

Thinking in Business

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Abstract

Thinking and reasoning enter into the practice of business in limitless ways. Basic and applied cognition researchers stand to gain by increasing their awareness of each others' work. To foster interaction, this chapter provides an introduction to applied cognitive research in the main areas of business academia, which collectively map out a large range of business practice: Consumer Behavior within Marketing, Organizational Behavior within Management, Management Science within Operations, Behavioral Finance within Finance, and Behavioral Accounting within Accounting.

Cognition; Business; Consumer Behavior; Organizational Behavior; Management Science; Behavioral Finance; Behavioral Accounting

The practice of business is enormously variable. The marketer influencing a customer's purchase, the executive negotiating a deal, the manager coordinating the production of goods, the analyst reviewing company performance, and the accountant trying to make the numbers add up are all engaging in aspects of the practice of business. To address the variety, I will provide introductions to research on thinking occurring in the context of marketing, management, operations, finance and accounting activity. These are arguably the major functional areas of business, and not coincidentally, the major areas of business academia. Accordingly, this chapter organizes research on thinking in business by the domain of business practice, with introductions to each corresponding area of business academia.

Business schools foster a substantial amount and range of applied research on thinking and reasoning. This work, like all applied research, makes two main contributions back to the basic research areas on which it draws: it translates basic research to advance real world practice, and it provides contexts that raise new questions and phenomena for basic research. This review aims to foster exchange between applied research on thinking and reasoning in business academia and basic research on thinking and reasoning.

There is important work on all main areas of business practice, but there is more work in some areas than others. I discuss the areas in rough descending order of the amount of current research on thinking in the different academic areas: Marketing, Management, Operations, Finance, and Accounting. Each academic area operates relatively independently, with its own journals and professional associations, roughly like the fields of psychology, anthropology, economics, sociology, and linguistics operate within social science—there is no single journal or forum in which all areas converge, just numerous

overlapping subfields. Each area of business academia has a segment engaged in behavioral research, within which scholars are engaged in research on thinking: consumer behavior (within marketing), organizational behavior (within management), management science (despite the name, it lies within operations), behavioral finance, and behavioral accounting.

Of all cognitive topics studied within business academia, decision-making research is by far the most common. The book based on Herbert Simon's dissertation, *Administrative Behavior* (1947), was particularly influential in making decision making a central behavioral topic in business academia. Because of Simon's (e.g., 1955) persuasive arguments for bounded rationality, meaning that human cognitive processing is limited, Simon also characterized decision making as a behavioral concern. To avoid confusion, I note that it was Simon's work from the 1940s and 1950s that was most influential in business academia; his work from the 1960s and 1970s that had such a large influence on cognitive science, such as *Sciences of the Artificial* (1969) and, with Allan Newell, *Human Problem Solving* (1972), is less widely known in business academia, just as *Administrative Behavior* is less widely known in cognitive science. As behavioral decision-making advanced and gained legitimacy in both psychology and economics due to the work of Kahneman and Tversky and others (Kahneman, Slovic & Tversky, 1982), and as business schools expanded their hiring of faculty from psychology departments, decision making became an established topic across business school departments. It also has more ties between basic and applied researchers than any other topic in thinking and reasoning research (see leBoeuf & Shafir, Chap. 16; Frederick & Kahneman, Chap. 17; Camerer, Chap. 18).

Accordingly, in this review I devote less space to decision making research than it warrants based on its current volume and more space to other thinking and reasoning research, such as work on learning, categorization, expertise, creativity, and group cognition. These topics are central concerns of thinking and reasoning, and have particular importance to core business concerns such as innovation—the development and implementation of new products and processes. Broadening the thinking and reasoning topics under discussion is an attempt to help foster new ties and to give a richer view of thinking in business. In addition, I emphasize research published in applied journals published by business academic societies and organizations, rather than the work on thinking and reasoning published in social psychology journals and Industrial/Organizational psychology journals. That work is no less important or insightful, but because the business outlets and papers are less likely to be familiar to basic researchers studying thinking and reasoning, there is greater potential for novel cross-fertilization.

Marketing: Consumer behavior

Businesses need to sell their products and services, so a major concern of business is shaping how consumers make purchases, use products, and think about brands. Consumer behavior researchers study these questions, and generate more psychological research on individual thinking and reasoning than researchers in any other area of business academia. As a simple indication of the role of cognition research in consumer behavior, the *Handbook of Consumer Psychology* (Haugtvedt, Herr & Kardes, 2008) dedicates about half of its 1200 pages to reviewing information processing and social cognition research (see also, e.g., Loken, 2006). Most consumer behavior research on

thinking and reasoning is experimental. There is also mathematical and computational modeling, field survey research, observations of consumer activity, examinations of archival measures of consumer activity, and some qualitative research.

Decision making

Consumer purchasing is a decision-making activity. For example, one prominent feature of the consumer decision-making context (as any walk through a grocery store or time spent shopping online will make apparent) is a concern for how people make decisions when confronted by large numbers of options (e.g., Broniarczyk, Hoyer, & McAlister, 1998; Hoch, Bradlow & Wansink, 1999). This work has identified tensions between larger numbers of options providing an opportunity to maximize fit to consumer preferences and making the choice process more difficult and more likely to spur regret (Broniarczyk, 2008; Chernev, 2011).

An intriguing development in this area is to consider the relationship among items in the choice set. Drawing on the contrast between alignable and nonalignable differences (Markman & Gentner, 1993; see Holyoak, Chap. 13), it is possible for items in a choice set to differ in ways that are alignable along a single dimension (e.g., increasing power or size) or in ways that are nonalignable (each member possessing a distinct categorical feature). People are more likely to make a choice from a large choice set if its members are all alignable (Gourville & Soman, 2005). Thus, the alignability of the options in a choice set is a moderator of choice set size on people's likelihood of making rather than avoiding making a decision. This work is consistent with research on other means of making large assortments easier to navigate, such as having detailed preferences (Chernev, 2003) due to expertise.

The context of consumer behavior also makes salient, unlike most decision making research, that the process of deciding can itself offer pleasure and value. Individual preferences for, say, seeking out variety (McAlister & Pessemier, 1982), can guide the construction of choice sets even for purchases that are for others (Chowdhury, Ratneshwar & Desai, 2009). Thus, one's own pleasure or annoyance at the decision-making process, in addition to considerations of the outcome, guide decision making.

