The Cultural Category of Cooperation: A Cultural Consensus Model Analysis for China and the United States

Joshua Keller
Nanyang Business School, Nanyang Technological University, Singapore 639798, jwkeller@ntu.edu.sg

Jeffrey Loewenstein
McCombs School of Business, University of Texas at Austin, Austin, Texas 78712, jeffrey.loewenstein@mccombs.utexas.edu

We provide evidence that cooperation is a cultural category, and that what it means to cooperate is culturally conditioned. We use a cultural consensus model analysis to assess which types of situations people categorize as cooperation and whether these categorizations are consistent within and across China and the United States. The data support revisiting the role of cognition in mediating cooperative behavior and the means by which culture shapes behavior. The data also support broadening research attention to multiple aspects of cooperation within the same theory, generating new research on reciprocity, and rethinking how key behaviors, such as competition and helping, relate to cooperation.

Key words: cooperation; team cognition; cultural consensus; categorization; China
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Understanding the cultural construction of organizations (Dobbin 1994) should include understanding the cultural construction of the processes, such as cooperation, that are central to organizing. Most theories of cooperation include the possibility for people's perceptions of situations to guide their choices to cooperate. However, previous theories of cooperation have not considered that what it means to cooperate is itself open to interpretation, and hence research has not systematically examined what people believe counts as cooperation. We examine the lay beliefs of individuals from the United States and China and estimate cultural-level understandings of cooperation. The lay beliefs support a richer view of what cooperation is than claimed by prior cooperation research, question common theoretical assumptions about cooperation, and suggest new avenues for cooperation research.

Cooperation is concerned with how people work together to advance group or organizational goals (Blau 1963, Chen et al. 1998, Jones and George 1998). Cooperation is clearly a central organizing process with important implications for organizations (Barnard 1938). Cooperation can improve performance (Campion et al. 1996, Stanne et al. 1999), enhance employee satisfaction (Campion et al. 1996), and reduce conflict (Tjosvold 1998). It is the subject of many theories, including dilemma research (Dawes 1980, Komorita and Parks 1996), procedural justice research (Tyler and Blader 2000), and organizational citizenship behavior research (Organ 1988).

Cooperation is a theoretical construct defined by researchers, but it is also a term that people use themselves. We examine lay beliefs about cooperation,

generating empirical support for conceptualizing cooperation as a *cultural category* (Atran et al. 2005, D'Andrade 1995, Sperber and Hirschfeld 2004). Cultural categories are social conventions (Millikan 2005) generated by cultural groups for labeling and grouping sets of objects, material practices, social actors, and other socially experienced examples (Douglas 1986, Hannan et al. 2007). Data supporting a cultural categories approach to cooperation also support the claim that beliefs about cooperation are socially constructed.

A direct implication is that it is not possible for theories of cooperation to provide universal definitions of what people believe does and does not count as cooperation. However, prior cooperation research has done just this (Smith et al. 1995). Cooperation researchers account for variability by allowing that people can differently interpret ambiguous situations (e.g., Barnard 1938, Hornstein and Deutsch 1967). For example, members of a project team could be unclear about whether another member is cooperating because they have insufficient or unclear information about the other member's actions. We add that people can also have different beliefs about what cooperation is. To illustrate this possibility, we provide an example from our experience at an international high-technology company. Members of a cross-national (United States and China) project team were working diligently on a project. They all believed that all members were cooperating. However, only the U.S. members of the team believed that responding quickly to e-mails indicated cooperation. The Chinese members of the team believed that deliberating on a group response exemplified cooperation. When the Chinese members deliberated on a response, it resulted in a delay that the

U.S. members interpreted as noncooperative, resulting in reduced work effort and an eventual disbandment of the project. Thus, despite the members' initial intentions to cooperate, their different beliefs about what indicated cooperation prevented them from sustaining cooperation and ultimately resulted in negative consequences.

This anecdote highlights the importance of understanding cultural variations in beliefs about cooperation. People within workgroups rely on implicit coordination to adjust their behaviors without communication (Rico et al. 2008, Wittenbaum et al. 1996). Workgroup members interpret others' actions and then use their interpretations to select responses (Gibson and Zellmer-Bruhn 2001). Therefore, in deciding whether to cooperate, people rely on their interpretations of situations and of the available actions in those situations (e.g., Larrick and Blount 1997, Zhong et al. 2007). Interpretations are particularly important for cooperation because cooperation entails ongoing social interaction and reciprocity (Fehr and Gintis 2007), and we know that people reciprocate based on their interpretations of others' actions, not merely the outcomes of those actions (Keysar et al. 2008). For people to reciprocate with actions of the same type as they received, they have to agree on what counts as cooperation. Thus, we suggest that broadly shared conventions about what does and does not indicate cooperation are important for effective reciprocity and sustaining cooperation. Sustaining cooperation, in turn, should facilitate group motivation, coordination, and performance (Chatman and Flynn 2001).

