Higgins, 1999).

A trait-based self has implications for cognition. As the last quotation above indicates, bankers thought about their traits during many interactions. When people repeatedly use a concept, such as a trait, and when this concept has important social consequences, it becomes more readily accessible and more psychologically real (Bargh, 1989). After about a month, bankers used their traits to make decisions also in situations that did not necessarily pertain to the self. For example, a junior Red banker said, "When you leave before 10 or 11 [at night], people say things like 'Half a day today?' or 'Thanks for stopping by,' making you feel like a slacker. . . . And I just don't want to be that kind of person." As a director commented on this excerpt, "That's what this place does to you. Whatever you do, the main question in your mind is what this behavior says about who you are."

The previous quote from the junior banker also illustrates how bankers repeatedly engaged in deductive cognition. Bankers could judge their behavior based on how it corresponded to the bank's norms and rules. They did not need to engage with the unique aspects of particular situations. In the example, the banker stayed at work for long hours regardless of whether the situation required it. Wood and Bandura (1989) documented a similar progression. Managers engaged in a simulation first used task-relevant information to make decisions. Once they had transitioned out of their initial uncertainty, they attended relatively more to self-relevant information to make decisions. The same quotation also illustrates how a trait-based self is an instance of deductive cognition, a kind of theory about oneself (Haslam, 2004). Seeing oneself as a socially recognizable person ("a slacker") starts from an abstract, decontextualized representation that summarizes the many concrete instances in which one did or did not exert effort.

During the first six months, the bankers had an official status as newcomers. Even though they formed an image of themselves in terms of socially valued traits and even though they worked hard to live up to this image, they did not use these traits to judge their behavior because they saw themselves as learners and because veterans had relatively low expectations of the associates. For example, one associate explained how she tried to contain readily arising self-judgments: "I just discipline myself. Whenever I catch myself fretting about these things, I just go 'lockbox' and try to think about something else." Another associate said, "At this point, it is too early to tell whether you are a success or a failure. Even if you do everything right, that may just be a fluke." Similarly, another associate pointed out, "When you make a mistake, this really doesn't say anything about *you*. It doesn't mean you are stupid. You are simply learning." The bankers learned this attitude partly from observing how others responded to them. For example, one associate observed that "people hold back on their judgments until the official learning time is over." Because associates believed that even embarrassing mistakes were "recoverable," they felt that "no question is too stupid to be asked." One associate explained, "When I don't know something, I see that as a great opportunity to interact with an expert, a chance to get to know them." Senior Red bankers agreed that most junior bankers "drew vigorously and deftly on the organization's resources," which is evidence of adaptive attunement.

Trait-based and contextualized selves. Table 6 presents the evidence for the development of trait-based and contextualized selves in the two banks, which has implications for the junior bankers' attunement to organizational resources. While Amp Bank fostered development of the contextualized self, emphasizing the task over personality, so that junior bankers had to continue to rely heavily on the expertise of others even after the first six months, Red Bank encouraged junior bankers to develop "big personalities" and their own reputations for expertise. After the first six months, Red bankers began to identify themselves by their traits and areas of expertise, focusing on how their performance was perceived rather than on what they learned. The fear of developing a reputation for "being stupid" caused the junior Red bankers to rely only on their allies for help, not on the person who was most suited to answer a question.

Red Bank: After six months. The associates' experience at Red Bank changed when the official learning period was over. As one associate explained,

. . . the first months are all about soaking everything up. It's literally like learning a new language like what being a banker is all about and how people think and what is important. But now it's showtime. I mean people still cut you slack because you are still learning and stuff, but you know from now on you gotta produce and whatever you do you are developing a reputation.

This excerpt indicates that different cultural beliefs were relevant at this stage. Because colleagues now believed that mistakes allowed inference about a person's traits, associates judged their behavior as evidence for traits. The

Table 6

Evidence of Trait-Based and Contextualized Selves

Self-view	Formal interviews	Informal interviews	Observation	Documents
Red Bank: Trait-based self				
Banker views traits as stable inner causes that motivate behavior across situations, and thus considers traits as important to think about	"I am a merger specialist. And to be good at that, you need to be aggressive, the go-getter type. That's me." (Associate)	"I think that people here worry a lot about who they are. You have to. This place is not called 'the echoing halls' for nothing. Once you have established a reputation, it precedes you wherever you go around here." (VP)	Bankers introduced themselves to clients in terms of their relevant experience and personality traits (e.g., "I am competitive, I don't like to lose").	In performance reviews, bankers described self and others in terms of traits, such as "John is highly intelligent. But he is also shy and does not have the personal presence expected of a banker at his level."
	"People don't have to describe themselves around here. You can see who someone is by the kind of watch they are wearing, how their cubicle looks. Together, all of that does predict behavior pretty accurately." (VP)	"[Head of department] is sitting right behind me while I am working on a deal for him. And I am really freaking out. All I think about is whether he thinks I am too slow because I don't build the spreadsheet fast enough or whether I am ineffective with clients." (Associate)	During one year, analyst performance declined. Bankers did not analyze this decline but simply assumed that it was caused by a "bad hiring year," thus attributing performance to a banker's inner traits.	Press articles referred to the "big personalities" of the bank's superstars, which bankers highlighted during press interviews.
Amp Bank: Contextualized self				
Banker views self as varying across situations and thus considers traits as less important to think about	"I know you are interested in identities. But you just have to accept that people here don't think in these terms. . . . People think of themselves in the context of the deal they are working on and what they have to do next." (Director)	"Hmmm, I think you asked me that question before. What did I say the last time? . . . You just don't have that much opportunity to think about these things [i.e. one's self] around here." (Associate)	Bankers introduced themselves to clients in terms of the specific activities they could complete for a particular client (e.g., "You can rely on me for all buyer contacts").	In performance reviews, bankers described self and others in more contextualized terms, qualifying attributes with reference to specific situations and also using more behavioral (than trait-based formulations). For example, "When Sally was overworked and when the time frame was rushed, she overlooked input from team members."
	"This place pounds the ego out of you. Each deal requires so much more knowledge and insight than one single person can deliver. . . . So my attributes really don't matter that much." (MD)	"This job glues your attention outside of yourself, to what you do. No one cares about who you are. It's just not practical information." (Associate)	To reverse one performance decline, bankers analyzed how they used resources and recommended changing software. Bankers thus viewed performance as tied in with the bank's resources.	Training department material: "Bankers here learn to deemphasize their personalities. . . . Having a personality means that you do something because of who you are—irrespective of the situation."

associate above distinguished between the "learning" goals she held during the first six months and the self-related performance goals ("you gotta produce") that guided cognition thereafter. Trait-based cognition is associated with a focus on the self-relevant (versus task-relevant) implications of performance. When people see the self in trait-based terms, mistakes are more likely to bring into question these relatively enduring aspects of the self and are therefore more threatening. Preoccupied with avoiding threat, bankers thought more about how they performed versus about the means they could bring to the task (cf. Dweck, 1986; Dweck and Leggett, 1988) and indulged in previously suppressed worries. For instance, one associate said, "I sometimes dissect what I said and did for days afterwards, trying to figure out whether I just do not have the sophistication or judgment that I should have."

