DETERMINANTS OF EXECUTIVE BELIEFS: COMPARING FUNCTIONAL CONDITIONING AND SOCIAL INFLUENCE

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Executive beliefs influence strategic decision making in organizations, and thus they ultimately influence organization performance. The factors that might determine upper-echelon executive beliefs, however, have received scant empirical attention; certainly, little is known about their relative influence. In contrast to the oft-asserted influence of functional experiences, our results indicate that beliefs held by upper-echelon executives are better explained with an alternate theoretical model based on social influence. Our pattern of results indicates support for the argument that beliefs are socially reproduced through interaction among executives. Copyright © 1999 John Wiley & Sons, Ltd.

Interest in executive cognition and its impact on strategic processes and outcomes has surged in recent years (cf. D'Aveni and MacMillan, 1990; Hambrick, 1988; Huff, 1990; Priem, 1994; Starbuck and Milliken, 1988; Wiersema and Bantel, 1992). Most researchers contributing to this body of work (e.g., Day and Lord, 1992; Priem, 1994; Thomas, Clark, and Gioia, 1993) take the position that the beliefs held by executives have strong effects on strategic choices and actions.[1] As noted

by Finkelstein and Hambrick (1990), this theoretical position is based to a considerable extent on the work of the Carnegie School theorists (March and Simon, 1958; Cyert and March, 1963), who argued that 'bounded rationality, multiple and conflicting goals, ill-defined options, and varying aspiration levels—and, in turn, actions or inactions—are all derived from the beliefs, knowledge, assumptions, and values that

[1] We note here the reasons behind our assertion that executive beliefs have strong effects on strategic choices and actions. Priem (1994) found that firms with CEOs whose judgment policies are consistent with normative contingency theory will outperform firms with CEOs who employ other decision rules

(adjusted incremental $R^2 = 0.24$). Day and Lord (1992) found that experts (CEOs and other top executives from the machine tools industry) sort strategic problems 50 percent faster than novices (MBA students). Thomas, Clark, and Gioia (1993) found that the interpretation of strategic issues by top managers affected the product/service offerings of their organizations (adjusted $R^2 = 0.09$). Fiol (1989) conducted semiotic analysis of CEO's letters to shareholders to show that firms where CEOs had a weaker conception of external boundaries were more likely to take part in joint ventures than firms where CEOs had a weaker conception of internal or interdivisional boundaries. D'Aveni and MacMillan (1990) showed

decision makers bring into the administrative setting' (Finkelstein and Hambrick, 1990: 485).

The hypothesized effects of executive beliefs on strategic decision processes are supported empirically. Early on, Hage and Dewar (1972) found that executives who believed in the value of change led more innovative organizations. More recently, Narayanan and Fahey (1990) found that executive beliefs concerning which factors might affect sales and profits were different in a successful manufacturing firm than in an unsuccessful manufacturing firm in the same industry. Other recent studies that link beliefs to organizational processes are those of D'Aveni and MacMillan (1990), Day and Lord (1992), Fiol (1989), Gioia and Chittipeddi (1991), Priem (1994), and Walsh, Henderson, and Deighton (1988). With respect to the linking of beliefs to organizational outcomes, and following the argument that demographic attributes are surrogates of beliefs (cf. Finkelstein and Hambrick, 1990; Hambrick and Mason, 1984; Priem, 1994), we note that researchers have found linkages between upper-level managers' demographic attributes and firm performance (Norburn and Birley, 1988; Roth, 1995; Smith *et al.*, 1994), strategic orientation (Chaganti and Sambharya, 1987), innovation (Bantel and Jackson, 1989), diversification strategies (Song, 1982), and decision-making processes (Hitt and Tyler, 1991; Melone, 1994).

In light of the impact of executive beliefs on organizational processes and outcomes, it is important to understand the factors and processes influencing the organization-related beliefs of executives (Walsh, 1995). Factors influencing the beliefs of organizational members have been discussed by some scholars (Ginsberg, 1989; Gray, Bougon, and Donnellon, 1985; Hambrick and

Mason, 1984; Harris, 1994; Sproull, 1981), and more fully articulated and studied empirically by others (Hambrick, Geletkanycz, and Fredrickson, 1993; Hauenstein and Foti, 1989; Ireland *et al.*, 1987; Lurigio and Carroll, 1985; Markoczy, 1997; Narayanan and Fahey, 1990; Stewart and Latham, 1980; Walker, 1985; Walsh, 1988). However, a gap remains in our knowledge regarding the antecedents of the beliefs of executives working in upper-echelon teams, particularly with respect to beliefs concerning the relative efficacy of a broad set of business strategies and goals in achieving organizational effectiveness.

A primary purpose of the present work is to further examine and compare the validity of two sets of arguments about the determinants of executive beliefs regarding factors affecting organizational effectiveness. The first set of arguments concerns whether executives' experiences and responsibilities in functional areas are determinants of these beliefs. Opposing lines of reasoning and contradictory evidence have supported both sides of the controversy concerning whether *functional conditioning* affects executive beliefs (cf. Beyer *et al.*, 1997; Dearborn and Simon, 1958; Houghton and Neubaum, 1994; Lawrence and Lorsch, 1967; Waller, Huber, and Glick, 1995; Walsh, 1988). Given that only one of these studies (Houghton and Neubaum, 1994) directly examined the influence of functional conditioning on executive beliefs, it certainly seems that more research is needed in this area.

The second set of arguments concerning the determinants of beliefs is related to *social influence*, and draws on the logic and literatures of organizational communication (Jablin and Putnam, 1997; McGrath, 1984), network theory (Krackhardt and Kilduff, 1990; Krackhardt and Porter, 1985), socialization (Jablin, 1997; Van Maanen and Schein, 1979), social control (Nemeth and Staw, 1989), and social information processing (Fulk *et al.*, 1987; Salancik and Pfeffer, 1978). These literatures suggest that people form and reproduce their beliefs through interacting with others. Daft and Weick (1984) and Hambrick (1994) suggest that these arguments concerning social influence apply to the context of an upper-echelon team. However, to our knowledge, there are no field studies in these or other literatures that specifically examine the validity of this social influence explanation of upper-echelon executive beliefs. Thus, the ques-

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that the strategic interpretation of issues by top managers is linked to the survival of the firm. Although the latter two studies provide no exact effect sizes due to the nature of their analyses, we interpret them as taking a strong position on the link between executive beliefs and organizational outcomes in the sense that they draw direct causal linkages between the cognitive processes of top managers and outcomes of profound importance for organizations. This position is summarized by Thomas, Shankster, and Mathieu, who state that 'understanding managerial cognition is critical for gaining insight into organizational actions (Dutton, Fahey, and Narayanan, 1983), strategic change (Dutton and Duncan, 1987), organizational learning (Daft and Weick, 1984), and ultimately firm performance (Ginsberg and Venkatraman, 1992)' (Thomas, Shankster, and Mathieu, 1994: 1252).

tion is one of domain: do social processes actually influence the beliefs of executives and, if so, to what degree?

EXPLAINING EXECUTIVE BELIEFS: A COMPARISON OF TWO THEORIES

The term *executive* is given different meanings in the management literature. In this paper we use executive to mean the chief administrative officer of a strategic business unit, the chief operating officer, and all managers who report directly to either of these two executives.

Barnard (1966) describes functions as arising from a division of labor within organizations based on the task to be accomplished, with an emphasis on the end to be accomplished by that task. Following the evolution of organizations into the complex forms that exist today, certain functions are common to most organizations, such that the tasks performed in a particular function in one organization are similar to tasks performed within the same function in other organizations, and different than tasks performed in other functions within the same organization (Chandler, 1990). The evolution of particular functions and the boundaries between those functions can be described in terms of structural isomorphism (DiMaggio and Powell, 1983). Functional areas that are commonly found in business schools and in modern organizations include areas such as: general administration, personnel, production and operations, research and development, finance, accounting, marketing, and sales.

Beliefs are defined here as the understandings about credible relationships between objects, properties, or ideas (Colby, 1973; Sproull, 1981). We examine the *normative beliefs* of executives, which relate to the perceived importance of various business goals, and the *cause–effect beliefs* of executives relating to the efficacy of various business tactics in achieving organizational effectiveness. Normative beliefs relate to how important a particular goal is believed to be. (For example, a normative belief may relate to how important it is for an organization to achieve a large market share, as contrasted with being more profitable with a smaller market share.) In contrast, cause–effect beliefs relate to how strongly a variable is believed to influence another variable. For example, a cause–effect belief may

relate to whether a firm is more likely to achieve long-term effectiveness by pursuing cost advantages over competitors, or by emphasizing new product development. We focus on these two types of beliefs as they have been shown to influence choices made by managers and guide strategic decisions in a business domain (Ford and Hegarty, 1984; Hedberg, Nystrom, and Starbuck, 1976; Hegarty and Sims, 1978; Markoczy, 1997). Moreover, both cause–effect and normative beliefs may be affected similarly by antecedents such as those considered in this study (Markoczy, 1997). Taken together, the cause–effect and normative beliefs that we examine represent the perceived efficacy of various business tactics and operative goals in achieving organizational effectiveness.

Functional conditioning as an explanation for executive beliefs

Of the factors that could influence executive beliefs, none have received more attention than the functional experiences of the executive (cf. Dearborn and Simon, 1958; Hambrick and Mason, 1984; Starbuck and Milliken, 1988; Waller *et al.*, 1995; Walsh, 1988). Consequently, it is the effects of functional experiences that we focus upon first.