More generally, decision making is an activity, and the many goals decision-makers have as they engage in that activity guide the choices that result. For example, reviewing an array of research, Bettman, Luce and Payne (2008) argue that four broad goals recur across a wide array of consumer decisions, if not decisions more broadly: concerns for accuracy (or decision quality), minimizing effort, minimizing negative emotion, and increasing the justification for the decision. Any of these broad goals can dominate decision making, and people can trade off value across goals.

People also have goals related to specific products that influence how they evaluate options. For example, in one series of experiments, people were asked to imagine wanting to buy a fast computer, and then read about a series of computers with features that strongly or weakly supported that product-related goal or were irrelevant to the goal (Meyvis & Janiszewski, 2002). It appears that people note whether features support the goal they have in mind when evaluating the product's features, and because irrelevant features do not support the goal, they temper judgments (a dilution effect). For instance, participants' explicitly noting whether the features were relevant or irrelevant did not eliminate the dilution effect, but having participants read the features before learning the

goal did eliminate the effect. Thus, goals guide how people frame or encode information, which in turn guides their evaluations.

One real world implication of the presence of multiple goals is that people sometimes exhibit inaccurate judgments of key features of choice options, such as price. For example, one study found that about half of the customers stopped and questioned in grocery stores could not name the price of the item they had just put in their shopping carts (Dickson & Sawyer, 1990). Strikingly, their price estimates deviated from the true prices by an amount that was, on average, as large as the range of prices in the product category.

Learning and Expertise

Another important concern is how consumers learn about products, services, and brands. Accordingly, there is a long-standing interest in consumer expertise (Alba & Hutchinson, 1987). This means that in addition to a concern for explaining a particular choice, another reason to examine consumers' goals is to examine the effect of goals on what consumers learn about products. For example, one study examined exemplar learning by low and high domain knowledge participants, varying whether they were given a goal at initial encoding (e.g., you will be traveling and need a camera that is easy to use), and whether they had a similar or different goal at each of two rounds of retrieval (Cowley & Mitchell, 2003). Learning by participants with low domain knowledge was guided by their initial goals and the fit between those goals and their first goal at recall, whereas high domain knowledge participants' learning was not influenced by the assigned goals at either encoding or recall.

The basic context of thinking about purchasing products is useful for studying learning. For example, consistent with work integrating research on categorical and

quantitative inference learning (Juslin, Olson & Olson, 2003) and work discussing the importance of how categories are used in category learning (Markman & Ross, 2003), Eisenstein and Hutchinson (2006) examined inference learning tasks in a consumer behavior context. They provided participants with product features, and asked them to make either a categorical or numeric judgment. Some estimated whether the product's price was above or below a specific price, and others estimated the product's price. Consistent with the importance of use, asking for categorical responses led to greater levels of learning for examples near the cutoff point (Eisenstein & Hutchinson, 2006). The implication from this work is that well-designed cutoffs can make learning efficient, but poor cutoffs can distort learning and undermine later category use.

Categories

Inference learning is just one instance of a much broader interest in categories within consumer behavior research. Consumers and marketers rely on categories to organize types of products and services (e.g., televisions, minivans, banking). They also rely on brand categories (e.g., McDonalds, Wal-Mart, Sony) to organize judgments of quality, availability, desirability, and other concerns. They also use social categories to identify kinds of consumers (e.g., early adopters, coffee drinkers, penny-pinchers) that then guide how, for example, people design products, generate marketing campaigns, and choose retail outlets. This work points out intriguing possibilities for research on categories and concepts (see Rips et al., Chap. 11).

As an example, research on brand extensions raises interesting possibilities about category membership: if you have a choice of including an item in a category, forming a subordinate category or forming an independent category, what should you do? If Crest has

a strong brand based on its toothpaste products, what might happen if the brand Crest was applied to other products, such as mouthwash, toothbrushes, sinks, dishwashing detergent, or glue? Would this generate better or worse appraisals of the other products, and does it matter what kinds of other products? Would the extension help or hurt the Crest brand as a whole, and would it help or hurt the main Crest toothpaste product on which the brand was built? These are pragmatic questions of interest to marketers, of course, but they are also interesting questions for the study of categories. They highlight the role of people's ability to generate and change categories and the effects of those changes on people's perceptions of the category and new and old category members. These questions generally do not arise when considering categories like robins or chairs. The consumer behavior context makes the roles of people's attitudes and social interaction more central to the study of categories.

There has now been at twenty years of active experimental research on brand extensions in consumer behavior. This work has established that if the new product will be atypical of the category and not clearly understandable as a category member, then it is more likely to lower people's perceptions of the category as a whole (i.e., the brand; see Keller & Lehmann, 2006, for a review). In some cases, including the new product in the brand can even lower people's perceptions of the flagship product (i.e., central category member; John, Loken & Joiner, 1998). The variety of products already included in the brand category is also an influence on people's willingness to accept a further product as an instance of the brand (Meyvis & Janiszewski, 2004).

Consumer behavior research on categories also highlights that categories can change over time. For example, the development of the minivan product category shows influence of both consumers and producers (Rosa et al., 2005). Most basic research on

categories, category membership, and category typicality has focused on stable properties of category members, rather than histories of the frequency of instantiation of items as category members (Barsalou, 1985). Examining magazine articles for frequency of instantiation—the proportion of product mentions that were made in reference to a product category, such as “the Honda Odyssey is a minivan that”—provides a measure of typicality derived from real-world aggregate behavior (Rosa et al., 2005). This frequency of category instantiation measure predicted a product’s longevity in the market—that is, the more often products were mentioned as being category members, the more likely they were to persist in the market. Frequency of instantiation may in practice be confounded with feature-based criteria for typicality. However, if categories themselves can change over time, and consequently what is central or ideal can change over time, then frequency of instantiation may be critical for establishing category typicality in practice. Given that people rely on a division of cognitive labor so that they do not need to become experts in all domains (e.g., Keil et al., 2008), and given that people are capable statistical learners (e.g., Saffran et al., 1999), it is plausible that frequency of instantiation is a far greater influence on category learning than current psychological models imply.

Consumer behavior research on categories of services, such as cruises or massages, also extends basic research on event categories. For example, one of the key features of events is that they unfold over time. This allows event duration to be causally important. For example, people use a service’s stated length as a heuristic guide to its value (Yeung & Soman, 2007). Further, experiencing greater variety within an event led people to report immediately afterwards that the event had a shorter duration than did those experiencing less variety (Ahn, Liu & Soman, 2009). One to three days later, however, the people who

experienced greater variety reported that the event had lasted longer. Thus, event duration can be a central feature of event categories.