A trait-oriented cognition has consequences for bankers' awareness and use of resources. When bankers felt confident that they could complete the work, they made effective use of resources. For instance, one associate said, "It might sound paradoxical, but the more I feel that I know what I am doing, the more willing I am to bounce ideas off of others because I won't have to worry about exposing myself." Another associate told me of his eagerness to educate himself: "It does not matter how late I go to bed. Even if I do not go to bed at all, I will read at least two tearsheets [tearsheets contain summary information about a company] every day until I know all the major companies by heart. Clients expect you to know these things." Other bankers read finance books in their spare time. These are instances of adaptive attunement because bankers noticed and assembled the resources needed to perform well. I judged cognitive uncertainty at Red Bank as transient because associates felt that they were prepared for most of their tasks (e.g., "I'd say most of us are up to their job 98 percent of the time, that's how well the system works"; "By this time in the program I can honestly say that I know how to deal with most situations").

Nevertheless, this confidence could be disrupted temporarily. In these instances, bankers exhibited a more maladaptive attunement pattern, in which they were distracted from task-relevant information because they were preoccupied with trait-relevant implications. Adding the label "attunement" to the term "maladaptive pattern" that Dweck and her colleagues used (e.g., Diener and Dweck, 1978, 1980; Dweck and Legett, 1988) focuses on the more relational conceptualizations of cognition. A quote from an associate illustrates the distraction, trait-focus, and impaired task performance associated with a maladaptive attunement pattern:

I was working on this doozy of a deal, a firedrill that had to be done over the weekend, with all those big wigs. Really complicated transaction, completely convoluted financial statements, analyses I hadn't even heard of before. Friday night we had a meeting and they were all there. The head of the department, the head of investment banking, the [client] CEO, CFO. And, you know, this would have been a really interesting meeting. But all I could think about is whether they are going to make me do stuff that I was clueless about and that I

didn't want to look stupid to these guys. And in my mind I kept going through the list of people I could call to help me out, you know, who owes me one. And what I would do if I couldn't get a hold of someone. Should I say that I got sick? Better to lie than to do a shoddy job. And it wouldn't even have been a lie because by that time, I really felt like throwing up.

When cognitive uncertainty was high, self-protective concerns also affected interactions among colleagues. For example, the associate above described how he completed his task with the help of his close friend Chad, versus relying on an expert:

Associate: I couldn't really go to anyone on my team for help because I just didn't want to look weak. In the end, Chad and I locked ourselves into a conference room for 24 hours straight to figure this out between us.

Researcher: Why did you ask Chad? Has he done this kind of deal before?

Associate: No, that's one reason it took us so long. We also had incomplete information. There were some questions I just didn't ask during the meeting. I am the one who is responsible for these analyses. . . . The senior guys don't think through these issues because they rely on me.

This example illustrates how the maladaptive attunement resulted in an indiscriminate use of the bank's most expensive resource, namely, bankers' time. To avoid looking weak, junior bankers exchanged such tips as shortening the presentation books ("Every page is a risk—that's how I see it"), faking computer problems ("I'll just say that I was almost done but then lost all the data"), and coming up with plausible excuses ("If you do something really dumb on one deal, you can always blame it on all the work you are doing on another deal"). In these maladaptive instances, bankers withdrew even further into reliance on their personal resources, including their own efforts and allies, neglecting more effective organization resources. As a result, they weakened the connections among the bank's resources beyond what its individual-centric organizational cognition mandated.

Cognitive uncertainty. The analyses showed that practices at the two banks were based on two different approaches to the cognitive uncertainty that newcomers experienced in organizations. As table 7 shows, Red Bank worked to reduce the new associates' cognitive uncertainty so that they would be able to work independently after the first six months. Amp Bank, in contrast, only increased new associates' uncertainty, socializing them into the organization, where uncertainty persisted at all hierarchical levels. As one VP said, "I often feel as confused as I did when I started out." The difference between the two banks was evident from the beginning of new associates' training. At Amp Bank, where little was done to reduce uncertainty, one associate said, ". . . the introductory training here just sucks."

Amp Bank: First six months. An Amp Bank associate described the bank's introductory training, which also lasted for five weeks: "We only had about five days of corporate finance training and a little bit of introductory accounting. For

Table 7

Evidence of Transient and Persistent Uncertainty

Duration	Formal interviews	Informal interviews	Observation	Documents
		Red Bank: Transient uncertainty		
Bankers experienced uncertainty mainly at entry	"Our system ensures that the initial confusion that everyone has when they start a new job doesn't last for long." (Red Bank trainer)	"Initially there was some uncertainty, like in every job. That's only natural. But I would say that when you hit the six-month mark, most of us know what they should be doing and are also good at doing it." (Associate)	After about six months, when bankers were staffed on a new deal, they often worked independently to create a first draft of a client presentation.	After about six months, most junior bankers had covered most of the topics on their "to learn" list.
	"We are pretty good at ramping up our people quickly. No one likes uncertainty. Also, having clueless junior bankers is just a drain on everyone's time and resources." (VP)	"If I had to rate how uncertain I felt at different stages here, I'd give it about a 6 out of 10 during the first few months. And now, maybe a 3." (Associate after one year)	In a staff meeting, the department head told the group that "almost all of our new colleagues are now up to speed after only half a year of working here."	E-mail feedback from senior Red banker on an early version of the paper: "I think you underemphasize the psychological benefits of feeling like you know what you are doing, which is something that people have here very soon, after only a period of months."
		Amp Bank: Persistent uncertainty		
Bankers experienced uncertainty throughout tenure	"We are not different from anyone else. No one here likes uncertainty. But uncertainty is just a fact that you cannot afford to forget. And this place reminds you all the time." (Director)	"If you ask me, the introductory training here just sucks. . . . I am smart, capable, and highly motivated. The fact that I still don't know how to do my job means that the system here simply doesn't work." (Associate after 4 months)	Even after almost 2 years, associates rarely completed first drafts of client presentations independently. They often had to call others because they were stuck on a problem.	White paper from training department warned that the "high uncertainty that our professionals experience on a continuous basis is unusual by industry standards . . . and is likely to eventually result in attrition. . . . It is likely to damage our ability to attract the strongest talent."
	"Even at my level, I often feel as confused as I did when I first started. . . . I still work on deals that have radically new components." (VP)	"I don't think my uncertainty rating has changed that much since I've started. It's still pretty high." (Associate after one year)	In an internal meeting, bankers discussed the high emotional cost of "all the uncertainty that people experience here on a daily basis."	E-mail feedback from senior Amp banker on early version of paper: "I like the term persistent uncertainty a lot better. Continuous uncertainty sounds like something you can get used to. I like 'persistent' because people can be persistent. The kind of uncertainty we experience here has that kind of agency. It is like an external force, something that controls you, and that you just cannot get rid of."