Theory and evidence

Psychologists, especially schema theorists such as Fiske and Taylor (1984) and Lord and Foti (1986), emphasize that beliefs develop through experiences; feedback and rewards associated with a given set of experiences amplify the salience of the goals and processes associated with those experiences (Locke and Latham, 1990), leading to the formation of a certain set of beliefs. Evidence from the laboratory supports this line of reasoning. Janis and King (1954) and Watts (1967), for example, found that the roles people play tend to change their beliefs such that their beliefs are consistent with the demands of their roles. Similarly, Cohen and Ebbesen (1979) found that goals that are salient during a task tend to amplify the salience of information relevant to those goals. Thus, it follows that executives working in a functional area are likely to be influenced by information relevant to their functional goals and develop beliefs consistent with their func-

tional roles. Furthermore, because people align their beliefs with those others who are of higher status (Jones and Wortman, 1973; Wortman and Linsenmeier, 1977), or to whom they are accountable (Tetlock, 1983), and accept the validity of acting in ways that are sanctioned by authority figures (Milgram, 1965), their beliefs are likely to be reinforced by peers and authority figures who provide positive feedback and rewards for performing according to functional roles. Thus, the strong implications from these studies are that executives working in a functional area are likely to be influenced by information relevant to their functional goals and to develop beliefs consistent with their functional roles.

A theoretical model that follows from these arguments and experimental evidence is portrayed in Figure 1. Extending this theoretical and experimentally substantiated model to the domain of *executive beliefs* and executive experience, one would hypothesize (as do Hambrick and Mason, 1984, and Starbuck and Milliken, 1988) that executives' *functional background* (i.e., the length of executives' exposure to various functional areas in their previous work histories) and *current functional position* (i.e., the functional area of the current job) are likely to influence executive beliefs and actions. Functional background is likely to influence executive beliefs primarily through exposure over time to issues, such that the greater the length of time spent by executives in a given functional area, the more likely it is that their beliefs will be consistent with the functional goals of that area. Current functional position is more likely to affect executive beliefs by highlighting current organizational issues in that functional area. The effects of functional background and current functional position are likely to operate similarly through *functional conditioning* as shown in Figure 1.

The evidence offered by Dearborn and Simon's (1958) and Lawrence and Lorsch's (1967) well-known works has led many researchers to accept for 30 years that an executive's perceptions of a specific situation are greatly influenced by the executive's functional position. Hambrick and Mason (1984) further reinforced and broadened this view to include beliefs rather than only perceptions as outcomes of functional conditioning, and emphasized functional backgrounds rather than current functional positions as the key factor in shaping perceptions. More recently, Houghton

and Neubaum (1994) investigated the impact of functional conditioning on the beliefs of upper-echelon executives in the hospital industry. They found that medical doctors place more importance on quality and marketplace-reputation beliefs, while financial managers place more importance on financial beliefs than do other managers. Finally, Markoczy (1997) found weak support for the relationship between functional background and managerial beliefs, although her study did not clarify the direction or nature of that relationship. All of these studies suggest that executive beliefs are likely to be influenced by functional conditioning.

However, the evidence from some recent field studies pertaining to the possible effect of functional conditioning on executive beliefs throws some doubt on this conclusion (Markoczy, 1997). Walsh (1988), for example, found no relationship between functional conditioning and managerial beliefs and perceptions. He concluded that middle- and senior-level managers did not suffer from the 'impoverished world views or parochial information use' (Walsh, 1988: 887) associated with Dearborn and Simon's (1958) 'selective perception' or with the unique 'orientation' towards time, goals, and colleagues that Lawrence and Lorsch (1967) found associated with members of different functional subsystems. More recently, Beyer *et al.*, (1997) found no support for the relationship between functional background and managerial beliefs, although their data did suggest that managers suffer from 'selective imperception', where managers' experiences in a particular functional area direct their attention away from problems and information in other functional areas. Finally, Waller *et al.* (1995) found no support for the idea that chief executive officers' and chief operating officers' attention to different sectors of their organizations' environments was affected by their functional backgrounds. Waller *et al.* (1995) did find, however, that the executives' functional backgrounds were associated with their attention to different measures of organizational effectiveness. Overall, these studies cast doubt on the idea that functional conditioning influences managerial beliefs, and present mixed evidence for a relationship between functional conditioning and managerial perceptions.

Given the conflicting results of the field studies cited above, the effects of functional conditioning on executive beliefs require further investigation.
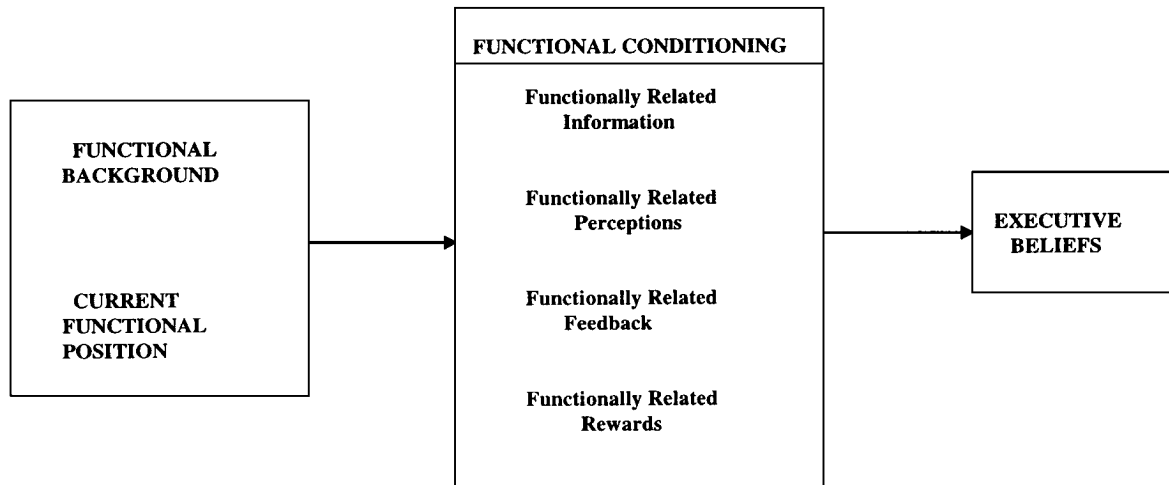
Figure 1. Effects of functional conditioning on beliefs of upper-echelon executives

The current study provides two contributions to this research. First, we study the effects of functional conditioning on the beliefs of upper-echelon executives in multiple industries, thereby increasing the generalizability of the findings. Secondly, rather than measuring only current position (as did Dearborn and Simon, 1958; Lawrence and Lorsch, 1967; and Walsh, 1988) or measuring only functional background (as did Houghton and Neubaum, 1994; Markoczy, 1997; and Waller *et al.*, 1995), we investigate the effects of both functional background and current functional position on executive beliefs, as theory suggests that both are important. Further, our study is positioned to test the relative importance of the two.

Overall, the literature concerning the effect of functional conditioning on executive beliefs is equivocal. Because we wished to avoid stating null hypotheses, and because our views going into this study were heavily influenced by the psychological theory noted earlier and by the thinking of the management theorists who have argued that functional background and current functional position do affect executive beliefs (Hambrick and Mason, 1984; Starbuck and Milliken, 1988), we hypothesized that

Hypothesis 1: The beliefs of an upper-echelon executive are related to his/her functional background.

Hypothesis 2: The beliefs of an upper-echelon executive are related to his/her current functional position.

A possible explanation for the equivocality of prior results concerning the influence of functional conditioning in field settings is model misspecification, such as the omission of one or more influential factors from the theoretical model. None of the previous studies examining the influence of functional conditioning on beliefs examined the influence of any other explanatory variables on beliefs. Beyer *et al.* (1997) suggested contextual reasons for why previous studies were equivocal regarding this relationship, but their data did not support the contextual effects. Our suggestion is that factors beyond functional conditioning need to be included in any model aimed at examining executive beliefs, so that the contribution of functional conditioning to the model is more accurately portrayed. Consequently, in the research reported here, we compared the explanatory power of the familiar but controversial functional conditioning model with the explanatory power of an alternative model, a *social influence* model that reflects the overlapping social processes of communication, socialization, and social information processing.

Social influence as an explanation for executive beliefs

In our development of a social influence model to explain executive beliefs, we first consider the

direct effect of the beliefs of other members of the upper-echelon team. Then we consider the effects of possible moderators of this direct effect.

Beliefs of other upper-echelon team members

A variety of theoretical arguments pertain to the interpersonal transmission of beliefs. As social information-processing theorists (e.g., Salancik and Pfeffer, 1978) have emphasized, the beliefs of one's associates are especially likely to have strong effects in ambiguous arenas such as those typically occupied by upper-echelon executives. In addition to this transmission of existing beliefs, beliefs are also socially influenced through shared sense-making processes (Gioia, 1986; Louis, 1980) that involve developing an understanding of shared ambiguous events through interactions with other team members (Daft and Weick, 1984; Krackhardt and Kilduff, 1990; Weick, 1995). Executives might also influence each other through their behavior or through other nonverbal modes of communication (Falcione, Sussman, and Herden, 1987). For example, by choosing not to attend a particular meeting, an executive may inform other executives that he or she does not place much value on the topics to be discussed. In summary, several theoretical perspectives suggest that through social actions and communication each executive on an upper-echelon team can be viewed as a *focal executive* whose beliefs are influenced by the *beliefs of other upper-echelon team members*. Because each executive is a focal executive, these social influence processes are assumed to be reciprocal among the upper-echelon team members.

Experimental evidence for the transmission of beliefs among group members has been well established by researchers such as Gordon (1952), McKeachie (1954), and Walker and Heyns (1962). These and other researchers found that group members are likely to influence one another's beliefs through communicating with one another, especially if the group is expected to work together to achieve a common goal (Deutsch and Gerard, 1955; Jones, Wells, and Torrey, 1958; Thibaut and Strickland, 1956). This is particularly likely to be true with regard to topics or issues where the group can act as a reference group (Israel, 1963). It seems reasonable to believe that the upper-echelon team is likely to act as an important reference group for its members.