Underlying much of this discussion of product and service categories is a close connection between category typicality and preferences. An examination of brands (e.g., Taco Bell, American Airlines) in eight product and service categories (e.g., types of restaurants, types of transportation) found strong correlations (about .6) between a particular brand's typicality within a product category and positive attitudes towards that brand (Loken & Ward, 1990). People's attitudes towards category members tend not to be discussed in basic research on concepts and categories. But consistent and strong relationships between typicality and attitudes are important to integrate theoretically, and are certainly important practically for thinking about category effects.

Similarity and analogy

Similarity and analogy research has also considered the joint action of cognition and affect (e.g., Thagard & Shelley, 2001), and consumer research offers new insights here as well. People use experiences as analogical bases that they extend by analogy to understand and develop emotional responses to new products or services serving as targets (Goode, Dahl & Moreau, 2010). The strength of people's preferences for the base experiences together with the number of inferences drawn from base to target influence people's emotional responses to targets (Goode et al, 2010).

This work is part of a larger stream of research on analogy and similarity in consumer behavior. For example, companies use similarity and analogy to make their products comprehensible and appealing to consumers. Providing analogies appears to promote more focused knowledge transfer and inferences than assigning a product to a

category, as categories license generating inferences about both surface features and underlying structure or relations, whereas analogies preferentially focus people on underlying structure (Gregan-Paxton & Moreau, 2002). Analogies are particularly useful for helping consumers understand very new products, rather than incrementally new products (Moreau, Markman and Lehmann, 2001). Companies can also manipulate surface similarity by designing products to look like something with the same underlying function (Rindova & Petkova, 2007). For example, digital video recorders, such as TiVo, were designed to look like VCRs so that consumers spontaneously made appropriate comparisons. The broad implication, and one that will recur in other areas of business research on thinking and reasoning, is that an understanding of how people think can guide businesses to design more effective products, processes, and policies.

Creativity

Consumer behavior also provides useful contexts for examining creativity (see Smith & Ward, Chap. 23). Creativity is important for understanding advertising. Some advertising is mainly concerned with raising consumer awareness of a product or brand, whereas other advertising is aimed at engaging consumers and increasing their attitudes towards and involvement with brands (Vakratsas & Ambler, 1999). It is for this latter group that creativity is consequential, because it can draw consumers' attention and consideration. One of the interesting outcomes of research on advertising is that it demonstrates that there are reliable ways to structure advertisements such that people will find them creative and effective (Goldenberg, Mazursky & Solomon, 1999; McQuarrie & Mick, 1996). An avenue for future cognitive research would be to unpack why these

structures are effective and to identify additional structures (e.g., Loewenstein, Raghunathan & Heath, 2011).

Creativity is also important in understanding how consumers use products. For example, one concern is what leads consumers to generate creative uses for consumer products, such as how one might generate one of those 1001 uses for duct tape (Burroughs & Mick, 2004). Consumer research also provides novel contexts in which people can be asked to generate new and potentially creative kinds of category members, similar to Ward's (1994; Ward, Patterson & Sifonis, 2004) drawing tasks. For example, online shopping allows consumers to design their own products (Dellaert & Stremersch, 2005), such as Nike enabling customers to design shoes.

This brief survey shows that thinking and reasoning research has important applications for understanding consumers and those who market to them. It also shows that the context of marketing to consumers spurs insights and reveals new phenomena to integrate back into basic research on decision making, learning, categories, similarity, and creativity, among other topics.

Management: Organizational Behavior

To have a product or service to sell takes work, of course. The field of organizational behavior aims to explain and facilitate employee, manager and executive work, including, for example, decision-making, conflict management, the generation and production of innovations, and group performance. Organizational behavior research generally relies on field surveys and experiments, but there is also qualitative research, research using archival sources, and a small amount of computational modeling work.

Ethics and Decision Making

Organizational behavior is the only behavioral research area in business in which decision making research is not the dominant stream of work on thinking and reasoning (Moore & Flynn, 2008). Still, decision making has not been neglected. For example, decision making has been influential in organizational behavior research on negotiation (Bazerman, Curhan, Moore & Valley, 2000). A distinctive contribution of organizational behavior research on decision making has been its examination of ethics (see Waldmann et al., Chap. 19). Ethics is related to practical concerns, but also to a fundamental cognitive claim, which is that how people represent or frame a problem or decision influences the solution or choice people generate. An important consequence, as Tenbrunsel and Smith-Crowe (2008) note, is that if decision frames do not take ethics into consideration, then the resulting decisions may be unethical without people realizing it.

For example, one study engaged participants in a hypothetical dilemma: they could either cooperate with a group agreement at a high known cost to themselves, or defect from the group agreement with a low known cost (Tenbrunsel & Messick, 1999). In a baseline condition, overall 55% stated they thought they were making an ethical decision, with the remainder framing it as a business (i.e., a narrowly framed cost/benefit) decision. In a second condition, in addition to the low known cost of defection, there was a chance of being caught for defecting and having to pay a small penalty. In this case just 18% used an ethical decision frame—the threat of a penalty shifted people’s decision frames. The decision frame was consequential, as 91% of those with an ethical decision frame cooperated, whereas just 39% of those with a business decision frame cooperated. It is plausible that the habitual use of many representations relevant to the business domain, as well as other domains in life, implicitly encourage people to make choices that are,

unintentionally, unethical. Therefore, a great project for thinking and reasoning research would be to examine factors that foster flexibility in how people represent information—the cognitive skills behind ethical behavior could overlap considerably with those for creativity.

A further concern over ethical implications of behavioral decision-making is that risk-seeking behavior can involve unethical behavior. For example, in one study, people were asked to complete an anagram task, with an opportunity to score and pay themselves for their own performance (Schweitzer, Ordoñez, & Duouma, 2004). Participants were assigned different goals: challenging goals, readily achievable goals, or simply a request to do their best. They found that relative to the two easy goal conditions, participants with the challenging goals—who likely thought that their performance would not be sufficient to allow them to reach their goals—were twice as likely to cheat. Related work found that participants who had already completed a goal were more likely to take a risky gamble than accept a sure payoff, and the more they had surpassed their goal the more likely they were to take the risky gamble (Jeffrey, Onay & Larrick, 2010). It is an open question whether in the aftermath of achieving a goal people will be not only more risk-seeking but also more willing to be unethical.