most of the time, we just had speakers tell us about *their* work." Another associate commented, "I just learned about everyone else's job but mine." Speakers conveyed phenomenological information about their own job and left the junior bankers to infer the implications for the newcomers. For instance, a capital market specialist said, "Imagine you are sitting on a floor with over 300 people. All of us are watching multiple computer screens, talking on the phone, and listening to market updates, all at the same time. So you can imagine that the people on the trading floor have the attention span of gnats, which is something to think about when you need our advice." The junior bankers experienced uncertainty because they had to consider a broad range of sometimes seemingly irrelevant information and because they were not given behavioral guidelines. For example, one associate complained, "Frankly, the whole orientation was more of a *dis*orientation. . . . First, there was just a lot of stuff, in general. . . . And what also made this confusing is that you didn't know what to do with it. . . . I mean the whole time, I just wanted to ask: why are you telling me this? And what does this have to do with my job?" Another associate, who listened to the capital market specialist, wondered afterwards, "I now know that capital markets people are apparently prickly. But I still don't know how to deal with that." When bankers did learn about their role, they often had more responsibility and received fewer guidelines than the Red bankers. For example, a VP told the incoming bankers, "You are trusted to manage effectively an extraordinary amount of the company's and the client's resources." The only guideline he gave the bankers was "Manage these resources as if they were your own."

Many Amp bankers did not have relevant educational background knowledge and therefore felt unprepared at the end of training. Senior bankers readily acknowledged this and tried to diffuse concerns. For example, one VP said, "This is all about getting to know the bank's resources. No one will expect you to know anything when you start." Adding to the newcomers' uncertainty, some were asked to help out on urgent projects while still in training. For example, one junior banker had to complete a complicated leveraged buy-out analysis for the next morning. Instead of benefiting from a mentor's guidance, he had to find his own resources: "I have never done this before. But they just told me to make good use of templates and colleagues and just get it done." News of these incidents spread rapidly among newcomers. Bankers experienced uncertainty because these incidents seemed to contradict explicit statements that no prior knowledge was required ("This is confusing, to say the least. They told us that they didn't expect us to know anything when we start"; "It just doesn't make sense").

Amp Bank's practices discouraged a trait-based self. For example, Amp Bank's availability-based staffing signaled that traits were irrelevant because whatever one banker did not know could be obtained from others. Senior bankers often said things like "What *I* know doesn't matter," and "We are all doing the same thing, drawing on the resources of the organization." This staffing practice made it difficult for

bankers to establish the causal connection between individual traits and organizational outcomes.

The teasing about inappropriate attire or behavior that contributed to the Red bankers' trait-based self occurred less frequently at Amp Bank, partly because casual interactions were less frequent. Associates said they often "cringed" when they saw a peer leisurely approaching their cube because they felt too pressured to "chit chat": "Most of the time I am just running around like a chicken with the head cut off, trying to get everything done in time." Gossip was also actively frowned upon. When junior bankers were caught gossiping, senior bankers said things like "You should be worrying about your work instead," or "These [personal] issues are of no concern here." These experiences prodded bankers to encode information at the level of the task or activity (terms that I use synonymously) and to downplay trait-relevant concerns.

Red bankers could enact their bank's culture early on. In contrast, during their first six months, the Amp Bank associates misunderstood one of its important cultural themes, namely, "task orientation." For instance, one junior banker offered the following as an example of his task orientation: "I had to get this huge spreadsheet done, and I just did it even though I had to stay up three nights in a row and was as sick as a dog. I mean, for the whole night, one minute I was typing, the next minute I threw up blood into my garbage can. . . . But I just wanted to prove myself and show that I can get the task done." The banker used his task performance to establish his traits, such as dedication. The locus of causality was the focal banker; the underlying question was "How will *I* complete tasks?" This suggests that despite the bank's culture, concerns relating to a trait-based self were very much in the foreground for the newcomers. Senior bankers judged the newcomer's behavior as "stupid," "unnecessary," and as "the opposite of task orientation—a pure ego trip. What he doesn't get is that tasks get done by an organization, not by people." Task orientation shifted the locus of causality from the individual banker to a larger social system. As I describe below, for the more task-oriented senior bankers, the focus shifted to "*How* will I complete tasks?"—away from the "I" to the "how."

The junior bankers' lack of experience and training as well as the availability-based staffing made independent work difficult. Yet, as one MD observed, "You can tell them that this is all about making good use of our resources here and, during the first half year or so, they still insist on doing everything by themselves." This quotation evidences the junior bankers' maladaptive attunement. Even though junior bankers were treated as full contributors from their first day on the job, this quotation indicates that they were still seen as novices for the first six months in terms of how they did their work. For instance, senior bankers believed that junior bankers made "a lot of avoidable mistakes" during their first six months. One newcomer, Lara, had stayed up all night to complete a memo. The memo was not a critical component of the deal, and the deadline was not a "hard" one. Yet she felt compelled to get it done independently and in a timely manner

because she "did not want to look stupid." This suggests that Lara viewed her work on the memo with reference to what it said about her underlying traits, such as competence or intelligence. When the VP reviewed the memo the next morning, he found that it was of low quality. He told Lara, "You are trying too hard. You got to be more task-oriented. Don't worry about what I will say or what the client will think about you. Then you are making bad choices. Here, look at this section. Once you made [that decision], the [other section] should have followed by itself. Take one step and then see where it takes you. Have some fun!" The previous quotation illustrates two cognitive patterns. Describing Lara's trait-oriented pattern, the VP believed that the worry about her traits caused her to make bad choices. This relationship is typical of a maladaptive attunement pattern (Diener and Dweck, 1978, 1980). Trying to teach Lara a task-oriented pattern, the VP discouraged her from encoding behavior at the level of the self ("Don't worry about what I will say or what the client will think about you"). Instead, he told her to encode her behavior at the level of the activity, literally pointing toward concrete, situation-specific information ("Here, look at this section") that could guide behavior.