Evidence from field research is less extensive. Walker (1985) found that employees' positions in a network may influence their orientation towards product goals. Further, Thomas and McDaniel (1990) showed that information processing among top management team members can influence the CEO's interpretation of strategic issues. These studies are consistent with the idea that team members can influence the beliefs of an upper-echelon executive. Drawing on the work of theorists and empiricists such as those just mentioned, an important component of our theoretical model is a causal effect indicating that the beliefs held by an upper-echelon executive are determined in part by the beliefs of other members of the upper-echelon team. The hypothesis that we test is

Hypothesis 3: The beliefs of a focal upper-echelon executive are related to the beliefs of other members of the organization's upper-echelon team.

It is likely that some team members will have a greater influence on focal executive beliefs than others. We investigate the basis for such differential influence by examining *relational demographic characteristics* that are expected to moderate the relationship between the beliefs held by the focal executive and the beliefs of other team members (see Figure 2). That is, we examine relational demographic characteristics as possible moderators of the degree of influence that one executive's beliefs have on the beliefs of another executive.

Relational demographic characteristics

Referent choice theory (Kulik and Ambrose, 1992) suggests that people who are similar to one another are likely to use one another as referents. Similarity-attraction theory (Byrne, 1971) states that people tend to be attracted to those whom they perceive to be similar to themselves, and to be more influenced by similar others than by people perceived to be dissimilar. In general, experimental evidence shows us that sources of communication who are demographically different are also perceived to be different in other respects, such as ideologically (Byrne and Wong, 1962; Stein, Hardyck, and Smith, 1965). Further, the experimental evidence shows consistently that persuasive impact increases with source similarity (Byrne, 1971;
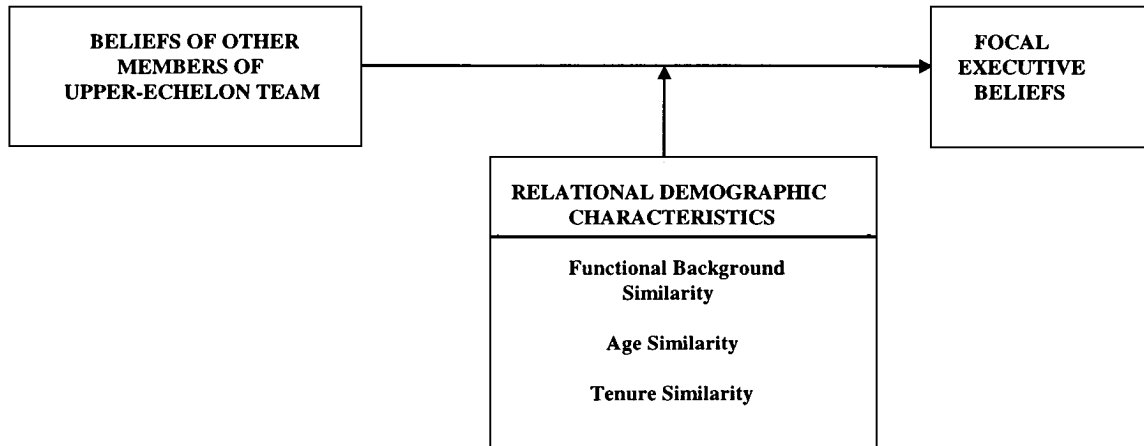
Figure 2.   Social influence effects on focal upper-echelon executive beliefs

Simons, Berkowitz, and Moyer, 1970; Stoneman and Brody, 1981). In particular, people are more influenced by the members of their group who are more similar to them in terms of salient demographic characteristics (Asch, 1952; Crutchfield, 1955; Tuddenham, 1958).

The above experimental studies strongly suggest that members of an upper-echelon team who are similar along certain demographic dimensions will interact more frequently or effectively with one another, and thereby influence one another's beliefs to a greater extent than will other team members who are dissimilar along these dimensions. Similarity along a particular dimension, however, is likely to be relevant only to the extent that that dimension is used by executives to categorize themselves and others (Tsui, Egan, and O'Reilly, 1992). Drawing on the above experimental studies and on relevant theoretical and empirical work (Hambrick *et al.*, 1993; Kanter, 1977; Katz and Kahn, 1978; O'Reilly, Caldwell, and Barnett, 1989; O'Reilly, Snyder, and Boothe, 1993; Smith *et al.*, 1994; Tsui *et al.*, 1992), we argue below that functional background, age, and tenure are salient dimensions along which executives categorize one another. Furthermore, based on the conclusions drawn by the above researchers, we argue that *similarity* on these demographic dimensions tends to influence the attraction and social interaction among executives, and thereby moderates the relative impact of different team members in the social transmittal of beliefs within an upper-echelon team.

As noted above, the differential impact of the

executives belonging to a given upper-echelon team may be related to similarity in functional background between the focal executive and each of the other team members. Executives with similar functional backgrounds might communicate more with one another than with executives having divergent backgrounds, as they may feel that similar backgrounds lead other executives to be more sympathetic to their views regarding organizational matters. *Functional background similarity* may also lead them to pay more attention to one another's behavior to learn what is appropriate. We expect, therefore, that executives with similar functional backgrounds more strongly influence one another's beliefs.

Hypothesis 4:   The strength of the relationship between the beliefs of a focal executive and the beliefs of another executive on the same upper-echelon team is positively related to the similarity of the two executives' functional backgrounds.

Executives of a similar age are likely to perceive that they have similar outlooks due to the similar historical circumstances that formed their environment throughout their lifetime, and due to the similarity of their current nonwork situations, such as the ages of their children (Tsui *et al.*, 1992; Zenger and Lawrence, 1989). *Age similarity* is thus treated by executives as an indication that other executives have encountered similar life experiences and are likely to be in similar stages of their life cycle. This leads them to identify with and interact more with one
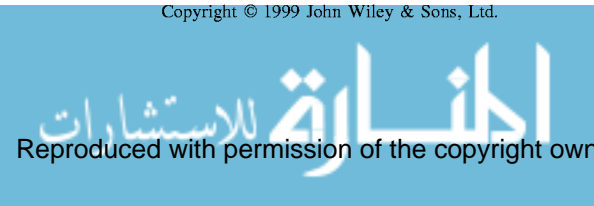
another. Greater age similarity is therefore likely to increase the influence of executives on one another's beliefs through both verbal and nonverbal communication. Accordingly, we hypothesize that

> *Hypothesis 5:   The strength of the relationship between the beliefs of a focal executive and the beliefs of another executive on the same upper-echelon team is positively related to the similarity of the two executives' ages.*

Executives who join the upper-echelon team of an organization at the same time have two options in establishing communication linkages with other team members. They may either attempt to penetrate the deeply entrenched communication networks of incumbents, or set up networks among themselves (Zenger and Lawrence, 1989). The former option disrupts existing networks and is often resisted by the incumbents (Roberts and O'Reilly, 1979). As communication patterns emerge, new team members are more likely to communicate among themselves, and influence one another's beliefs more strongly than executives outside the cohort (Katz and Kahn, 1978). Executives with greater *tenure similarity* on the upper-echelon team are also more likely to discuss and form a common understanding of experiences which occur at the time they are brought into the executive team. These processes result in a positive moderating effect of tenure similarity, leading to stronger relationships between the focal executive's beliefs and the beliefs of another executive when they are more similar in tenure on the upper-echelon team.

> *Hypothesis 6:   The strength of the relationship between the beliefs of a focal executive and the beliefs of another executive on the same upper-echelon team is positively related to the similarity of the two executives' tenures.*

Control variables

The beliefs of upper-echelon executives regarding the efficacy of various business tactics or goals are also likely to be grounded in the objective features of the setting. Thus, it is important to control for features of the setting that could independently influence the beliefs of each executive, causing shared beliefs through processes unrelated

to social information processing (i.e., causing spurious correlations between team member beliefs and focal executive beliefs). With this objective in mind, we introduced several environmental and organizational control variables into the model. These variables were selected based on their relevance to the beliefs we study, as this relevance is reflected in the organization science and strategic management literatures.

At the environmental level, we controlled for *environmental turbulence* and *environmental munificence* and also the degree to which a strategic business unit is autonomous from its parent (henceforth referred to as *SBU autonomy*). At the organizational level, we controlled for the extent to which an organization is functionally or divisionally structured (henceforth referred to as *organization specialization*), *organization size*, and *organizational effectiveness*. In sum, we controlled for these environmental and organizational characteristics to reduce their potential confounding with the effects of beliefs of team members on focal executive beliefs.

Issues of causality

It is important at this juncture to digress for a moment to the matter of causality. With regard to all the hypotheses set forth earlier, the psychological theories concerning the determinants of beliefs that we reviewed were grounded in experimental evidence. In these experiments, causality was rather unambiguous, but generalizability to the domain of upper-echelon executive beliefs was open to question, and still needs to be addressed. Our field study is not longitudinal. Thus we do not assert causality in the hypotheses. Rather, following Aronson and Carlsmith (1968) and Tetlock (1985), we set forth associations that follow from experimental work where causality was unambiguous. This allows us to assess whether our understanding of apparently causal processes isolated in the laboratory can be used to predict relationships in field settings. In a Bayesian sense, field study data consistent with our hypotheses strengthen one's belief in the validity of the causal, theoretical model and its generalizability to the domain of executive beliefs. When we do find correlations consistent with the hypotheses derived from the theoretical model, we employ an approach recommended by Cook and Campbell (1979: Chapter 2) for

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assessing causality. The approach is to develop alternative explanations for the correlations, and assess their validity through argument and reliance on other empirical work. These explanations and arguments appear in the Discussion section.