To address individual level biases towards unethical decision making, or more broadly, towards poor decision making, research need not look solely to individual level solutions. Social and organizational contexts can mitigate some individual shortcomings (Heath, Larrick & Klayman, 1998). For example, the guidelines for total quality management, a collection of practices aimed at improving the reliability of work processes, encourage people to gather complete information about problems, in contrast to individual

tendencies to gather information selectively. A broad implication is that examining organizational routines and jobs can reveal specialized controls and tasks that cover for what people otherwise fail to consider or do. Another implication is that there are likely other cognitive limits that organizations are failing to address, awaiting people to draw attention to them and propose repairs.

Learning

Another central cognitive concern in organizational behavior is learning from experience, with a particular concern for learning from events that are often complex, ambiguous, and far from randomly sampled (Loewenstein & Thompson, 2006; March, 1994; Wood, 1986). For example, Denrell (2003; Denrell, Fang & Levinthal, 2004; Denrell & March, 2001) used computational modeling to show that organizational settings produced a host of biased samples as successful managers and organizations tend to stay and grow in prominence, whereas unsuccessful ones tend to leave or fold. The result is effectively learning based on sampling on the dependent measure.

Another approach to learning from experience is to examine counterfactual reasoning. For example, one study examined airplane accidents (Morris & Moore, 2000). The National Transportation and Safety Board maintains records of airplane accidents and near-accidents. These include narrative descriptions of accidents, which can be coded for the presence of counterfactuals and the presence of specific lessons for the future. Pilots' narratives with upward, self-directed counterfactuals (If only I had done X, the accident would not have happened) were most likely to exhibit lessons for the future, in contrast to narratives with downward counterfactuals (if I had not done X), narratives with other-directed counterfactuals (if only air traffic control had said...) and narratives with no

counterfactuals (Morris & Moore, 2000). Two follow-up experiments tested the effects of counterfactual reasoning on learning from experience used a flight simulator game. Replicating the archival study of actual pilots, participants who spontaneously generated upward, self-directed counterfactuals were most likely to write specific lessons learned. Participants asked to generate upward or downward self-directed counterfactuals after an initial flight simulator session revealed that those asked to make upward counterfactuals showed greater improvement on a subsequent flight simulator session than those asked to make downward counterfactuals (Morris & Moore, 2000). These studies also found that people generated more counterfactuals the more severe the accident, and the more personally accountable (as opposed to organizationally accountable) the pilot. The implication is that counterfactual reasoning is a form of self-explanation that people generate spontaneously in response to events that can yield learning.

Categories

Organizational behavior has a longstanding interest in the products of learning. For example, there is research on novice and experienced entrepreneurs' understandings of worthwhile and non-worthwhile opportunities to start a new business (Baron & Ensley, 2006), managers' understandings of threats and opportunities (Jackson & Dutton, 1988), and participants' reactions to tasks framed as work and play (Glynn, 1994). In a characteristic early study along these lines, Lord, Foti and De Vader (1984) examined the category "leader," using feature listing and ratings tasks to assess what features indicate the category. They showed that participants rated a feature's prototypicality faster the more typical it was. They also showed that a vignette about a leader managing a project that used typical features for the leader, compared to one using atypical features, yielded

ratings indicating that participants expected the leader to behave in more typical ways, and considered the leader more responsible and accountable for the project.

In a series of studies on firm competitors, Porac and colleagues (Porac & Thomas, 1994; Porac, Thomas & Badenfuller, 1989; Porac et al 1989, 1995, 1999) examined managers' category taxonomies as an influence on which firms a manager at a given company would say were competitors. Rather than assuming managers are rational agents examining every firm's resources and dependencies to determine their competitors, this work suggests that managers use categories of firms to simplify and guide their attention. For example, one study examined a category taxonomy derived from the superordinate category "retailer" (Porac & Thomas, 1994). Store managers noted typical subordinates such as groceries and drug stores and atypical subordinates such as travel agencies and animal grooming shops. Store managers rated stores from the same subordinate categories as their own stores as far more likely to be competitive threats than those from different subordinate categories. Store managers also tended to perceive typical retailers to be more of a competitive threat than atypical retailers. Thus, category membership and typicality influenced managers' perceptions of the firms with whom they were competing.

A further study surveyed managers from the Scottish knitwear industry (Porac et al., 1995). They found that five prominent dimensions (firm size, location, knitting method, construction method, and product style) accounted for how managers categorized firms in the industry. Managers largely perceived their competitors to be other firms within the same category as their own firm. Further, the more typical a firm was of its category, the more likely it was to be rated a competitor by others in its category. These studies indicate that category taxonomies and category typicality are tools managers use to simplify the

task of who to monitor and compete against. They also suggest that there is social consensus about categories.

Organizational research, due to concerns over power and ethics, also highlights that people sometimes manipulate category membership. For example, public companies have to report which firms they used as a basis for comparison when deciding on the compensation package for their CEOs. Usually the reports cite other firms from the same industry. However, managers include comparison firms from outside their industry in greater numbers when, for example, firm performance is low or when their industry performs well (Porac, Wade & Pollock, 1999). The implication is that managers are changing category membership when it serves the purpose of rationalizing higher compensation for their CEOs. Thus, firm categories are useful and cannot simply be ignored, but they can be manipulated.

Another area of research examines culture's influence on categories. For example, Keller and Loewenstein (2011) used a cultural consensus model analysis, following Atran, Medin and Ross (2005), to examine how people think about a complex category—cooperation. The study examined similarities and differences in how people in the U.S. and China understand 17 dimensions related to the category of cooperation. Overall, there was substantial consensus across both nations about what does and does not indicate cooperation. Importantly, there were high levels of consensus both for settings that indicate cooperation (e.g., having aligned goals, being friends with the people in one's group) and for actions that indicate cooperation (e.g., putting in effort on group tasks, sharing knowledge with others). This makes the category of cooperation complex and not easily defined, but it also makes the category of cooperation highly useful. Because the

category spans settings and actions, it performs a valuable function by linking perception and action. A broad implication might be that internal category structure might be complex so as to increase the efficiency of category use.

The study of cooperation also found a striking cultural difference in category membership. About two thirds of the Chinese participants (and a third of U.S. participants) felt that competing with others within one's group and trying to outperform them was considered cooperative, and that not trying to compete within one's group was considered non-cooperative. Additional research (Keller, Loewenstein & Yan, 2010) shows that people in both cultures believe that cooperation and competition are opposites. The difference seems to be that people in China are more likely to show a predilection for dialecticism (Peng, Spencer-Rodgers & Nian, 2006), or an interest in integrating opposites rather than keeping them separate. Dialecticism mediates the link between culture and the categorization of competitive behaviors within a group as cooperation. Broad cultural tendencies in how to reason about categories can influence category content and the relationship among categories (see Iliev et al., Chap. 29).