Accordingly, we examine whether there are conventional beliefs about the specific types of workgroup situations that people in the United States and in China think count as cooperation. We focus on workgroups because they are a core part of organizations and their dynamics can often be extrapolated to other organizational contexts (Cohen and Bailey 1997). Also, workgroup members are often reciprocally interdependent (Thompson 1967), so cooperation is critical for their functioning (Wageman 1995). We focus on the United States and China because they are typically portrayed as extreme cases because of their cultural values profiles, particularly for individualism-collectivism (Hofstede 1980) and because they have markedly different beliefs about workgroups (e.g., Gibson et al. 2001, Menon et al. 1999).

The Cultural Category of Cooperation
We conceptualize cooperation as a cultural category because categories are basic building blocks of cognition. Categories are knowledge structures that cluster sets of examples that belong to the same class, usually because the group perceives the examples to be equivalent in some way (e.g., share a common appearance, function, or underlying essence, Murphy 2002). Thus, an understanding of the development and use of categories provides insights into larger knowledge structures such as schemas and mental models that are constructed of categories (Markman 1999). Categories decrease the amount of information required for making a decision, they connect past experiences to present situations, and they provide inferences that can direct action (Smith 1989). Individuals can generate categories independently (e.g., Medin et al. 1987), but most often individuals learn and use socially or culturally constructed categories (e.g., Douglas 1986, Tomasello 2003). If categories are culturally held, they provide a basis for people in organizations to interpret situations in a mutually consistent fashion and form useful expectations about others' potential subsequent actions (Dutton and Jackson 1987). Prominent examinations of key organizational categories are studies of *threats* and *opportunities* (Jackson and Dutton 1988), *work* and *play* (Glynn 1994), *performance* (Binning et al. 1986), and *leadership* (Ames and Flynn 2007, Ensari and Murphy 2003, Palich and Hom 1992).

Examining cooperation as a category has not been emphasized in prior research. Instead, theories of cooperation rely on the assumption that people will perceive certain aspects of situations (e.g., group members having aligned goals, Deutsch 1949, Tjosvold 1984; group members making choices that benefit group outcomes, Komorita and Parks 1996) and somehow respond appropriately. However, these perceptions and responses must have some connection to a *category* of cooperation as the basis for the interpretation behind the perceptions and the selection of responses, because there are so many possible situations that could exemplify cooperation (Argyle 1991, Tyler and Blader 2000). Reciprocity also implicitly assumes categorization by assuming that an act requires a response that is equivalent (Gouldner 1960), meaning of the same value or of the *same kind*. Thus, our study provides data that question the implicit assumption common to theories of cooperation that the meaning of cooperation is fixed, and provides data that highlight and extend the typically overlooked point in theories of cooperation that cooperating requires categorizing situations.

From a categories perspective, there is no simple definition of cooperation. There are no necessary and sufficient features that determine category membership (Smith and Medin 1981). Instead, people's understandings of cultural categories are shaped by a large number of experiences interacting and communicating with others, learning socially legitimated ways to identify and interpret experiences and direct action (Harnad 1987). In this process, they are learning social conventions (Lewis 1969, Ullmann-Margalit 1978) about what situations are members of cultural categories—*categorization conventions*. We expect that categorization conventions will vary by situation, such that there are broadly shared

conventions that some situations are considered category members, but there is little agreement about other situations (cf. Diesendruck and Gelman 1999). For example, people may largely agree that some situations indicate cooperation (e.g., putting in effort on group tasks seems likely to be widely considered cooperative), but show less agreement that other situations indicate cooperation (e.g., compromising on one's position might be found cooperative by most, but not all). Understanding the specific categorization conventions regarding particular situations is important for building theories of cooperation, because they indicate what cooperation means to people themselves and could be used to estimate important outcomes such as the likelihood of successful reciprocity.

Cultural Consensus About the Category of Cooperation

Given the importance of culture in category formation, it is an important open question as to whether people within and across cultures have a consistent understanding of the category of cooperation. Social construction does not rule out the possibility of different cultures generating similar categories (e.g., Atran et al. 2005). Indeed, some kinds of similar categories appearing across cultures can be predicted (e.g., Gentner and Boroditsky 2001). Evolutionary theorists suggest that members of all societies, even the least developed, experience tensions concerning working together (Ostrom 1990, Price 2006). According to this perspective, cooperation is a fundamental type of social condition that is shared by all people. If so, people in any culture will experience similar social dynamics, and hence have the potential to generate similar categorization conventions to represent those social dynamics. Of course, social construction allows for there to be cultural differences as well, particularly if there is substantial contextual variability and complexity, as in the case of cooperation. Thus, it is possible for there to be consistent conventional beliefs about cooperation across cultures (*metacultural conventions*), as well as differences in conventional beliefs about cooperation between cultures (*culture-specific conventions*).