METHOD

Sample

Because we were interested in developing and testing theory that is generalizable across a broad variety of contexts, the organizations in which we collected data were diverse. The sampling strategy followed two steps. First, a heterogeneous set of 71 industries was identified through the 1989 Compustat II industry-segment data file (Standard and Poor's Compustat Services, 1986). This data set is very representative of moderate to large publicly traded firms subject to Financial Accounting Standards (FASB-SFAS N. 14). It does not include information from privately held firms, or firms that are traded in local or restricted markets. Second, up to 20 strategic business units in each of the 71 industries were randomly selected. The 396 sampled strategic business units were screened during phone interviews to include only those units with at least two levels of management and status as an independent firm, autonomous subsidiary, or autonomous division reporting financial data as a separate business segment following the Financial Accounting Standards (FASB-SFAS N. 14).

The chief administrators (e.g., presidents, general managers, and divisional vice-presidents) of these strategic business units were contacted and asked to participate in the study during 1990. Seventy-nine of the chief administrators (20%) agreed to participate. After the chief administrator had agreed to participate in the study, he or she was asked to 'list the members of the top management team, their titles, and to whom they report'. Surveys were mailed to all these members. Following from the description in the survey instrument, the upper-echelon team is defined here as including the chief administrator, the chief operating officer (if the position existed), and all individuals who report directly to either of these two executives. Eighty-two percent of the upper-echelon team members from the 79 participating organizations completed and returned the surveys.

In order to have enough members from each team to effectively evaluate the effects of team member beliefs on the beliefs of a focal executive, all organizations that had fewer than four returned surveys were dropped. The final sample included 371 executives in 58 strategic business units across 26 industries (at the 2-digit SIC code level), with an average of 6.4 returned surveys from each upper-echelon team.

Measures and Variables

Executive beliefs

Two types of beliefs—normative and cause–effect (Sproull, 1981)—were examined using an instrument similar to the one used by Beyer *et al* (1997). Seventeen normative beliefs were measured by asking each executive to rate the importance of 17 operative goals from Quinn and Rohrbaugh's (1983) competing values model of effectiveness. Twenty-two cause–effect beliefs were measured by asking each executive to rate how positively or negatively each of 22 business tactics would influence long-term profitability. The 22 tactics were taken from the work of Porter (1980) and Robinson and Pearce (1988). These 39 belief variables concerning the efficacy of goals and business tactics were then factor analyzed to reduce the pool of items to a conceptually manageable and empirically defensible set of six dimensions. These dimensions are described in more detail in the next section. Thus, *focal executive beliefs* are operationalized as the executive's scores on the six belief dimensions. A high score on a particular belief dimension indicates high perceived efficacy for the goals/tactics underlying that dimension, while a low score indicates low or negative perceived efficacy. In predicting focal executive belief scores, separate regression analyses were used for each of the six belief dimensions.

Beliefs of other upper-echelon team members are operationalized as the belief scores of all upper-echelon team members *excluding* the focal executive's on the six belief dimensions. Please note that each executive in turn is considered to be the focal executive while all other upper-echelon team members are considered as nonfocal executives. Thus, each executive is both a focal executive and a team member for each of his or her team members at different points in the

model. We therefore account for each executive's influence on all other executives at some point in the model.

In estimating the impact of team member beliefs on the beliefs of the focal executive, we chose not to enter a separate regression term for each of the other team members and thereby separately estimate the impact of each executive's beliefs on focal executive beliefs; rather, we averaged across the beliefs of all team members excluding the focal executive for a given belief dimension and entered the average in the regression. Averaging across team members is based on the theoretical premise that the focal executive is equally influenced by all other executives—*except as otherwise specified by the moderator variables in the theoretical model* (e.g., executives similar in age have a greater impact). This approach allows us to estimate the average effect of the beliefs of other team members, reduces the number of parameters estimated—thereby increasing the power of the tests—and weights all other executives equally. We seek, and attempt to explain, any differential influence among executives with the moderators introduced in Hypotheses 4 through 6.[2]

Executive demographic characteristics

Functional background was assessed as the number of years the executive had spent in each of eight major functional areas: general adminis-

tration,[3] personnel, production and operations, research and development, finance, accounting, marketing, and sales. Thus, eight separate functional background indicators were used in our analyses with each indicator representing the number of years in a functional area. *Current functional position* was coded into the same eight categories by two independent raters who coded the job titles of executives using standardized coding instructions. As all the organizations were independent SBUs, almost all executives in our sample were in charge of a single functional area unless they were in the role of CEO or COO. *Age* and *tenure within the upper-echelon team* were each assessed with direct, single item questions.

Relational demographic characteristics

The executive demographic characteristics were used to calculate all of the relational demographic variables: *functional background similarity*, *age similarity*, and *tenure similarity*. The Euclidean distance formulas for calculating each of these similarity indices and associated interaction terms are described in the Appendix.

Control variables

Environmental munificence and *turbulence* were assessed archivally using procedures specified by Dess and Beard (1984) and Wholey and Brittain (1989). These frequently used procedures (e.g., Keats and Hitt, 1988) involve using time-series regression to predict outcomes such as sales and income from one time period to the next. In our case, sales, capital expenditures, and assets were predicted on a yearly basis for a 7-year period. For munificence, the regression coefficients are key (see Dess and Beard, 1984), while for turbulence the standard errors and R^2s are key (see Wholey and Brittain, 1989). The required archival data were collected from the 1989 Compustat II

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[2] For some readers, it is easier to see the mathematical equivalence of these two formulations of regressing focal executive beliefs on the beliefs of other team members. The equation for entering a separate regression term for each member of the upper echelon team can be stated as

Focal Executive Belief = $a + b_1$ (Member$_1$Belief) + b_2 (Member$_2$Belief)

$+ b_3$ (Member$_3$Belief) + b_4 (Member$_4$ Belief)... + b_n (Member$_n$ Belief) + e

If we set $b_1 = b_2 = b_3 = b_4 = \ldots = b_n$ to reflect the assumption that all team members have an equal influence on the focal executive, then this equation reduces to

Focal Executive Belief =

$a + b_1 \left[\sum_{i=1}^{n} (\text{Member}_i \text{ Belief}) / n \right] + e$

which is the same as regressing the focal executive belief on the average belief of all other team members.

[3] Following Beyer *et al.* (1997) and Waller *et al.* (1995), we use the term general administration to refer to the function carried out by executives such as chief executive officers, presidents, and general managers. This function is essentially integrative in nature, pulling together and acting on the disparate viewpoints of executives from other functions such as sales and finance, who often do not have a very complete set of viewpoints, facts, or perspectives, or who of necessity strive for the betterment of one function at the cost of others.

industry-segment data file (Standard and Poor's Compustat Services, 1986). *SBU autonomy* was assessed by asking each executive to indicate their agreement on a 7-point scale regarding the extent to which the firm is run by directives from the parent company (see Child, 1972). *Organizational size* was measured with a question asking for the number of full-time employees in the organization.[4] *Organization specialization* was assessed by asking each executive to indicate their agreement on a seven point scale regarding the extent to which each major subunit in the organization performed tasks that were within a single functional area (see Mintzberg, 1979). *Organizational effectiveness* was assessed by asking each executive to indicate their agreement on a 7-point scale regarding the level of organizational performance in terms of return on assets relative to other firms in the industry (see Dess and Robinson, 1984). For the survey measures of the control variables, the executives were treated as key informants (Seidler, 1974) for their respective organizations. The averages of these measures across an organization's upper-echelon team members were used as estimates of the organization's attributes. Inter-rater reliability statistics were calculated (Shrout and Fleiss, 1979) for these measures, and are reported below.

RESULTS

Instrument development

The 39 belief variables were factor analyzed (see Table 1). Based on (1) a scree plot of the eigenvalues, (2) interpretability of the oblique factor structure, (3) initial communality estimates, and (4) reliability of resulting scales (DeVellis, 1991; Mulaik, 1972), we retained six factors. The initial communality estimates were above 0.3 for

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[4] We also analyzed our data using an alternate measure of size based on the total sales of the SBU. Our sample had a mean sales volume of \$223,327,570 (S.D. = \$552,776,958), and ranged from \$1,750,000 to \$4,001,428,571. This variable was found to be significant ($p<0.05$) for only one of the six belief dimensions, and did not alter our results substantially. The significance levels of four out of 92 tested effects were changed, such that three variables became marginally significant where they had previously been significant at $p<0.05$, while another gained significance from $p<0.01$ to $p<0.001$. Total adjusted R^2 changed 0.01 or less. Since these changes do not affect our conclusions in any meaningful fashion, we concluded that the results are not sensitive to the specific measure of size.

all the retained factors, with the exception of one item in the factor labeled innovation. Further, all factor loadings were above 0.4 with no cross-loadings above 0.3 on any other factor, with the exception of one item in the factor labeled efficiency. A total of 28 of the 39 items were retained.

The factor solution did not directly match traditional business functions represented in business schools, but many of the factors do resemble some of the areas of emphasis discussed by Hambrick and Mason such as product innovation, advertising, and 'throughput functions ... that work at improving the efficiency of the transformation process' (Hambrick and Mason, 1984: 199). More specifically, the *innovation* factor dealt with the perceived efficacy of tactics/goals dealing with innovation in products, services, manufacturing processes, and marketing techniques; the *human resources* factor dealt with the perceived efficacy of goals/tactics dealing with human resources development and communication; the *quality* factor dealt with the perceived efficacy of goals/tactics dealing with the quality of products, services, manufacturing, and marketing processes; the *efficiency* factor dealt with the perceived efficacy of goals/tactics dealing with minimizing costs, and controlling firm input and output; the *bottom line* factor dealt with the perceived efficacy of goals/tactics dealing with the growth of sales, market share, and profits; and the *image* factor dealt with the perceived efficacy of goals/tactics dealing with the reputation of the firm in the environment. These factors incorporated both causal and normative beliefs.