The cultural differences and uses of categories highlight social bases for category formation that are generally not considered by basic psychological research. Most such research assumes that what makes something a member of a category is the intrinsic properties of the category members themselves (e.g., what features it has). Additional research examines the particular goals people have in using the categories (Ratneshwar, Barsalou, Pechmann, & Moore, 2001), and the role of the category member in a larger event or system of relations (relational and role-based categories, Gentner & Kurtz, 2005; Markman & Stilwell, 2001). Yet although it is only rarely described this way, category

membership in most basic research is dictated by experimenter fiat, and participants usually manage to learn the categories. Categorization research needs a means for separating out the role of categorization based on features from categorization based on social or cultural forces.

Creativity

Research on creativity is also an important organizational behavior topic, as innovation is a common reason for the creation for new businesses and the success of existing businesses. A central finding from this work is that bringing knowledge from a variety of domains or contexts together is important for creativity (George, 2007). For example, a case study found that designers at IDEO are effective because they bring together people with experience working on different kinds of products, enabling them to draw effective analogies (Hargadon & Sutton, 1997). This is similar to Dunbar's (1995) case study research on microbiology lab groups (see Dunbar & Klahr, Chap. 35). An archival study of comic book prices found that on average, the more genres in which a comic book's authors had experience, the higher the market value of the comic book (Taylor & Greve, 2006). There was value for both individuals and teams of authors to have had varied domain experience, and signs that individuals who themselves had a variety of prior experience had the strongest relationship between variety and creativity.

A further study of creativity examined the researchers at an applied research institute, their working relationships, and the creativity of their work. The greater the variety of work experience represented in a researcher's relationships, the more likely they were to have their work rated as creative (Perry-Smith, 2006). For these researchers, the variety of work experience that was important was not those with whom one worked

closely (strong ties, in social network parlance), but those with whom one was acquainted (weak ties). These illustrative studies of creativity using a variety of methods rarely used in basic research suggest that there is robust support for the claim that the variety of knowledge one can bring to bear is important for producing creative work. It also suggests there is still unexplained variation as to when it is most beneficial for that variety of knowledge to be mastered by one person, held within a tight working group, or accessed through brief interactions.

Group cognition

The field of organizational behavior also has a strong interest in how groups and organizations learn, remember, innovate and perform. Thus, cognition research in organizations is frequently at the level of social aggregates (e.g., Walsh & Ungson, 1991). These are not claims about group minds. Rather, the interest is in how people work together, socially distributing information processing tasks and coordinating problem solving activity. For example, people working closely together learn to generate divisions of cognitive labor, allocating different kinds of information about their tasks to different members to encode, remember, and retrieve from each other when needed (Faraj & Sproull, 2000; Lewis, Lange & Gillis, 2005). At the level of the organization, research on learning curves, for example, has demonstrated that manufacturing error rates decrease and efficiency increases with production experience, echoing individual-level learning curve research (see Argote, 1999, for a review). Thus, there are literatures within organizational behavior on how large-scale cognitive tasks are socially distributed, and the cognitive challenges and opportunities involved. The implication for research on thinking and reasoning is that analyzing individual thinking and reasoning may be misleading if the

activities under study are collaborative, and that to understand the collaborative cognitive work that consumes so many people's working lives, studies of individual thinking and reasoning can offer only a partial account.

Taken together, organizational behavior research on thinking and reasoning highlights the value of studying cognition in context. For example, the categories research shows why categories may be so complex: social and cultural influences can dictate whether something is or is not a member of a category regardless of what a given individual might believe, and category membership can be complex if it serves to simplify category use. Further, because people are using categories, making decisions, learning and being creative in the context of working with others, then the thinking and reasoning they do may be qualitatively different due to those interactions and due to the distribution of thinking and reasoning across members of a team or organization.

Operations: Management science

Business activity often now involves considerable technical complexity in buying, developing, manufacturing and selling products. It also involves gathering, generating, processing, and distributing large quantities of data. Management science emphasizes the role of analytic and information technology support for guiding organizational action and decision-making. It has something of an engineering culture, and emphasizes mathematical and computational modeling to guide potentially complex, practical and large-scale concerns, such as scheduling transportation, maximizing factory production yields, and minimizing risk. Management science research links to thinking and reasoning research mainly in considering the use and flow of information, but there is also a stream that considers the pragmatic, robust implementation of routines for effective performance

despite the involvement of fallible human performers. Management science research often involves formal and computational modeling, but also includes field research, archival research, and experimental research.

Cognitive Support Systems

One concern in management science is to design support systems to process information in the service of improving decision making. Consistent with Payne and others' research on multiple goals in decision making noted earlier, Todd and Benbasat (1992) found that people tend to use decision support systems to reduce the effort involved in decision making rather than to improve the quality of their decision making. Further, if people perceive that decision systems will require effort to use or will function in a rigid way, they are less likely to want to use them (Wang & Benbasat, 2009). Novices seem particularly strongly guided by concerns about ease of use, whereas experienced users are more evenly guided by ease of use and ability to control the functioning of the decision support system (Taylor & Todd, 1995). Why and how people choose to use decision support systems appear to be consistent with research on unaided decision-making, and the interaction between the two areas should lead to more effective support systems.

The conclusions from decision support systems are consistent with broader examinations of why people choose to use any kind of information technology (Venkatesh, Morris, Davis and Davis, 2003). There are thus more areas to learn about by examining information technology use than decision-making alone. For example, different communication media serve different communication needs, so examining which media fit which kinds of tasks could lead to improved performance (Te'eni, 2001). New information technologies provide new opportunities for creating fits, and how people choose among

available communication media can therefore be informative (Watson-Manheim & Bélanger, 2007). As a further example, information systems frequently generate classification systems, and research on human categorization is beginning to guide the design of such systems (Parsons & Wand, 2008). The general point is that analyzing the features of artifacts designed to support cognition provides avenues for understanding unaided cognitive processing, and management science research has yielded a wealth of data on this issue.