In examining cooperation as a cultural category, we are following a theoretical approach to culture centered on examining knowledge structures (Hong et al. 2000, Menon et al. 1999). We are asking how people understand situations within their own culture. This contrasts with the more common cultural values approach to studying culture that focuses on researcher-defined theoretical constructs. Cultural values researchers attempt to specify fundamental universals based on the premise that people external to a culture can formulate dimensions (e.g., power distance and individualism-collectivism) that aptly characterize the crucial social concerns in that, or any, culture (Hofstede 1980, Triandis 1995).

This has been the dominant approach to studying the relationship between national culture and cooperation, with researchers focused on whether individualism-collectivism has a main effect (e.g., Cox et al. 1991, Mann 1980) or moderating effects (Chen and Li 2005) on cooperative behavior. In this work, similarities across cultures are treated as null effects, and differences among people within a culture are treated as error variance. These are limitations, because national cultures are not unidimensional, completely distinct from one another, or internally homogeneous (Gelfand et al. 2007, Gerhart 2008, Morris et al. 2008, Tsui et al. 2007). Therefore, more fully capturing the role of culture in influencing cooperation requires additional approaches. The knowledge structure approach to cultural research meets this need.

The knowledge structure approach relies on a different set of fundamental universals. These are that people within cultures generate and learn knowledge structures, those knowledge structures become conventionally associated with particular cultural cues and situations (i.e., categorization conventions are formed), and those knowledge structures guide thought and action in those situations (Hong et al. 2000, Tomasello 2003). No knowledge structure, cue, or situation is universal. There is no limit on the number of knowledge structures there can be within a culture. Consequently, a key object of research is to study the specifics of cultural knowledge structures—what cultural members themselves believe—because those beliefs guide action. Another key object of research is assessing variability, within and across cultures, in people's understandings of cultural knowledge structures.

We take an inductive approach to assessing the cultural category of cooperation. No theory of cooperation makes claims about what people's own beliefs about cooperation will be. An inductive approach allows us to explore whether there is cultural consensus about the category of cooperation, what the conventional beliefs are for particular types of situations, and cultural differences in these conventions. We used a cultural consensus approach (Romney et al. 1986; see the appendix). Cultural consensus theory and cultural consensus model analyses were developed by cognitive anthropologists to assess cultural-level knowledge from individual informants. The analytic approach is to assess whether there is an overall (metacultural) consensus about what people categorize as cooperation (there could be no consensus), and whether there are distinct subcultures with even more consistency in their beliefs (there may be none). Thus, our search for consensus starts with patterns of responses about what cooperation is and simultaneously derives both interpretations of what the category of cooperation is and the culture or cultures that hold those interpretations.

Methods

Following the two-step pattern of prior research using cultural consensus model analyses (Weller 2007), we first gathered types of situations relevant to cooperation from published research, news sources, written open-ended statements, and semistructured interviews. Then we generated a questionnaire with several examples of each type of situation and presented it to participants in the United States and China.

Development of the Situation Types

Part of developing the types of situations to examine in our questionnaire was deriving types of situations that could indicate cooperation from written sources. An author and a research assistant collected situation types from peer-reviewed organizational research articles that mentioned "cooperation," drawn from two English-language databases (Business Source Premier, ISI Web of Science) and one Chinese-language database (China Academic Journal Database). Literature included Western research on social interdependence (e.g., Deutsch 1949, Tjosvold 1984), social dilemmas (e.g., Dawes 1980, Komorita and Parks 1996), free-riding (e.g., Albanese and Van Fleet 1985, Spagnolo 1999), and organizational citizenship (e.g., Organ 1988), as well as Chinese research on cooperation written both in Chinese (e.g., Lou 2002, Zhang 2000) and in English (eg., Farh et al. 2003, Ng et al. 2008). The researchers also gathered popular press articles that included the word "cooperation" from one month's worth of articles drawn from Factiva (a comprehensive English-language directory of news sources) and from Sina Web (http://news.sina.com.cn, a Chinese-language portal website). The researchers identified situations described as instances of cooperation, with a liberal criterion so as to bias towards inclusion. As an additional source of situations that could be described as cooperation, we asked 96 undergraduate students from the United States an open-ended question (embedded within a larger study): "What do you believe cooperation within a workgroup entails?" Every situation type from the scholarly articles, the popular press articles, and the open-ended responses was recorded, categorized by the author and research assistant (irr = 0.83), and aggregated into types of workgroup situations. The result was a list of 23 broad types of situations that were mentioned in at least 5% of at least one type of source (e.g., the Chinese popular press articles). There were 14 identified in all sources, 4 just from Western published sources, 3 just from Chinese published sources, and 2 just from the United States open-ended responses.