The VP's quotation illustrates a more subtle way in which task orientation entailed a different theory than a trait orientation of the causation of action. Lara had made choices when she should have let the task determine the decisions ("Take one step and see where it takes you"). Other senior bankers also talked about task orientation in terms of "letting the task take over" or "being guided by the task," implying that situational cues and constraints can cause action—to the extent that people notice them. A task orientation implies that cognition is distributed not only across people but also across material resources, such as task structures.

Amp Bank: After six months. The junior Amp bankers' experience changed after about six months, by which time they had learned to use the organization's resources. As one explained it:

You know, I eventually figured it out. This is not about me, it's not about how smart I am. This is about what you can do when you pull extraordinary resources together. I might not know whether the client should sell the business, spin it off, whatever. I might not even be able to do half of the analyses that I am responsible for. But I can still get it done and get it done well every single time because of the resources here.

An associate, Josh, illustrated how he experienced challenging situations differently than before:

Before, I used to have this knot in my stomach in each and every meeting because I was just waiting for someone to ask me something that I was clueless about and worrying about what to say and about losing credibility. . . . Now these are the moments I live for. . . . I ask tons of questions to really understand this client . . . then I literally say it flat out: I don't have the answer for you right now. But we'll get our heads together and make sure you get the best advice possible.

These excerpts illustrate how Amp bankers continued to experience high cognitive uncertainty ("I don't have the

answer"). Yet their experience changed because they became aware of social resources that they could use fungibly with their own resources ("This is about what you can do when you pull extraordinary resources together"). The senior Amp bankers who helped me code the data rated Josh's episode as exemplifying high task orientation and as an effective way of using the bank's resources (adaptive attunement). One VP explained, "I think this is task orientation because it was more important for Josh to solve the client's problems than his [own] ego problems." Josh concentrated relatively more on what to do next—encoding the situation at a concrete, activity-based level ("I ask tons of questions")—than on the trait-based implications of this behavior. He stayed focused on the specific situation to figure out which resource to draw on—an instance of inductive cognition—thereby strengthening organizational resource connections.

Inductive cognition was also evident in the different kind of self that the Amp bankers developed. Red bankers and new Amp bankers answered self-descriptive questions with reference to traits. For example, during his first month, one Amp Bank associate answered, "I'd say I am a go-getter: Hard-working, hopefully intelligent, clearly determined, and also reliable." In contrast, the socialized Amp Bank associates often answered the same questions by qualifying their attributes with the time and the place when they exhibited them: "Just yesterday, I was in a phone conversation and when the VP pushed me on something, I got back way too aggressively." This quotation suggests the development of a more contextualized self (Markus, 1977; Chiu, Hong, and Dweck, 1997). It differs from a trait-based self in that people who exhibit it do "not believe in fixed traits, and instead appear to view behavior as being mediated by more dynamic . . . processes" (Ruble and Dweck, 1995: 128). A contextualized self is an instance of inductive cognition in that it is generated from concrete and situation-specific information (Haberstroh et al., 2002). In contrast to a trait-based self, it is not an abstract concept that people use to interpret behaviors across different situations. The cognitive literature's inductive cognitive style construct, which includes the contextualized self, aptly conceptualizes the Amp bankers' own notion of task orientation.

A contextualized self could explain why, after six months, the Amp bankers felt less vulnerable in situations that previously elicited threat. A contextualized self entails more numerous self-representations because it reflects the diverse contexts in which a person participates. For example, when I asked a VP whether he was aggressive, he answered:

I don't think you can generalize these things. People are more discriminate than that. I might behave in pushy ways when a client is not forthcoming with information or I might not be pushy when I sense that the client is responding to constraints within the organization. I might pound the table in a tough merger negotiation or I might sit back to avoid alienating an ally. It all depends on what exactly is going on [in the situation].

This quotation suggests that the banker construed his self based on numerous particular behaviors that vary across situ-

ations, versus in terms of one generalized attribute. Failure in a particular situation is therefore less threatening because it pertains to a smaller portion of people's overall self than their trait-based self (Ruble and Dweck, 1995; Chiu, Hong, and Dweck, 1997; Dweck, 1999). As a result, individuals who exhibit a contextualized self are less preoccupied with avoiding threat and can focus more on the means they can bring to a task and on the implications for the task, versus on how they perform.

While the Red bankers and the new Amp bankers answered self-descriptive questions quickly and with elaboration, the bankers who exhibited high task orientation often stammered and took a relatively long time to answer these questions. When I probed about these difficulties, most bankers replied along the lines of "I guess I just don't think about these issues [i.e., my own attributes] a lot," and "I don't have the time to reflect on this [i.e., my traits]." People have more difficulty reporting on something (e.g., a trait) the less frequently they activate this trait in memory (Markus, 1980). The bankers' difficulties further suggest that they thought less frequently about their self in terms of decontextualized traits. There are two possible explanations. First, establishing one's traits in a new context requires cognitive effort. Trait-based inference can be disrupted under high cognitive demands—such as Amp Bank's—with the effect that people fall back to a simpler, behaviorally based contextualized self-classification (Ruble and Dweck, 1995). Second, a trait-based self requires goals for impression formation (Ruble and Dweck, 1995). Amp Bankers had fewer incentives to think about traits because they were less important than access to organizational resources. As the analyses showed, the kind of cognition that bankers developed in the two banks also enabled each bank's chosen form of organizational cognition. And although each type of individual cognition was associated with distinct vulnerabilities, the organizational cognition in each bank compensated for these vulnerabilities.