Information Search

Management science also contributes to thinking and reasoning research by addressing neglected topics. For example, most basic research provides information to participants rather than examine how people search for information or examine when people decide to stop searching for information. The widespread use of information technology, company databases, and the internet makes the search for information salient, and satisficing (Simon, 1955) provides a reason to think about people's rules for stopping their search for information. One study examined five stopping rules: finding information about a single issue; finding all the information on one's initial list; noting that one's representation is no longer changing; noting that the incremental gain of each new piece of information is consistently small; and noting that the amount of information gathered reached a threshold (Browne, Pitts & Wetherbe, 2007). Different stopping rules seemed to fit with different kinds of tasks. For example, the list stopping rule was commonly used by people engaged in product and job search tasks, whereas the threshold stopping rule was commonly used by people engaged in a map search task. This line of research could be

broadly expanded and doing so could contribute substantially to understanding real-world problem solving and decision making.

Learning

Management science research also has an interest in how people learn to act in complex and dynamic systems. For example, Sterman (1989a) examined people's performance on a dynamic inventory distribution task, the classic "beer game." In the task, four people play roles in a typical supply chain: a beer manufacturer supplies a beer distributor, who supplies a beer wholesaler, who supplies a beer retailer. As customers purchase beer from retailers, retailers need to request new supplies, and those requests ripple up the supply chain, with lags at each step. People learn poorly from the delayed feedback built into the task (Sterman, 1989a). Dynamic systems modeling of the tasks facilitated pinpointing the locus of participants' errors. Tracings of the data implied that participants were using an anchoring and adjustment strategy in their largely futile attempts to keep their supplies constant. Open-ended participant responses afterwards confirmed that the impression from the model parameters fit people's subjective impressions. In additional research (Sterman, 1989b), participants in a single-player dynamic game showed similar patterns.

Interaction with a dynamically changing environment and delayed feedback is a common and often unavoidable aspect of action in the world, and clearly presents strong challenges for learning (Rahmandad, Repenning & Sterman, 2009). It is less often a feature of cognitive psychological research, but it is tractable. For example, part of people's difficulty with learning from delayed feedback is a failure to keep track of prior actions (Gibson, 2000). Modeling and experimentation showed that people's learning from delayed

feedback improved if the system displayed their history of prior actions. Similar issues regarding delayed feedback arise in computer-based tutoring systems (e.g., Anderson, Corbett, Koedinger & Pelletier, 1995), but with an added concern with task dynamics. Delayed feedback is not the only aspect of dynamic systems that is challenging conceptually. Even in very simple situations, people have difficulty understanding accumulation (Cronin, Gonzalez & Serman, 2009).

Groups

A final feature of management science research to note is that there is a concern for how groups and organizations work together using information technology to accomplish tasks. For example, large-scale projects, such as building an airplane or writing and revising the Linux operating system, raise the issue of how to design the project so that multiple people can work on the project. If working on one part of the project depends on what happens on another part of the project, this makes doing the work more complicated, error-prone, and costly. MacCormack, Rusnak, and Baldwin (2006) analyzed open source software design projects, using design structure matrices to capture the interdependencies in the source code. This method allowed them to analyze and track changes in the overall pattern of dependencies among parts of the project, providing useful insights into quantifying the design of projects to estimate the likelihood of effectively distributing the work, or what they call the "architecture for participation." It is plausible that reducing dependencies among parts of a problem would also ease individual problem solving.

Management science research, by highlighting roles for technology in thinking and reasoning and distributing thinking across individuals working together, raises similar issues to discussions of situated cognition in the 1990s. Most real-world thinking and

reasoning involves groups of people generating and using artifacts to accomplish tasks, and hence studying individuals in isolation is likely insufficient to explain the thinking and reasoning of people at work. With the proliferation of information technology, its ready accessibility in the form of mobile phones and tablets, and the geographic dispersion of work, the work in management science to understand how groups of people work and use technology to assist their work provides further support for the practical value of that research agenda and provides new reasons to extend it.

Finance: Behavioral finance

Part of the practice of business—and to some, perhaps too much of the practice of business—is concerned with financial markets. Behavioral finance aims to explain actors' decisions in financial markets, providing an alternative to financial economics models that assume markets are aggregates of the behaviors of rational agents. As psychological research has called into question the assumption that individual agents act rationally, behavioral finance researchers have begun to test for effects of biased actors on financial activity, and to formulate new models for understanding individual investor behavior and aggregate market performance (Barberis & Thaler, 2003; Subrahmanyam, 2007). This research involves core issues in finance, such as whether stock prices are accurate representations of the aggregate information about the prices of firms. Behavioral finance research consists primarily of experimental research, archival research to examine individual and aggregate performance of financial actors, and mathematical modeling.

Judgment and decision making

The most proximal cognitive concern in behavioral finance research is work examining the behavior of individual investors. This is a decision-making context about

which one can sometimes obtain excellent real-world behavioral data, such as transaction data from individual retirement accounts. It is also an important practical area to study. For many reasons, including the shift in retirement plans away from providing a defined benefit or pension to providing a defined contribution to an investment portfolio that individuals themselves manage, more people than ever are making investment decisions.

Unfortunately, people often appear to make poor financial investment decisions. There is both experimental evidence and evidence from investment records that employees tend to allocate their own retirement investment funds based on the choice sets provided by their company retirement plans (Benartzi & Thaler, 2001). The array of funds offered by companies play an important signaling role for what investments people perceive to be normative. For example, in one experiment, participants tended to allocate money evenly between two mutual funds, regardless of whether the two funds' holdings were stocks and bonds, stocks and a mixture of stocks and bonds, or bonds and a mixture of stocks and bonds (Benartzi & Thaler, 2001). This pattern matches a tendency to seek variety from options that are presented simultaneously that is also found in consumer behavior decision making research (e.g., people's selections from arrays of snack foods; Simonson, 1990). Choices made serially show less variety-seeking behavior, as people repeatedly choose a favored item. Accordingly, Benartzi and Thaler's (2001) conclusion was that people make major financial decisions based on the same heuristic that guides their selection of candy bars. Behavioral decision-making tendencies appear robust, for good and ill.