Means, standard deviations, correlations and inter-item reliabilities for all variables are reported in Table 2. Inter-rater reliabilities (ICC(1,k), Shrout and Fleiss, 1979) were also calculated for survey measures where the executives were treated as key informants. The inter-rater reliabilities (among key informants within a firm) for control variable scales were 0.78 for SBU autonomy, 0.53 for organization specialization, 0.80 for organization size, and 0.75 for organizational effectiveness. For the coded measure of current functional position, Cohen's kappa (Cohen, 1960) for inter-rater reliability between the two coders was 0.79. Disagreements were resolved through discussion between the two coders.

Table 1. Factor analysis of executive belief variables[a]

Beliefs about the perceived efficacy of tactics/goals dealing with ...[b]	Factor loadings					
	Human resources	Innovation	Quality	Efficiency	Bottom line	Image
Employee compensation and benefits	0.71	0.00	0.08	0.12	-0.05	0.13
Retention of key personnel	0.84	-0.03	0.01	-0.01	0.06	-0.17
Employee satisfaction and morale	0.72	0.09	0.04	-0.02	0.09	0.02
Management development	0.76	0.06	0.14	0.10	-0.10	-0.08
Community service and goodwill	0.53	-0.01	-0.06	0.23	-0.16	0.03
Effectiveness of communication among subunits	0.67	-0.10	0.03	0.15	0.04	0.12
Quality of procedures used in making key decisions	0.58	0.06	0.02	0.10	0.08	0.05
Recognition as an innovative firm	0.11	0.24	-0.06	-0.11	0.02	0.51
Prestige of the firm	0.28	0.12	-0.23	-0.04	0.01	0.57
Building and/or maintaining the firm's name recognition	-0.11	-0.04	0.29	0.00	0.11	0.55
Developing and/or maintaining a solid reputation in the industry	0.02	0.07	0.26	-0.17	0.07	0.60
New product/service offerings	0.07	0.59	-0.02	-0.11	0.26	-0.02
Frequently developing new products/services	0.00	0.66	0.17	-0.17	-0.05	-0.05
Being innovative in the techniques used to market products/services	-0.16	0.48	0.05	0.23	0.04	0.11
Emphasizing specialty products/services	-0.11	0.52	0.03	0.04	-0.12	0.11
Being innovative in the way you produce your products/services	0.06	0.45	0.01	0.08	-0.21	0.25
Refining existing products	-0.13	0.12	0.50	-0.02	-0.09	0.22
Providing extensive customer service	0.09	0.05	0.50	-0.12	0.10	-0.16
Utilizing extremely strict quality control procedures	-0.07	0.04	0.55	0.05	0.02	-0.11
Constantly striving for a more highly trained workforce	0.12	-0.08	0.54	0.01	-0.04	-0.09
Cost advantages over competitors	-0.13	-0.11	-0.11	0.51	0.18	-0.04
Maintaining or seeking the lowest cost-per-unit in the industry	0.01	-0.12	0.01	0.65	0.03	-0.05
Controlling the distribution of your firm's products/services	0.12	0.10	0.02	0.30	0.12	-0.08
Investing in strategies to improve raw material procurement	0.13	0.19	0.10	0.44	-0.18	-0.17
Net profit over the coming year	-0.02	-0.21	0.05	0.10	0.53	0.11
Net profit over the next 5 years	0.12	-0.06	0.08	0.02	0.44	0.02
Sales growth	-0.06	0.09	0.00	-0.04	0.61	-0.23
Market penetration	-0.15	0.15	-0.01	0.07	0.51	0.01

[a] The eigenvalues for the first eight factors are 7.21, 2.33, 1.36, 1.10, 0.85, 0.71, 0.57, and 0.39. Underlined factor loadings indicate the items retained for each scale.
[b] Executives assessed (1) the importance of 17 operative goals suggested by the work of Quinn and Rohrbaugh (1983) and (2) the perceived efficacy of each of 22 business tactics taken from the work of Porter (1980) and Robinson and Pearce (1988). Item wording is provided in the first column.

Tests of hypotheses

Effects of functional conditioning

Hypothesis 1 stated that the beliefs of upper-echelon team members are related to their functional backgrounds. Hypothesis 2 stated that the beliefs of upper-echelon executives are related to their current functional positions. Because we had eight functional background variables and eight dummy-coded (0 or 1) current position variables, we had to determine which of these were theoretically relevant for predicting executives' scores on a given belief dimension (e.g., does experience in general administration theoretically impact beliefs related to efficiency?). Based on the results of our factor analysis of beliefs, arguments made by Hambrick and Mason (1984), and our own familiarity with the organizational behavior and strategic management literatures, we were able to associate theoretically the eight functional areas with the six belief dimensions. These logical associations are briefly described below.

Functional conditioning in either sales or marketing was expected to be positively associated with the perceived efficacy of bottom-line tactics/goals, quality tactics/goals, innovation tactics/goals, and image tactics/goals. Increases in sales and market shares may depend on all of these factors. *Functional conditioning in either finance or accounting* was expected to be positively associated with the perceived efficacy of efficiency tactics/goals and bottom-line tactics/goals. *Functional conditioning in research and development* was expected to be positively associated with the perceived efficacy of innovation tactics/goals and quality tactics/goals. *Functional conditioning in production and operations* was expected to be positively associated with the perceived efficacy of human resources tactics/goals, quality tactics/goals, and efficiency tactics/goals (all three belief categories deal with different ways of upgrading the production process, and therefore should be of interest to production and operations-oriented managers). *Functional conditioning in personnel* was expected to be positively associated with the perceived efficacy of human resources tactics/goals and quality tactics/goals. We expected that *functional conditioning in general administration* would be associated with the perceived efficacy of tactics/goals that concerned all aspects of the organization, as general administrators essentially have roles encompassing all aspects of organizations, and carry out integrative tasks.[5]

Hypotheses 1 and 2 were tested using the functional conditioning variables after controlling for all other variables in the model (each of the hypotheses was tested by regressing the six belief dimension scores on all of the relevant independent variables and the control variables as shown in Table 3).

The results do not support Hypothesis 1; out of the 25 possible effects tested for functional background, only three were statistically significant ($p < 0.05$). The results provide very weak support for Hypothesis 2; out of the 25 possible effects tested for current functional position five were statistically significant ($p < 0.05$). In addition, the incremental adjusted R^2s for the combined effects of functional background and current functional position on each of the six belief dimensions are very small, ranging from 0.00 to 0.04 (see Table 3). Overall, the relationships between functional conditioning and executive beliefs are extremely weak.

Effects of social influence

Hypothesis 3 stated that the beliefs held by an upper-echelon executive are related to the beliefs of other members of the same upper-echelon team. As explained in the Methods section, this hypothesis was tested by regressing the focal executive's belief for a given belief dimension on the average belief score of other team members for that dimension. Thus, this effect can be interpreted as the mean impact of other team members on focal executives. The hypothesis was substantially supported with effects significant at the 0.01 level or better for all of the six belief dimensions (see Table 3).

Recall that relational demographic characteristics were hypothesized to moderate the relation-

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[5] An alternative to specifying the logical associations between functional experiences and beliefs is to regress each executive belief dimension on all functional areas, without any prior assumptions. Post hoc analyses based on the latter approach produced slightly weaker adjusted R^2 results than the *a priori* approach reported in the tables. Only two of the 46 added effects significantly affected executive beliefs, thus supporting our *a priori* arguments that functional experiences in some areas are not logically associated with beliefs in other areas. Results relating to social influences were substantially the same in both models.

Table 2.   Means, standard deviations, correlations, and interitem reliabilities[a,b]

Variables	Means	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Focal executive beliefs																				
1. Human resources	5.41	0.96	(0.87)																	
2. Image	6.27	0.98	0.43	(0.73)																
3. Innovation	6.53	0.98	0.26	0.46	(0.73)															
4. Quality	7.15	0.98	0.26	0.39	0.43	(0.69)														
5. Efficiency	6.01	0.97	0.34	0.21	0.22	0.24	(0.62)													
6. Bottom line	5.84	0.84	0.30	0.39	0.39	0.30	0.30	(0.65)												
Functional background																				
7. General administration	5.02	7.38	0.06	0.08	0.11	0.01	-0.14	0.08	—											
8. Personnel	1.36	4.74	0.07	0.05	0.06	0.11	0.13	0.08	0.14	—										
9. Production & operations	4.79	7.64	0.10	0.02	-0.09	-0.09	0.01	-0.04	0.15	0.10	—									
10. Marketing	2.34	5.15	0.03	0.08	0.12	0.15	0.05	0.10	0.21	0.19	0.12	—								
11. Sales	2.74	6.06	0.07	0.10	0.12	0.15	0.08	0.09	0.22	0.14	0.02	0.56	—							
12. Research & development	1.61	4.78	-0.02	0.07	0.13	0.06	0.07	0.02	0.07	0.16	0.09	0.10	0.06	—						
13. Finance	1.59	4.04	-0.01	-0.04	0.03	0.02	0.06	0.07	0.11	0.14	-0.13	0.12	0.08	-0.10	—					
14. Accounting	1.89	5.01	-0.06	-0.10	-0.01	-0.07	0.03	0.01	0.00	0.01	-0.16	-0.04	-0.10	-0.12	0.41	—				
Current functional position																				
15. General administration	0.35	0.48	0.12	0.00	0.11	0.02	0.01	0.01	0.33	0.00	0.13	0.16	0.14	-0.04	0.07	-0.12	—			
16. Personnel	0.05	0.22	-0.05	-0.06	-0.02	0.01	0.00	-0.01	-0.02	0.58	-0.11	-0.08	-0.10	-0.08	-0.09	-0.08	-0.17	—		
17. Production & operations	0.23	0.42	0.06	0.04	-0.11	0.00	0.03	0.01	-0.07	-0.11	0.31	-0.22	-0.17	-0.02	-0.16	-0.16	-0.40	-0.13	—	
18. Marketing	0.10	0.30	-0.05	0.08	0.06	0.09	-0.03	0.04	-0.12	-0.09	-0.13	0.33	0.21	-0.04	-0.11	-0.10	-0.24	-0.08	-0.18	—
19. Sales	0.04	0.20	0.06	0.02	0.04	0.07	0.09	0.12	-0.13	-0.04	-0.09	0.07	0.25	-0.02	-0.06	-0.07	-0.15	-0.05	-0.11	-0.07
20. Research & development	0.05	0.21	-0.03	0.04	0.04	-0.01	0.04	-0.05	-0.10	-0.06	-0.07	-0.08	0.07	0.55	-0.09	-0.09	-0.17	-0.05	-0.05	-0.08
21. Finance	0.10	0.30	-0.13	-0.11	-0.11	-0.09	-0.04	-0.07	-0.06	-0.03	-0.18	-0.11	-0.14	-0.11	0.41	0.61	-0.24	-0.08	-0.12	-0.11
22. Accounting	0.03	0.16	-0.06	-0.10	-0.01	-0.08	-0.01	-0.01	-0.05	-0.04	-0.06	-0.04	-0.07	-0.06	0.10	0.28	-0.12	-0.04	-0.09	-0.05