The Interaction between Organizational Cognition and Bankers' Cognition

Red Bank's individual-centric practices minimized the negative effects of the maladaptive pattern that was associated with a trait-based self. Because bankers were trained extensively and staffed on familiar types of client situations, they encountered situations that exceeded their abilities less frequently than did Amp bankers. Consequently, maladaptive reactions were less likely. Like the Amp bankers, the Red bankers were supported by organizational resources, such as input from other departments. But while the Amp bankers had to solicit much of this input ad hoc, the Red bankers sought this input as part of a formalized routine. For example, one Red Bank VP explained, "There is a routine you have to go through for each type of deal. When you work on a sell-side assignment, you first have to meet with the research analyst. . . . Then you have to talk to people in capital markets and on the syndicate desk." Because this input seeking was formalized, it did not reflect negatively on the input-seeking banker—it did not indicate that the banker did not know something that he or she was supposed to know but simply

meant that the banker was doing his or her job. This formalization thus made it less likely that the bankers' maladaptive pattern would prevent crucial interactions. Finally, some of the negative effects of the trait-based self were interpreted away or even turned into positives. Even when bankers were absent-minded or defensive in meetings, this was often written off as part and parcel of the flamboyant superstar personality. For example, in one client meeting, a senior Red banker did not know the answer to a client's question and told the client with irritation, "This line of questioning is just irrelevant here. Let's get back on track." Though the banker's colleagues believed this response was a "judgment error," the client said, "Well, he can afford the ego. After all, he is *Stewart Mayer.*"

The vulnerabilities resulting from a trait-based self were costly at Amp Bank in that they weakened the resource connections on which the bank relied. A contextualized self is not associated with a maladaptive pattern (Ruble and Dweck, 1995) but rather with a heightened sensitivity to the context (cf. Haberstroh et al., 2002). Instead of leading to a focus on self-judgment, it leads to a focus on aspects that mediate performance, such as problem-solving strategies and help from others (Chiu, Hong, and Dweck, 1997), which enabled the bank's collective-centric organizational cognition. The Amp bankers' inductive cognition also led to vulnerabilities. For example, it could invite a "halo effect" (Cooper, 1981), which means that individuals let highly salient information dominate and cut short their information processing. I observed this effect sometimes when bankers briefed peers on advice to clients that they were about to give and when the group directed the bankers to speak to more people or to conduct further analyses before talking to the client. This example illustrates how Amp Bank's collective-centric organizational cognition counteracted the halo effect because it functioned as a socially distributed triangulation process (cf. Hutchins, 1991; Hardin and Higgins, 1996). It meant that more people got involved to look at the same situation but from a slightly different perspective. Through comparing and contrasting different perspectives, bankers could discard unreliable or invalid information and establish valid higher-order patterns from concrete information. As one Amp Bank VP explained, "We get input from others to see whether they see the same facts and interpret them in the same way. . . . In a business as complex as ours, there is just too much noise to do it any other way. . . . [There is no other way] to make sure that what you are acting on is a trend, not a fluke." These highly developed connections also came at a cost. They required bankers to talk a lot to one another, thereby drawing heavily on the bank's most valuable resource, bankers' time. Amp Bank's system partly compensated for that high cost. Because the bank could staff its bankers fungibly, it could leverage resources more than Red Bank.

DISCUSSION

This paper is the first to examine uncertainty amplification and its cognitive effects, contrasting it with the notion of uncertainty reduction that the organizational literature has

taken for granted. The findings indicate that there is no one best way to manage uncertainty. The two banks managed uncertainty differently to achieve distinct cognitive outcomes. Red Bank reduced cognitive uncertainty, such that bankers experienced it as transient. It conveyed abstract concepts to simplify decision making so that bankers could solve problems independently using deduction. These findings support well-known ideas by the Carnegie School and socialization research, but studying diverse ways of managing uncertainty brought to light different cognitive processes that are difficult to account for with existing frameworks. To highlight situational uniqueness, Amp Bank amplified cognitive uncertainty, such that bankers experienced it as persistent. Because demands exceeded individuals' cognitive capacity, bankers had to use organizational resources to solve problems inductively. Studying cognitive change from a distributed cognition perspective helps clarify the results from both banks. It yields new ways of conceptualizing the relationship between individual and organizational cognition, with significant implications for future research.

A Distributed Cognition Model of Social Cognitive Change Processes

Figure 1 summarizes the grounded theory model derived from the data. The model suggests that each way of managing uncertainty is associated with distinct organizational practices as well as social cognitive processes and outcomes. The theory outlines how organizational uncertainty management practices influence the two fundamental aspects of individual cognition: (1) information processing, which I conceptualized here as attunement, and (2) encoding (Fiske and Taylor, 1991). In contrast to the decontextualized treatment in traditional cognitive theory, the model posits that individual cognition cannot be understood apart from the particular organizational cognition context in which it is situated. It specifies how different types of individual and organizational cognition are interrelated.

The results at Red Bank show how practices that reduce cognitive uncertainty convey the abstract knowledge participants need to master role-related tasks. The socialization literature also focuses on how organizations convey such concepts (e.g., Morrison, 1993; Chao et al., 1994). These practices attune participants to their personal resources as they use internalized knowledge to approach situations. Using knowledge in this way is how the Carnegie School conceptualizes expertise (e.g., Newell and Simon, 1972; Simon, 1991) and how individuals enable the individual-centric form of organizational cognition associated with expert cultures. By making abstract concepts salient for encoding, uncertainty-reduction practices promote a deductive cognitive style. Because abstract concepts help classify new situations in familiar terms, participants experience cognitive uncertainty as transient. This progression toward deduction and reduced uncertainty has been described in the cognitive literature on life shifts and the organizational socialization literature. Yet the Amp Bank data illustrate that this is not the only way in which cognition can change. Organizations can also amplify uncertainty by withholding abstract concepts and