A further general point is that people seem to make decisions as if each decision was separate from others (choice bracketing; Read, Loewenstein & Rabin, 1999). Standard finance models assume that people's choices regarding an investment decision should be

linked to one's other investments, one's home mortgage, and so forth. Instead, it appears that people tend to treat these decisions as if they were independent. This tendency relates to the notion that people make choices with respect to a reference point, and hence people are sensitive to changes in utility, not absolute or total utility (Tversky & Kahneman, 1974). The reference point is often used to highlight the difference between how people perceive gains and losses, and the loss aversion effect, or the tendency to avoid losses more strongly than to seek comparably-sized gains. But just as important as loss aversion is the notion that the reference point is generated separately for each decision—decisions are narrowly framed or bracketed (Barberis, Huang & Thaler, 2006). Without this assumption, prospect theory and related models could not predict the basic loss aversion effect. Further, if people think about financial decisions separately rather than in terms of their influence on their total financial portfolio and are risk averse, this could help explain the historical reluctance of individuals to invest in the stock market—in 1984, half the households with \$100,000 in liquid assets did not own stock (Barberis, Huang & Thaler, 2006).

Vivid information appears to have large-scale effects due to its influence on decision making. Following Griffin and Tversky's (1992) suggestion that people over-emphasize vivid evidence and under-emphasize the credibility of the source of that evidence, Sorescu and Subrahmanyam (2006) tested the implications of buying or selling stocks based on large or small changes in recommendations (e.g., strong sell, sell, hold, buy, strong buy) by high and low credibility analysts. Examining stock prices over several days, all recommendations, on average, yielded gains (positive abnormal returns). However, if the evidence was vivid (i.e., a large change in recommendation) and made by a less credible source (analysts with little experience or who work for lower-prestige firms), then over the

longer term, the recommendations led to losses. In contrast, if the evidence was not vivid (small change in recommendation) or was made by a higher credibility source (analysts with years of professional experience or who work for the highest-prestige firms), then the recommendations yielded gains over the longer term (Sorescu & Subrahmanyam, 2006). The implication is that stock investors appear to overreact to low quality, vivid evidence, consistent with claims from lab research.

Behavioral finance generates some striking evidence that irrelevant or transient information can be consequential. For example, stock market returns tend to be positive on sunny days and mixed on cloudy days (Hirschleifer & Shumway, 2003; Saunders, 1993). Similarly, the outcomes of national sporting events predict national stock market performance (Edmans, Garcia & Norli, 2007). Even simple association effects matter. Company names that capitalize on cultural trends show stock market advantages. Companies adding dot-com names during the technology boom of the 1990s generated sharp gains after the announcement of their name change (Cooper et al., 2001). The gains did not fade immediately afterwards but appeared to persist. Further, companies dropping dot-com names during the technology crash also generated sharp gains (Cooper et al., 2005). Some clever companies both added and removed dot-com names, and they tended to generate stock price gains both times. Similarly, mutual fund name changes attract investors (and hence money), but have no influence on fund performance (Cooper et al., 2005). The emotion-cognition link (e.g., Clore & Huntsinger, 2007) has broad social consequences.

Prediction markets show another interaction between individual level thinking and macro behavior. In prediction markets, people wager real or virtual money on the

outcomes of future events, such as the revenue of Hollywood movie openings, the level of United States unemployment, the winners of political elections, and the outcomes of geopolitical events (Wolfers & Zitzewitz, 2004). The logic is that the opportunity to make money provides an incentive to find, aggregate and weigh information to form judgments. However, lab studies show that because people sometimes make optimistic bets, other market participants observing the bets tend to change their beliefs to believe the optimistic outcome is more likely (Seybert & Bloomfield, 2009). Thus, individual beliefs interacting with collective behavior can make beliefs more and less accurate and work on prediction markets is aimed at understanding when each occurs.

Learning and expertise

Another main finding in behavioral finance is that investors who are confident in their own abilities make more trades (Graham, Harvey & Huang, 2009). This suggests the importance not only of examining how people make a given decision, but also the reasons why they are likely to make a decision or take an action in the first place (Heath & Tversky, 1991). For example, in a series of studies of archival records of individual brokerage accounts, Odean (1998, 1999; Barber & Odean, 2000) generated evidence consistent with the possibility that overconfidence leads investors to buy and sell stocks. Odean and colleagues found that those who trade more earn less, and that the stocks they sold perform better in the coming year than the stocks they purchased.

Investment experience does not necessarily alter cognitive tendencies. For example, records of bond futures traders' personal trading accounts show that those who lost money during the first half of the trading day made more and riskier trades during the second half of the trading day, consistent with loss-aversion-induced risk-seeking behavior (Coval &

Shumway, 2005). It is as if professional traders tally their accounts at the end of each day, and wish to avoid finishing the day with a loss. Of interest, the assumptions that traders are loss averse and tally their accounts at the end of each day are key to a model of investor behavior to explain why stocks have, historically, yielded higher returns than bonds (the equity premium puzzle; Benartzi & Thaler, 1995). Thus, research on decision making appears to be a useful guide to at least some forms of important investment activity by both novices and experts; and further, cognitive research may provide useful components for models of aggregate behavior (cf., Goldstone, Roberts & Guereckis, 2008).

Overall, behavioral finance research shows that numerous individual-level cognitive tendencies have large personal consequences and are useful predictors of aggregate behavior. It is heartening to see basic research hold up in real world settings under high stakes. It is also a spur to search for more comprehensive models that incorporate additional aspects of thinking and reasoning, and to craft interventions to support people's thinking and reasoning when they are making large financial decisions.

Accounting: Behavioral accounting

Businesses aim to make money, which sounds simple but can be extremely complex to assess, let alone bring about. Behavioral accounting research examines how people generate, use, audit and regulate an organization's quantitative economic information (Libby, Bloomfield & Nelson, 2002; Sprinkle & Williamson, 2007). Accounting research is concerned with how such quantitative information is used within organizations (the domain of managerial accounting), such as for budgeting or compensation systems to pay employees. Accounting research is also concerned with how quantitative economic information is used by organizations to communicate to lenders, investors and regulators

(the domain of financial accounting), such as for financial statements the Securities and Exchange Commission requires of public companies. In all cases, there is a concern with generating accurate quantitative information for guiding decision making and behavior.

Expertise

A major tenet of how financial markets function is that markets accurately integrate information into prices. The accounting literature shows that the analysts whose judgments guide the buying and selling of stocks and other concerns traded in financial markets form systematically inaccurate assessments. One reason is that they rely too heavily on domain categories. For example, companies can use accounting categories to frame their actions in ways that influence financial analysts' stock price judgments (Hopkins, 1996). To establish baselines, Hopkins showed that an announcement that a firm acquired financing through a loan led analysts to predict no change in stock prices, whereas announcing financing through the use of additional stock led analysts to predict a 4% drop in stock prices. Hopkins (1996) provided other participants with an announcement of mandatorily redeemable preferred stock that was framed as either being like a loan or like additional stock, which yielded predictions comparable to the effects to the unambiguous frames. Thus, rather than generating the same predictions from identical financial terms, analysts with an average of 10 years of professional experience instead appeared to rely on category-based induction to guide their judgments.