(Continued over)

Table 2.   (Continued)

Variables	Means	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Beliefs of other upper echelon team members[c]																				
23. Human resources	5.41	0.55	0.21	0.11	0.02	0.09	0.03	0.01	-0.01	0.03	0.02	-0.06	-0.06	-0.12	-0.02	-0.07	-0.01	0.05	0.04	-0.04
24. Image	6.26	0.62	0.09	0.35	0.24	0.17	-0.11	0.20	0.10	0.08	-0.04	-0.01	0.02	0.01	0.01	-0.08	0.03	0.01	-0.07	0.07
25. Innovation	6.54	0.67	0.01	0.20	0.44	0.16	0.07	0.20	0.11	0.08	-0.14	0.04	0.13	0.16	0.04	-0.04	0.07	0.00	-0.13	-0.01
26. Quality	7.15	0.63	0.06	0.16	0.18	0.34	-0.03	0.21	0.04	0.07	-0.12	0.03	0.03	0.04	0.04	-0.01	0.01	0.05	0.00	0.01
27. Efficiency	6.39	0.62	0.00	-0.05	-0.01	-0.01	-0.22	-0.03	-0.12	-0.07	-0.11	-0.13	-0.04	-0.06	-0.05	0.00	0.00	0.09	-0.02	-0.03
28. Bottom line	5.84	0.55	-0.01	0.18	0.20	0.21	-0.06	0.38	0.00	0.00	-0.19	0.02	0.09	0.02	0.07	-0.01	-0.02	-0.01	-0.06	0.07
Relational demographic characteristics																				
29. Functional background similarity	2.05	1.03	-0.03	0.02	0.13	0.03	0.08	0.09	0.40	0.24	0.15	0.37	0.36	0.36	0.30	0.29	0.04	-0.06	-0.15	-0.02
30. Age similarity	0.78	0.35	0.01	-0.01	-0.01	-0.02	-0.04	-0.02	0.08	-0.02	-0.02	0.06	0.09	-0.09	0.05	0.01	0.02	-0.02	-0.03	-0.04
31. Tenure similarity	0.66	0.53	0.05	-0.05	0.05	-0.03	-0.02	-0.08	0.35	0.05	0.20	0.19	0.20	0.07	-0.02	0.08	0.22	-0.05	-0.09	-0.10
Control variables																				
32. Environmental turbulence	0.12	1.75	-0.03	-0.02	0.11	0.09	0.04	0.03	-0.10	-0.04	-0.14	-0.03	-0.01	0.01	-0.03	-0.03	0.03	0.05	-0.04	-0.03
33. Environmental munificence	0.11	0.17	0.00	0.04	0.14	0.16	-0.08	0.12	0.02	0.05	-0.08	0.03	0.01	0.07	-0.02	0.04	0.04	-0.02	-0.05	0.01
34. SBU autonomy	7.84	1.61	0.02	0.00	-0.15	0.01	0.00	0.00	-0.01	0.02	0.04	0.06	0.08	-0.06	0.01	-0.02	0.07	-0.02	-0.08	0.02
35. Organization specialization	11.66	3.12	-0.08	-0.05	0.00	-0.12	-0.11	-0.11	0.03	0.02	0.06	0.13	-0.03	0.09	0.06	0.06	-0.01	-0.07	-0.02	0.06
36. Organization size	2422	5480	0.12	-0.02	-0.11	0.00	0.17	-0.17	-0.11	0.02	0.07	-0.03	-0.04	-0.04	-0.06	0.00	0.05	0.10	-0.03	-0.04
37. Organizational effectiveness	4.88	0.93	0.17	0.15	0.09	0.12	-0.09	0.06	0.02	-0.02	0.04	0.01	0.00	-0.12	0.04	-0.06	-0.01	-0.03	0.05	0.02

(Continued over)

Table 2. (Continued)

Variables	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Current functional position (cont.)																			
20. Research & development	-0.05	—																	
21. Finance	-0.07	-0.08	—																
22. Accounting	-0.03	-0.04	-0.05	—															
Beliefs of other upper echelon team members[c]																			
23. Human resources	0.01	-0.08	0.03	-0.07	—														
24. Image	0.04	-0.06	0.03	-0.09	0.39	—													
25. Innovation	0.13	0.07	0.02	-0.10	0.18	0.50	—												
26. Quality	0.09	-0.02	-0.02	-0.04	0.26	0.43	0.45	—											
27. Efficiency	0.07	0.22	-0.02	-0.07	0.25	0.07	0.13	0.14	—										
28. Bottom line	0.10	-0.01	0.01	-0.04	0.20	0.43	0.44	0.40	0.19	—									
Relational demographic characteristics																			
29. Functional background similarity	-0.04	0.15	0.15	0.01	-0.16	-0.06	0.13	0.04	-0.06	0.09	—								
30. Age similarity	-0.01	-0.03	0.01	0.06	-0.03	0.04	0.00	0.03	-0.07	0.02	0.23	—							
31. Tenure similarity	-0.02	-0.05	-0.03	-0.01	0.00	-0.14	0.00	-0.08	-0.18	-0.20	0.36	0.11	—						
Control variables																			
32. Environmental turbulence	0.06	0.07	-0.02	-0.05	-0.02	0.00	0.18	0.17	0.12	0.05	-0.10	-0.03	-0.03	(0.71)					
33. Environmental munificence	0.06	0.02	0.00	-0.05	0.03	0.09	0.22	0.24	-0.08	0.19	0.04	-0.03	0.00	-0.06	—				
34. SBU autonomy	0.02	-0.09	-0.04	0.08	0.05	0.01	-0.25	0.00	0.02	0.00	0.07	0.07	0.09	-0.09	-0.24	—			
35. Organization specialization	0.02	-0.01	0.08	-0.01	-0.15	-0.11	0.00	-0.19	-0.22	-0.17	0.18	0.12	0.13	-0.19	0.00	-0.21	(0.86)		
36. Organization size	-0.05	-0.01	-0.03	-0.04	0.21	-0.05	-0.18	-0.01	0.14	-0.27	-0.06	0.02	0.10	-0.07	-0.06	0.02	-0.06	—	
37. Organizational effectiveness	0.00	-0.10	-0.03	0.00	0.29	0.25	0.14	0.19	-0.07	0.11	-0.04	0.09	-0.03	-0.09	0.00	-0.01	-0.01	-0.06	—

[a]Figures in parenthesis indicate interitem reliabilities.
[b]All correlations above 0.097 are significant at $p < 0.05$.
[c]As noted in the text, belief scores for team members were averaged for each belief dimension.
$N = 371$

Table 3. Upper-echelon executive beliefs regressed on determinants of beliefs[a]

Determinants of beliefs	Focal executive's beliefs					
	Human resources	Image	Innovation	Quality	Efficiency	Bottom line
Control variables						
Environmental turbulence	−0.02	0.00	0.12*	0.04	0.08	0.05
Environmental munificence	0.00	0.03	0.02	0.06	0.01	0.04
SBU autonomy	0.08	0.03	0.02	−0.02	0.01	0.02
Organization structure	−0.01	−0.01	0.01	−0.04	−0.05	−0.04
Organization size	0.07	−0.01	−0.05	0.07	0.07	−0.05
Organizational effectiveness	0.11*	0.07	0.05	0.06	−0.02	0.03
Functional background						
General administration					−0.21**	
Personnel	0.06	0.03	0.07	−0.02	–	0.07
Production & operations	0.31***	–	–	0.18*	0.03	–
Marketing	0.04	–	–	−0.06	–	–
Sales	–	0.07	−0.02	0.10	–	0.05
Research & development	–	0.06	0.03	0.01	–	−0.02
Finance	–	–	0.10	0.05	−0.01	–
Accounting	–	–	–	–	0.09	0.04
	–	–	–	–		0.13
Current functional position						
General administration	0.15*	−0.06	0.13*	0.11	0.05	−0.06
Personnel	−0.24**	–	–	0.05	–	–
Production & operations	0.03	–	–	0.16*	0.03	–
Marketing	–	−0.02	0.05	0.05	–	0.03
Sales	–	0.03	0.06	0.09	–	0.19*
Research & development	–	–	−0.07	−0.03	–	–
Finance	–	–	–	–	0.05	0.08
Accounting	–	–	–	–	−0.10	−0.11
Social influence						
Beliefs of other upper-echelon team members	0.27**	0.28**	0.45***	0.35**	0.41***	0.45***
Relational demographic characteristics						
Functional background similarity	0.04	0.03	−0.05	−0.04	−0.04	−0.03
Team member beliefs × Functional background similarity	0.24*	0.05	0.04	0.07	0.21*	0.27**
Age similarity	0.03	−0.01	0.01	0.00	0.07	0.06
Team member beliefs × Age similarity	0.10	0.14	0.24*	0.32**	0.24*	0.06
Tenure Similarity	0.00	−0.04	0.01	0.07	0.02	0.00
Team member beliefs × Tenure similarity	−0.22*	−0.20*	−0.02	−0.24**	0.05	−0.10
Adjusted R^2 for set of control variables[b]	0.04*	0.03*	0.06***	0.05**	0.01	0.06***
Incremental adjusted R^2 for set of variables related to:						
Functional background & current functional position	0.04*	0.01	0.00	0.02	0.01	0.00
Social influence	0.03*	0.10***	0.12***	0.08***	0.08***	0.07***
Total adjusted R^2	0.10***	0.12***	0.19***	0.17***	0.12***	0.16***