Figure 1. A distributed cognition model of social cognitive change processes.
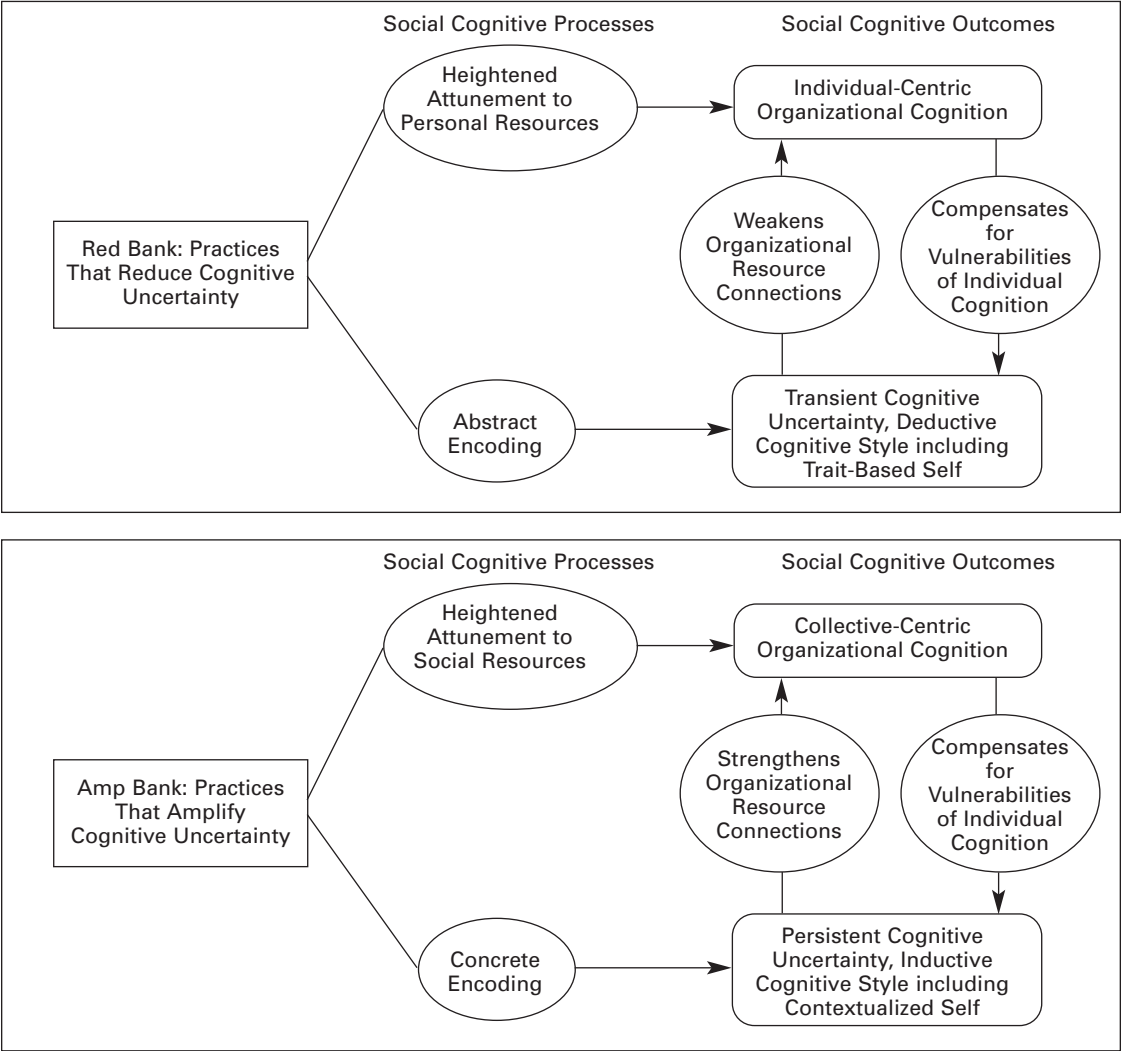
even counteracting their formation. These practices attune overwhelmed participants to the social resources available for mastering daily tasks and thus enable a collective-centric form of organizational cognition. Similarly, Hargadon and Sutton (1997) and Sutton and Hargadon (1996) described how IDEO designers drew on colleagues and material objects to design types of objects with which they had no prior experience. Without abstract frameworks to classify new situations, participants encode situations in the more concrete terms characteristic of an inductive cognitive style. Because participants cannot classify new situations in familiar terms, they experience cognitive uncertainty as persistent.

When organization theories assume that individual cognition is deductive, they usually also assume that organizational cognition is individual-centric (e.g., Simon, 1991), an association that is supported but also qualified by the model. The findings at Red Bank suggest that deductive individual cognition and individual-centric organizational cognition are mutually reinforcing. Deductive cognition is relatively prone to maladaptive attunement that weakens the connection among

organizational resources and increases individual-centric organizational cognition. Individual-centric organizational cognition compensates for the vulnerabilities of deductive cognition and thereby makes it possible for an organization to rely on the deductive cognitive style that is typical of individual-based expertise (Nanda, 2005). The model qualifies these results by suggesting that deductive individual cognition and individual-centric organizational cognition are not a given but an accomplishment: the Amp Bank data on inductive individual cognition and collective-centric organizational cognition show that there is empirical variance in cognition. The data indicate that inductive individual cognition and collective-centric organizational cognition are mutually reinforcing. Inductive cognition strengthens organizational resource connections and thus supports collective-centric organizational cognition. Collective-centric organizational cognition compensates for the vulnerabilities of inductive cognition and makes it possible for the organization to rely on the inductive cognitive style that is typical of collective-centric forms of expertise, a notion that I elaborate below. Researchers thus cannot simply make assumptions about cognition but need to assess empirically what form individual and organizational cognition take.

Limitations. This study is limited in several ways. Because the banks had reputations for being relatively individual- versus collective-centric, I cannot completely rule out self-selection of bankers to the banks, despite the similarity in the banks' hiring criteria and practices. Relying on ethnographic notes might have led to recall biases even though the methods were designed to avoid these. Also, the trusting relationship that developed between the informants and me, in which they sometimes treated me as a confidante, could have affected how informants viewed themselves and their role in the firms. I was careful to minimize this effect, for example, by only discussing emerging findings with bankers other than the focal associates. There are also constraints inherent in the nature of the sample and the theory-building approach. First, I examined two extreme cases to achieve salient contrasts in the dependent variables. As a result, it is not clear whether and how organizations blend the different cognitive styles. Examining larger samples with surveys, for example, might help answer this critical question and give insight into the relative prevalence of the two types of uncertainty management in a larger population. Second, investment banks might affect employees in unrepresentatively comprehensive ways. For instance, long work hours limited employees' other social bonds. Similar isolating practices are adopted by "total organizations" (Etzioni, 1975), "total institutions" (Goffman, 1961), and "greedy organizations" (Coser, 1967) and are known to render members unusually susceptible to organizational influence. Other types of organizations consequently need to be studied to establish the boundaries of the model developed here. Most importantly, while a highly context-dependent ethnography can generate detailed descriptions of processes and actors, it cannot claim generalizability or offer authoritative recommendations for practice. Therefore, the theory and its implications must be understood as propositions for future research.

Theoretical Contributions and Future Research

The grounded theory generated in this study contributes to understanding the social cognitive processes and outcomes related to individual cognitive change in organizations in at least five ways: (1) it elaborates the processes of encoding and attunement in socialization; (2) it shows the effect of uncertainty on cognitive styles; (3) it sheds light on the social self in context; (4) it outlines the mutual constitution of individual and organizational cognition; and (5) it develops the notion of collective-centric expertise.

Encoding and attunement. The theory's focus on encoding and attunement contributes to distributed cognition research by providing a currently missing understanding of how novices' cognition changes as they interact with new distributed cognition environments. It outlines the change in fundamental cognitive processes that, according to Van Maanen and Schein (1979), is at the very heart of socialization but that has been neglected as socialization research has focused on "secondary" (Ashford and Taylor, 1990) outcomes such as role stress, job satisfaction, and organizational commitment (Fisher, 1986; Bauer, Morrison, and Callister, 1998). The model suggests propositions about different mechanisms that organizations can use to change the two basic aspects of cognition. It also extends theories of expertise, learning, managerial cognition, and socialization, which focus on how people internalize social concepts, by specifying how and when encoding and attunement can be controlled externally.