As a further example, another study contrasted two forms of presenting information about firm actions on analyst forecasts (Sedor, 2002). One form was a list of facts. The other form was a narrative linking the facts into a coherent explanation. Analysts with an average of eight years of professional experience forecasted higher earnings from the

narrative form, consistent with a range of research on the value of information in story form (e.g., Pennington & Hastie, 1988) and making relations explicit (e.g., Gentner & Toupin, 1986). The implication from this work and other behavioral accounting research (Bonner, 2008) is that cognitive information-processing models make predictions that fit the judgment and decision making performance of professional accountants and analysts. Further, the research suggests that companies are taking advantage of these information-processing tendencies to generate favorable market reactions.

Another issue raised in behavioral accounting research is predicting effective knowledge transfer. Most cognitive science research examines learning and knowledge transfer in settled domains of math and science, such as probability judgments (e.g., Ross, 1987). In this way, researchers can establish correct answers. In domains such as accounting (and many other areas of business, and, for that matter, life), it is far more challenging to establish that knowledge transfer is useful rather than misleading. Cognitive science research on knowledge transfer (e.g., Loewenstein, Thompson & Gentner, 1999; Gick & Holyoak, 1980; Singley & Anderson, 1989), combined with domain task analysis (e.g., Bonner & Pennington, 1991, provided a general task analysis for the auditing process) could therefore help to identify opportunities for effective knowledge transfer. The result could produce substantial savings in training and benefits for task performance.

For example, auditors with experience in the financial services industry performed as well at assessing the potential for a manufacturing firm to go bankrupt as auditors from the manufacturing industry (Thibodeau, 2003). They were also better than analysts in the manufacturing industry at assessing bankruptcy potential for firms in the gambling industry. Thibodeau (2003) measured auditors' knowledge of the core accounting tasks for

assessing firm financial conditions, future cash flows and payment histories, and showed that this knowledge mediated auditors' assessments. Thus, cognitive research can facilitate understanding the skills involved in task performance, which in turn can guide the search for opportunities for effective knowledge transfer.

Numerical cognition

Given the strong focus on handling quantitative information in accounting, behavioral accounting research has examined managers' and accountants' memory and recall of numeric accounting data (Kida & Smith, 1995; Libby, Tan & Hunton, 2006). For example, in one study, researchers presented managers with accounting information for a specific firm as well as prior year figures and industry averages and then, an hour later, gave the managers a recall test (Kida et al., 1998). Managers remembered the affective tone of the accounting information most often, less frequently remembered the relative standing of the information (e.g., higher or lower than the prior year), and still less frequently remembered the approximate (let alone the exact) numbers.

In a further study, researchers presented managers with information about two sets of companies, separated by an hour's delay. After a further hour, they asked for the firm in which managers would be most interested in investing, and found that a firm from the first set, which clearly dominated the set, was chosen more than a firm from the second set that did not clearly dominate its set but was clearly objectively superior (Kida et al., 1998). The implication is that managers' memory for numbers may preserve affective and qualitative aspects more robustly than the exact quantities, and that as a result making decisions from one's memory of numeric data can readily become distorted. This finding relates to

consumer behavior research discussed earlier (Dickson & Sawyer, 1990) that showed consumers poorly recall exact prices.

This very brief review of behavioral accounting research provides an indication of the degree to which limitations to human thinking and reasoning, over and above decision biases, has important practical consequences for the practice of business. Behavioral accounting research might be very useful to link to research on thinking and reasoning in the law (see Spellman & Schauer, Chap. 36), which, despite having less of a numerical component, is also heavily concerned with understanding people's thinking when it is guided by a complex system of socially-generated rules.

Conclusions and future directions

The practice of business has wide scope, making many aspects of thinking and reasoning important for understanding this important applied area. Each area of business research examines thinking and reasoning involved in tasks in a major aspect of the practice of business. These are important practical concerns, so it is noteworthy for basic researchers to know that their work is being used to understand and improve behavior in these domains, and that there are applications of their work that they may not have realized.

There are many opportunities for exchange between basic and applied business researchers studying thinking and reasoning. Translating and applying basic research to understand a particular context raises questions, and studying particular applied contexts generates new phenomena and ideas. One goal of this chapter has been to highlight examples and so foster such work, in part by helping to develop mutual understanding despite differences in vocabularies (Clark, 1996). Thus, perhaps the simplest use of this

overview is to provide starting points for scholars, journals, and topic keywords to examine for relevant research. It is easy enough to miss the fact, for example, that consumer behavior research on brands, organizational behavior research on competitors or organizational identities, and behavioral finance research on portfolio allocations, is all research on categories. These and other lines of business research highlight aspects of cognition that are less often considered in standard psychological research, such as (to stick with the topic of categorization) the potential for categories to change (e.g., membership changes, typicality changes), the potential for category membership to be a choice, or the influence of social and cultural factors on category membership.

An overarching theme from most areas of business academia is linking individual and social level cognition and behavior, whether by social one means groups, organizations, industries or societies. Research on thinking and reasoning has the potential to help understand large-scale patterns of behavior (e.g., Goldstone et al., 2008; Koonce & Mercer, 2005; Loewenstein & Heath, 2009). Further, effects at those social levels in turn influence individual cognition, such as what people attend to, learn and think about (e.g., DiMaggio, 1997; Douglas, 1986; Ocasio, 1997). For example, due to the limitations of human memory, record-keeping was arguably critical for the development of advanced economies (Basu, Kirk & Waymire, 2009). Archival research shows associations between the use of writing systems and the size of communities, the use of credit, and the frequency of interactions between strangers (Basu et al., 2009). Whether it is to study culture, markets, organizations, industries, professions, or other macro concerns, research on thinking and reasoning can offer key insights.

A linked theme is that business academia makes far more use of survey and archival research methods than does basic research on thinking and reasoning. These methodological approaches offer the potential to examine sophisticated questions outside of the lab, and thereby provide evidence of real-world consequences and open up possibilities for guiding organizational action and public policy. The broader implication is that a better understanding of cognition across levels of analysis would serve to enrich research on both individual cognition and the practice of business. It might also be profitable.

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