*$p<0.05$; **$p<0.01$ ***$p<0.001$
[a]Standardized regression coefficients reported from full regression model.
[b]Includes variance allotted to set of control variables in the absence of all other predictor variables.
[c]Includes variance allotted to main effect of team member beliefs and its interaction with functional background similarity, age similarity, and tenure similarity.

ship between focal executive beliefs and the beliefs of other team members. Hypothesis 4 stated that the strength of the relationship between the beliefs of a focal executive and the beliefs of another team member is positively related to the similarity between the two executives' functional backgrounds. The interaction between the beliefs of other team members and functional background was found to be significant for three belief dimensions at $p < 0.05$ or better, and in the predicted direction. Closer examination of the interaction terms, however, showed that the interaction was monotonic (Schoonhoven, 1981), being attributable mainly to the stronger negative effects of beliefs from team members with dissimilar functional backgrounds (i.e., dissimilar beliefs were associated with dissimilar backgrounds while similar beliefs were not associated with similar backgrounds). Thus, Hypothesis 4 was supported; the observed pattern of relationships was consistent with our theoretical arguments.

The strength of the relationship between the beliefs of a focal executive and the beliefs of another team member was hypothesized to be positively related to the similarity in age between the two executives (Hypothesis 5). For half of the belief dimensions (innovation, quality, and efficiency), the predicted interaction effect was significant at $p < 0.05$ or better. Closer examination of the interaction terms, however, revealed two distinct patterns. For the innovation belief dimension, the interaction was monotonic, being attributable solely to the stronger positive effects of beliefs from team members with more similar ages, thus confirming our prediction. However, for the efficiency and quality belief dimensions, the interactions were nonmonotonic, being attributable to both stronger positive effects of beliefs from team members with more similar ages and stronger negative effects of beliefs from more dissimilar team members. Thus, Hypothesis 5 received support, but the observed relationships were more complex than had been hypothesized.

Hypothesis 6 stated that the strength of the relationship between the beliefs of a focal executive and the beliefs of another team member is positively related to the similarity between the two executives' upper-echelon team tenures. Three of six interaction terms associated with this hypothesis were significant. However, the direction of the relationship was opposite to that

predicted by the hypothesis. Thus, Hypothesis 6 was not supported. The interactions were all monotonic, and suggested that a team member's beliefs were most similar to the focal executive's beliefs when the member was more dissimilar in tenure to the focal executive.

Statistical power

The null results found here for some hypotheses are only meaningful if there is a negligible chance of committing a Type II error (i.e., falsely accepting the null hypothesis). To guard against committing a Type II error, we calculated the probability of correctly rejecting the null hypothesis (i.e., the statistical power) for a small effect (effect size = 0.1). With 371 observations and alpha set to 0.05, the statistical power of 0.97 was judged to be excellent for this analysis. Any true effects that were not observed are probably negligible.

DISCUSSION

It is important to understand the antecedents of upper-echelon executive beliefs because they may have a substantial influence on organizational processes (cf. Narayanan and Fahey, 1990; Priem, 1994). In spite of this importance, there is a surprising paucity of research regarding these antecedents (see Houghton and Neubaum, 1994, for an exception). In particular, no previous studies have compared the relative impact of functional conditioning and social influence on the beliefs of upper-echelon executives.

The beliefs of executives concerning the importance of goals and the effectiveness of tactics are moderately predictable. Variables associated with functional conditioning and social influence, in combination, predicted between 6 and 13 percent of the variance in upper-echelon executives' beliefs (mean of 10 percent) across six dimensions of executive beliefs, after controlling for the variance allotted to the set of control variables. Importantly, the results show much stronger support for the effects of social influence than for the effects of functional background and current functional position, even though the latter variables are discussed more frequently in the context of executive beliefs. Across the six belief dimensions, social influence predicted between 3 and

12 percent of the variance, with a mean of 8 percent. Functional conditioning, however, predicted only between 0 and 4 percent, with a mean of approximately 1 percent.

The beliefs of our sample of executives were found to be cross-functional in nature, resembling some of the areas of emphasis discussed by Hambrick and Mason (1984) such as product innovation, advertising, and throughput functions (see Table 1). This contrasts with previous studies using middle managers (Walsh, 1988) and MBA students (Beyer *et al.*, 1997) that found organization-related beliefs to be structured along functional lines. This is particularly interesting, given that the Beyer *et al.*, (1997) study used an augmented version of the beliefs measures from this study. We suggest that this difference between upper-echelon executives and other employees who have worked at more junior levels (as in the sample examined by Beyer *et al.*, 1997) is due to the wide range of experiences most executives had in reaching their current position— approximately 33 percent of our executives had experience in three or more functional areas, while roughly 70 percent had experience in two or more functional areas. Such a wide range of experiences may enable executives to see connections between different functional areas which may not be so obvious to others with less experience. Alternately, this effect may occur because upper-echelon executives have, in general, spent more time than lower-level managers working in organizations, leading to their greater expertise in organization-related issues and enabling them to see connections between issues not seen by lower-level managers (Dutton, Stumpf, and Wagner, 1991). This argument is in accordance with a large body of knowledge comparing the knowledge structures of experts and novices, which suggests that experts develop in-depth schemata in their areas of expertise, which enable them to discern patterns and see connections where novices, lacking such schemata, see disparate issues (Kirschenbaum, 1992).

Functional conditioning

Our results show that the effects of functional conditioning on executive beliefs are extremely weak overall. This is evident in the tests of Hypotheses 1 and 2. This may, in part, be due to the cross-functional mobility executives have experienced in the recent past as described above. Experience in several functional areas may dilute the impact that experience in any one functional area has on executive beliefs. A second possible explanation is that the traditional boundaries between functional areas may be eroding. Tasks, activities, and responsibilities that have been traditionally associated with one function may be shifting to new functions. As the division of labor shifts, functional boundaries are redefined. Over time, this reduces the effects of functional conditioning. A third possibility may be that the beliefs of these executives have been broadened through professional education and exposure to the media. A fourth possible explanation is that these executives have adopted goals consistent with their roles as members of the upper-echelon team rather than as representatives of their current functional areas. If they are identifying with firm goals rather than functional goals, they may have adopted a broader perspective in a manner similar to that of the subjects assigned to the less restrictive goals condition in Beyer *et al.* (1997). A fifth, complementary explanation, is that the executives may have been selected and promoted based on their ability to see beyond functional boundaries to adopt an upper-echelon perspective. Thus, executives' functional conditioning may play a very minor role in shaping their beliefs in comparison to these other influences. These weak results are consistent with several other studies examining the relationship between functional conditioning and the beliefs of managers at various levels in the organization (Beyer *et al.*, 1997; Houghton and Neubaum, 1994; Markoczy, 1997; Walsh, 1988). Together with our findings, these studies suggest that it may be fruitless to continue exploring this avenue of research any further.

Social influence

Executives' beliefs are clearly influenced to a greater extent by the beliefs of other members of the upper-echelon team than by their past and current functional experiences. This conclusion is supported by the fact that the average variance explained by upper-echelon team variables is much greater than that explained by functional conditioning variables (average incremental adjusted R^2 of 0.08 vs. 0.01). This conclusion is particularly interesting given that prior research focuses more frequently on functional experiences

(Beyer *et al.*, 1997; Dearborn and Simon, 1958; Houghton and Neubaum, 1994; Waller *et al.*, 1995; Walsh, 1988) than on social interactions within teams as determinants of executive beliefs.

Relational demographic characteristics

For three of the six belief dimensions, focal executive beliefs are more similar to the beliefs of team members who are more similar in *age* to the focal executive. For two of these belief dimensions, focal executive beliefs are also more negatively related to the beliefs of team members who are more dissimilar in age. Thus, there is an interesting combination of greater similarity leading to conformity, while greater dissimilarity sometimes breeds polarization and disagreement. Although we had not anticipated the negative side of age dissimilarity, it seems plausible. Upper-echelon executives from different generations, who perceive one another to be different due to their apparently different formative experiences, are less likely to identify with each other. Further research is needed to understand why this lack of identification sometimes leads to disagreement, while at other times it leads to indifference.

We had predicted that executives with more similar *tenure* in the upper-echelon team would tend to influence one another's beliefs more strongly than executives with dissimilar tenure. We found, however, that upper-echelon team members who are more dissimilar in tenure tend to produce similar beliefs in one another, while team members with similar tenures do not influence each other. One explanation may be that the gradual introduction of new members into the upper-echelon team allows for more intensive socialization through a process which has been referred to as self-cloning (Hambrick *et al.*, 1993) and as homosocial reproduction (Kanter, 1977). In this model, a team may have one person, or perhaps two people with similar beliefs as its initial nucleus. Over time, newcomers are added one at a time to the team. Since a new member is the only one to be introduced into the upper-echelon team at a given point of time, he or she has only more entrenched colleagues to interact with, and is more likely to be influenced by them. This process would not be possible in a team with a high level of tenure similarity, where every member joins at the same time.