Both banks controlled encoding through a mechanism external to the individual, namely, work practices. Surprisingly, the effect of work practices on individual change—versus on secondary, attitudinal outcomes—has not received much attention in the socialization literature (Bauer, Morrison, and Callister, 1998). Encoding has to be managed externally because it is typically not under an individual's control (Bargh, 1999). The banks could therefore not *tell* bankers how to encode information. Instead, work practices continuously directed their attention toward either concrete or abstract information. The banks differed in how they influenced attunement. Individuals can control attunement (Bargh, 1999). Red Bank could thus transfer control over attunement to bankers. As described by the socialization and traditional cognitive literatures (e.g., Carver and Scheier, 1981, 1990; Chao et al., 1994), Red Bank encouraged the bankers to internalize the bank's concepts and use them to orient their behavior. But the Amp Bank data imply that these prior literatures are incomplete. Amp Bank did not rely solely on the bankers to internalize such notions as "draw on your colleagues." Its practices forced the bankers to draw on colleagues because that was the only way to produce a high-quality product under extreme time pressure. Even when given no choice, however, the bankers initially struggled against the bank's collective-centric culture. Therefore, an external control mechanism was required as a constant restraint on people's tendency to fall back on their own resources even in a context such as Amp Bank, where this tendency was not adaptive.

Future research should further investigate the different dimensions of the material environment that can control cognition externally, such as artifacts and workplace design. While the early Carnegie School tradition has contributed to our understanding of how artifacts can direct attention (Cohen and March, 1974; Pfeffer and Salancik, 1978), subsequent research has neglected their cognitive properties (exceptions include Rafaeli and Pratt, 2006) in favor of symbolic considerations. One could study, for example, whether different reports that employees have to fill out or different types of software cause employees to encode different types of information. Red Bank, for instance, sometimes used software that cued bankers to produce summary financials. For similar tasks, Amp Bank preferred spreadsheet technology that required bankers to build up such summaries from more concrete client data. Amp Bank's workplace design might have facilitated the bankers' attunement to social resources. For example, while Red bankers had offices, Amp bankers sat at long tables, like traders, to facilitate interactions.

Cognitive styles. As a second contribution, this study challenges the assumption in the socialization literature and the cognitive literature on life shifts that participants necessarily experience uncertainty as transient. The data indicate that a progression toward deduction is not inevitable but is a product of specific conditions that have so far been taken for granted, namely, practices that reduce cognitive uncertainty. Traditional cognitive work on implicit theories (Heider, 1958; Dweck, 1999) and lay theories (Ross and Nisbett, 1991) bolsters the logic on this social cognitive outcome depicted by the model in figure 1. It suggests that when people experience different uncertainty durations, they develop different tacit assumptions about what the world is like and what type of information is useful. When they frequently face transient uncertainty, they experience the world as relatively predictable. They consequently orient themselves toward the enduring—and thus abstract—properties of people and situations, to build taxonomies that aid prediction. This orientation implies a deductive cognitive style. When people face persistent uncertainty, they experience the world as relatively unpredictable. They consequently orient themselves more toward concrete information and processes, to understand unique dynamics (Whitehead, 1938; Chiu, Hong, and Dweck, 1997). This orientation implies an inductive cognitive style. The present investigation extends cognitive theory, showing how organizations can shape these tacit assumptions by how they manage uncertainty.

Social self. Third, this study advances knowledge about the social aspects of the self. Cognitive researchers have examined the trait-based and the contextualized self in a relatively context-free way. They have either studied them in maturing children (Ruble and Dweck, 1995), without attending to contextual influences, or as preexisting in national cultures. The present study expands on this research by tracing how these selves emerge and are maintained in organizations. The grounded theory posits that organizations shape selves not only by causing employees to internalize beliefs and values,

which is the focus of the organizational identity literature (e.g., O'Reilly and Chatman, 1986, 1996), but also by how they structure the activities that people engage in on a daily basis. Moreover, the model explains why different organizations might want to foster different types of selves, a question that has not been explored previously.

Amp Bank cultivated the contextualized self to render employees more context-sensitive. As globalization intensifies and technology changes at an ever faster pace, tasks in organizations are likely to become increasingly dynamic and complex. It is therefore important to understand different ways in which organizations can attain the requisite alertness in employees. For this purpose, future research could compare the contextualized self to the related notion of a social identity, which also enhances context-sensitivity, in terms of cognitive processes and outcomes. The present study provides the basis for specific hypotheses. Like a social identity, the contextualized self is social in that it construes the person in relation to a context. Unlike a social identity, the contextualized self implies that people experience themselves in terms of behaviors and specific situations, versus in terms of social categories that refer to more abstract contexts such as groups or organizations (e.g., "I am a merger banker"). Different types of knowledge structures are likely to have different cognitive properties and outcomes (e.g., Brewer, 1988). Social identities render people sensitive to a context in the sense that one thinks, feels, and acts on behalf of the entity with which one identifies, such as an organization (O'Reilly and Chatman, 1986; Brewer and Gardner, 1996). But because a social identity "summarizes one's general interrelatedness with the world, [it] necessarily removes people from the immediate here and now" (Higgins, 1996: 1078). Given that a contextualized self represents one's interrelatedness with the world in more concrete and situation-specific ways, any removal from the here and now—to the extent that it occurs at all—should be less pronounced.

Furthermore, because social identities represent people in ways that aggregate across situations, they can be readily applied to many different situations. A given social identity is therefore likely to be used more frequently than a particular aspect of a contextualized self. When a social identity, such as "I am a merger banker," is made ready for use in memory, so are the associated behaviors and expectations (Thoits, 1991), such as asking for merger-relevant information. Schemas that are used more frequently are more likely to become applied automatically even when they are not relevant, resulting in decreased sensitivity to the context (Bargh, 1989). In contrast, a contextualized self means that a person does not simply activate and apply a preexisting social self-representation (e.g., "I am a merger banker") but has to inductively construct a new social self-representation (e.g., "I work on this client's project") and thus to continuously consider new, specific expectations and needs (e.g., "This company does not require merger but corporate finance services"). Over time, people might become more practiced at discovering situation-specific uniqueness. The repeated activation of a core set of schemas is also less likely. Moreover,

because the contextualized self is often generated in direct interactions, the relevant needs are likely to be available in concrete detail rather than supplied from memory. As a result, there would be fewer perceptual gaps for people to fill in automatically. Based on this logic, it would be predicted that a contextualized self renders people more sensitive to a specific context than a social identity.

The mutual constitution of individual and organizational cognition. As a fourth contribution, this study leads to a more social conception of cognition. It indicates that what are currently understood as inner mental processes should also be viewed in distributed terms. In contrast to how traditional cognitive psychologists view them, cognitive styles are not merely distinct ways in which a person forms mental representations. Nor are they simply social by virtue of the origin or content of mental concepts. This is the definition of "social" that the organizational literature uses, for example, when distinguishing between personal and social identities. They are social in the more expanded sense preferred by Weick and Roberts (1993): they are different ways in which people engage and interconnect organizational resources. Deductive cognition means that people approach situations with their internalized concepts, prioritizing personal resources over other organizational resources. Deduction is thus an individual-centric form of organizational cognition. Inductive cognition means that an individual approaches situations by first drawing on social resources. Induction is thus a collective-centric form of organizational cognition. Individual cognition cannot be separated from the social system in which it takes place.

This reasoning has implications for how to conceptualize the interrelation in figure 1 between individual and organizational cognition. It would be misleading to interpret this interrelation as an interaction. The notion of an interaction implies that the cognitive properties of one level (e.g., the individual) can be stated independently from the properties of another level (e.g., the organization) to assess variables such as fit (e.g., Chatman, 1989, 1991). In contrast, the data indicate that what a property such as "induction" or "expertise" means depends on the context. In distributed cognition research, this more fundamental interrelation is referred to as "mutual constitution" (e.g., Lave, 2003). The findings lead to propositions about two different types of cognitive contexts, namely, individual-centric and collective-centric, and the ways in which each context alters how a supposedly universally valid cognitive process manifests itself. This insight into the context-induced specialization of cognition, as expertise, is the study's fifth contribution.

Collective-centric expertise. Within an individual-centric context, induction aims at deduction. For example, when the Red bankers entered, they encoded concrete and observable information to formulate abstract concepts. In contrast, in a collective-centric context, induction aims at the situation. For example, after six months, the Amp bankers encoded concrete and observable information, not necessarily to retrieve existing solutions from memory—the bankers often did not know the relevant solution—but to generate solutions

through social interaction. Similarly, the different types of organizational cognition cause participants to hone their expertise in different ways. As a result, expertise manifests itself differently in these different contexts. In an individual-centric context, such as Red Bank, expertise manifests itself as described by traditional cognitive accounts. It involves the accumulation of abstract concepts that facilitates pattern recognition (e.g., Simon, 1991; Ericsson and Lehman, 1996). According to this cognitive miser perspective, experts generate abstract concepts to summarize a surfeit of information. Relevant skills are primarily intra-mental, such as memorization and classification.

Although some researchers believe that this type of expertise also accrues under conditions of persistent uncertainty (e.g., Eisenhardt, 1989a; Eisenhardt and Tabrizi, 1995), others disagree. Weick (1998: 549) argued that people who act effectively under persistent uncertainty do not "solve problems by recognizing patterns." Yet he did not investigate empirically what this different type of expertise consists of, which is one of the present investigation's contributions. The model posits that under conditions of persistent uncertainty, organizations cultivate a collective-centric type of expertise in which the primary resource is not a person's mind but the larger social system. Collective-centric organizations guide participants in suspending the automatic responses that their experience compels and augmenting their personal resources ad hoc with collective resources. In addition to intra-mental skills, collective-centric expertise is also likely to require relational skills, such as listening (Weick, Sutcliffe, and Obstfeld, 1999), that future research should specify.

Collective-centric expertise differs from existing models of distributed decision-making processes, such as transactive memory and group decision making (e.g., Baron, Kerr, and Miller, 1992; Laughlin and Hollingshead, 1995), in that the relevant resources are not a prespecified set of persons with whom the focal individual regularly interacts. The bankers had to discern the best resource from a large and diffuse pool, consisting of hundreds of often unknown employees and outside experts, such as accountants or lawyers. In addition, the relevant set of resources was not limited to people but also included objects and task structures. This means that in the present conceptualization—but not in the transactive memory and group decision-making paradigms—people can also exhibit collective-centric expertise during solitary activities, to the extent that they notice and use task cues.

Finally, this study advances distributed cognition research in important ways. Largely because of its neglect of individual cognition, research on distributed cognition currently lacks empirical building blocks for a truly systemic account of cognition. The present analysis brings individual cognition back into distributed systems in a contextualized way. By empirically demonstrating the mutual constitution of individual and organizational cognition, this article advances our understanding of the systemic aspects of cognition. In contrast to the prior emphasis on snapshots of cognitive systems, my longitudinal approach details how and why different aspects of the system come to fit together over time. In doing so, it

also tells us a great deal about the cognitive uncertainty that newcomers experience in entering new organizations—with their own distinct practices for managing it—and how the novices become different kinds of persons as a result.

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APPENDIX: Sample Questions for Formal Interviews

The specific questions I asked during interviews evolved as I analyzed data and formulated new research questions. In general, my goal was to get answers to as many of the questions below as possible from as many of the bankers I observed as possible. Whatever I could not cover during a formal interview, I tried to cover in informal interviews. The questions were as follows:

1. Please summarize your personal and professional background.

2. What is your role in this organization? What kinds of activities does this entail?

3. Tell me about the organization's socialization processes. What kinds of processes does the organization have in place to convey the knowledge you need to be effective at your job? How effective are these processes?

4. Tell me about your first few months with the organization.

5. What did you learn during these initial months with the organization? How did you learn?

6. Can you describe specific learning situations? What did you think in these situations?

7. Has membership in the organization changed you as a person? In what way? Through what processes or experiences? How do you evaluate this change?

8. How would you describe yourself when you entered the organization? How would you describe yourself at [midpoint of tenure; current point in time]? Can you illustrate your characteristics at each point with an example?

9. How would you describe your knowledge and skills [when you entered the organization; at the midpoint of your tenure; now]?

10. Please describe a situation that you considered successful. Why do you consider it successful? What caused it to be so successful? Can you recall

what you were thinking during this situation? Can you guess what other key participants were thinking during this situation?

11. Please describe a situation that you considered unsuccessful. Why do you consider it unsuccessful? What caused it to be unsuccessful? Can you recall what you were thinking during this situation? Can you guess what other key participants were thinking during this situation? If you could change how this situation was handled, what would you change?

12. What makes an analyst (associate, VP, director, managing director) successful in this organization?

13. How successful do you consider this organization? Why? Against which standard or comparison do you assess its relative success? How would you improve the functioning of this organization?

14. Has the organization's performance changed over time? Why? How do you know?

15. What makes an investment bank, in general, successful? Why do investment banks fail?