A complementary argument follows from the idea that people are likely to have a greater influence on others when they are regarded as experts in a particular domain (Aronson, Turner, and Carlsmith, 1963; Hass, 1981) or are shown to have a proven track record in performing the same task (Mausner, 1954). Thus, executives who have been in the upper echelon for a longer time are likely to be regarded as experts in organization-specific issues by relative newcomers, and to influence the beliefs of newcomers regarding these issues. It may also be that newcomers who are brought in for their expertise in specific domains influence the beliefs of more senior colleagues in those domains.

Greater dissimilarity in *functional background* led to a greater negative influence of team member beliefs on focal executive beliefs for three of the belief dimensions. This suggests that functional background is a criterion that executives use to categorize themselves with regard to similarity with other upper-echelon team members. However, dissimilarity in functional background leads to polarization in beliefs, rather than similarity leading to conformity. In combination with our results relating to functional conditioning, it appears that while executive beliefs are not influenced by the functional area in which they currently work or previously worked, executives do tend to categorize on the basis of functional background, and disagree with others who are dissimilar from them in this regard. In combination with our results relating to age similarity, it appears that it is as important to focus on the *negative* influence of demographic *dissimilarity* on the tendency of executives to develop similar beliefs as it is to focus on the *positive* influence of demographic *similarity* on their tendency to agree with one another.

Social influence vs. alternative explanations

Beliefs of other upper-echelon team members had fairly strong associations with focal executive beliefs. In addition to the theoretical reasoning we discussed earlier, suggesting that executives influence each other through social information processing, shared sense-making, and other communication processes (these several processes together are referred to as *social influence*), we identified two alternative explanations for our results: (1) executives may simply share similar experiences and be embedded within a similar

corporate culture or upper-echelon team subculture (*common exposure*); and (2) executives may be attracted and selected based on similarity of beliefs (*selection*). By examining the pattern of results related to moderating variables, we attempt to determine if there is more or less support for the social influence explanation than for the other two.[6]

First, we consider whether our results are attributable to *common exposure* of the executives to similar experiences. (Note that this explanation of the association of focal executive and team member beliefs does not require direct interaction within the upper-echelon team.) Although we controlled for many environmental- and organizational-level variables that executives are exposed to, we obviously could not control for all conceivable characteristics of their common experiences. For example, some aspects of the subculture of the upper-echelon team may influence the beliefs of all upper-echelon executives, thereby causing executives within an organization to hold similar beliefs.

An anomaly limits the plausibility of the common exposure explanation. The common exposure explanation predicts that the greatest similarity between the beliefs of the focal executive and the beliefs of other team members will occur when tenure similarity is highest. Executives who join the team at the same time are likely to share more common experiences and are more likely to have experienced the same critical events for the organization. Further, the beliefs of executives

are more likely to be influenced by cultural variables when they first join a group (Louis, 1980), or within a short period thereafter (Katz, 1982). If these arguments are true, then the common exposure explanation leads to the prediction that executives who join at similar times will have more similar beliefs than those who join at dissimilar times. Contrary to the prediction based on the common exposure explanation, however, focal executives in this study had beliefs more similar to the beliefs of those members of the upper-echelon team with whom they had more dissimilar tenure.[7]

A second alternative explanation for the relationships between focal executive beliefs and beliefs of other team members is that the relationships are caused by *selection* of like-minded executives to the upper-echelon team. This alternative explanation is consistent with the observed associations between beliefs of the focal executive and those of other team members, and with the tenure similarity interaction effect. It does not, however, explain the effect that the interaction between team member beliefs and age similarity has on focal executive beliefs.

The moderating influence of age similarity is difficult to explain based on selection because the explanation implies that executives more similar in age were chosen for their similarity in beliefs, while executives more dissimilar in age were chosen either with no consideration for their beliefs (for the belief dimension labeled innovation), or because they held beliefs that were in greater opposition to existing executives (for the belief dimensions labeled quality and efficiency). As these arguments are not logical, we strongly doubt the selection explanation for this portion of our results. The social influence model provides a more logical and parsimonious explanation of the age similarity effects, as described above.

Based on the above discussion, it appears that the most parsimonious explanation for our overall

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[6] We chose to measure social influence through examining the association between focal executive beliefs and the beliefs of other executives rather than directly eliciting the required information from the executives for several reasons. Information provided by executives may be biased because (a) executives are often unaware of subtle social influences from other team members; (b) more recent influence attempts are likely to be more salient to them, and have a greater chance of being reported; (c) executives may not wish to admit that they are influenced by certain team members, and thus suppress that information; (d) executives may strive for consistency within their responses, leading to a response–response bias. We were also apprehensive that getting information from each executive regarding their social interactions with all other upper-echelon team members would lead to respondent fatigue due to the length of the survey instrument (it already contained around 170 items) and possibly generate conflict among executives as they reflect on and communicate about who influences whom. Finally, computing social influence as an algebraic function (or other descriptive statistic) that includes the beliefs of other persons is a research method that has been accepted in a variety of settings (see, for example, Davis *et al.*, 1997; Tindale *et al.*, 1990).

[7] In addition to the environmental and organizational control variables discussed in the text, we controlled for industry in two post hoc analyses (industry was defined in terms of mining, manufacturing, and services in the first analysis and in terms of 1-digit SIC codes in the second). In comparison with the results presented in the text, there were no changes in the significance of the effects in these supplemental analyses controlling for industry. The robustness of these results shows strong support for the social influence model over competing explanations based on industry differences.

pattern of results is based on the social influence model. Common exposure and selection do not explain many of the results. Given that the social influence model was based on experimental evidence, our results may be interpreted as extending the external validity of those experiments. It appears that focal executive beliefs are likely to be influenced by the beliefs of other upper-echelon team members to a significant extent, and that this impact is likely to be moderated by the extent to which focal executives are similar or dissimilar to other team members in terms of their functional background, age, and tenure.

CONCLUSION

Functional conditioning, whether in the form of past experiences or current rewards and responsibilities, has a negligible influence on upper-echelon executive beliefs. Social influence has a moderate but much larger influence. Further, the social influence that upper-echelon executives have on the beliefs of other team members is moderated by the similarity of their functional backgrounds, ages, and tenure within the upper-echelon team. However, the moderating effect of these demographic variables varies; a given variable influences beliefs about some issues but does not influence beliefs about other issues. Overall, these findings suggest a complex pattern of influence on executive beliefs—a pattern that is very different from the straightforward model of the relationship between functional conditioning and executive beliefs held by many organizational scholars and executives.

In the past, researchers examining the determinants of executive beliefs have concentrated more on the functional conditioning of executives than on social influence processes. The results from this study suggest that future researchers might make more progress by attempting to understand social influence processes as determinants of upper-echelon executive beliefs.

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Appendix: Formulas for Relational Demographic Variables and Related Interaction Terms

Functional background similarity was assessed by first calculating the absolute difference between the focal executive, *i*, and each team member, *t*, in the number of years spent, *x*, in each functional area, *k*, then averaging these absolute differences across all functional areas, *K*, averaging across all team members, *T*, and finally taking the multiplicative inverse to arrive at a similarity score. Algebraically, this is

$$\frac{1}{\sum_t \left[\sum_k |x_{ijk} - x_{tjk}|/K \right]/T}$$

where *i* = individual (focal executive), *j* = organization, *k* = functional area, *K* = number of functional areas, *t* = team member, *t* ≠ *i*, *T* = number of team members (excluding the focal executive) in organization *j*, *x* = number of years in functional area *k*.

Note that averaging across functional areas and averaging across team members reduces these effects to a single term for the effects of similarity in team members' functional areas. From a theoretical level, this is introducing two assumptions: similarity in each functional area has an impact equal to the impact from similarity in each other area, and similarity to each team member has an impact equal to the impact from similarity to each other team member. From a practical level, these simplifying assumptions are necessary to identify the equations and estimate the model. Further, these simplifying assumptions force us to explicitly specify the characteristics of team members that increase their impact on focal executives.

To investigate the moderating impact of functional similarity, a multiplicative interaction term was created for each belief dimension. The *interaction between team member beliefs and functional background similarity* was calculated in the following manner: the absolute difference in functional background between the focal executive and each team member (averaging across

differences in all functional areas) was multiplied by the team member belief score, *z*, for each belief dimension, *b*, averaged across all team members, and the multiplicative inverse taken to arrive at a single score for each focal executive for each belief dimension. All variables were standardized before the multiplication of two variables at any stage in the calculations. More formally, this is

$$\frac{1}{\sum_t \left[\left[\sum_k |x_{ijk} - x_{tjk}|/K \right] z_{tjb} \right]/T}$$

where *b* = belief dimension, and *z* = belief score.

Age similarity was assessed by calculating: (1) the absolute difference in age, *a*, between the focal executive and each team member; (2) averaging across all team members; and (3) taking the multiplicative inverse of this average. The relevant equation is

$$\frac{1}{\sum_t [|a_{ij} - a_{tj}|]/T}$$

where *a* = age.

The *interaction of age similarity and team member beliefs* was calculated by: (1) multiplying the absolute difference in age between the focal executive and each team member with the team member belief score for a given belief dimension; (2) then averaging across all team members; and (3) taking the multiplicative inverse to get a single score for each focal executive for the given belief dimension. All variables were standardized before the multiplication of two variables at any stage in the calculations. The relevant equation is

$$\frac{1}{\sum_t [|a_{ij} - a_{tj}| z_{tjb}]/T}$$

Tenure similarity and the *interaction of tenure similarity and team member beliefs* were calculated in a manner similar to that applied to age.