Next, we conducted semistructured interviews with 15 respondents, each 20–30 minutes, to gather further situation types and to evaluate the 23 we had already generated. The U.S. respondents were three graduate students with at least three years of full-time work experience and two undergraduate students with no full-time

work experience. The Chinese respondents were 10 graduate students from the Peoples' Republic of China with up to five years of full-time work experience. They were native Chinese speakers, and their interviews were conducted in Mandarin Chinese. We first asked open-ended questions about what situations they believed indicated cooperation. We asked interviewees to describe types of situations that were cooperative and noncooperative, and when a situation changes from being cooperative to noncooperative. For example, one interviewee mentioned that being on time to a meeting is cooperative and being late is noncooperative, and we followed up by asking how many minutes early to a meeting is cooperative, and how many minutes late is noncooperative. Next, we asked each interviewee to rate the 23 types of situations from the written sources for their degree of cooperativeness, as well as two additional types of situations that were not related to cooperation to anchor the low end of the scale. We further asked respondents to rank order the types of situations from most to least cooperative. After completing all the ratings and rankings, we asked the interviewees to explain their answers and describe specific instances that would be cooperative or noncooperative, and the point at which a situation becomes cooperative.

After the interviews were conducted, open-ended responses were then recorded, categorized by two researchers (irr = 0.86), and aggregated. This yielded two additional types of situations (*friendly relations* and *humility*) that were each mentioned by at least three of the Chinese interviewees, but not included in the first-stage sources. We then conducted a follow-up interview with five of the Chinese interviewees, and found that they agreed that friendly relations and humility were high indicators of cooperation (relative to other situation types), and so merited inclusion.

We found that of the 23 situation types we asked about during the interviews, 13 were consistently ranked most highly, rated as at least moderately cooperative, and explained as being clearly relevant to cooperation. The remaining 10 situation types (including, for example, *job satisfaction*) were given notably lower rankings and ratings, and more tentative explanations linking them to cooperation. In addition, in examining the specific instances mentioned for the 13 types of situations, two types appeared to have somewhat different examples listed, leading us to subdivide them (this division was later supported by inspecting item reliabilities in our questionnaire): *doing work on behalf of the group* was divided into *effort towards group goals* (promoting group outcomes) and *refraining from leisure* (preventing group harm); *acting considerately* was subdivided into *coordination of activities* (task-focused consideration) and *compromising* (relational consideration). Thus, together with the two new situation types, *friendly relations* and *humility*, we had a list of 17 types of situations with support for being clearly related to cooperation, 11 of which had

support from both U.S. and Chinese sources, 3 of which had support from only U.S. sources, and 3 of which had support from only Chinese sources.

Constructing the Questionnaire Materials

We used the interview data to generate simple, concrete instances of workgroup situations exemplifying each of the 17 types of situations we identified. We generated several instances to exemplify each of several levels of each situation type. For example, *friendly relations* was divided into two levels: "Group members are also very good friends" was an instance of high friendly relations, and "None of the group members are friends" was an instance of low friendly relations. Levels were determined on the basis of prior research and our interviews, and were built into the structure of the items on the questionnaire. In support of our questionnaire design, the mean reliability of all the levels for all the situation types was 0.71, and 80% of the reliabilities were at least 0.70; we discuss the few areas of low reliability in the results section. The national origin of each situation type, sample items for each level of each situation type, the number of items per level, and reliabilities per level are all presented in Table 1.

Situation Types and Levels Used in the Questionnaire. We briefly explain each situation type and its levels. *Competition* (two levels, 6 items) involves attempting to gain a relatively higher position within the group (Stanne et al. 1999), often treated as antithetical to cooperation in the social interdependence (Deutsch 1949) and dilemma (Komorita and Parks 1996) literatures. High levels of competition indicate the presence of competition, and low levels of competition indicate the absence of competition.

Compromising (three levels, 12 items) refers to refraining from advocating one's position for the sake of the team, considered cooperative in social interdependence theory research (Tjosvold 1998). High compromising indicates a complete removal of one's own position, medium compromising indicates yielding on aspects of one's position, and low compromising indicates no yielding on one's position.

Confrontation (two levels, 5 items) is concerned with how group members address issues and problems, consistent with the Confucian concept of harmony (Chen and Chung 1994, Leung et al. 2002), which has recently been conceptualized as a component of cooperation within Chinese organizations (Ng et al. 2008). High confrontation entails confronting others directly about problems. Low confrontation entails avoiding direct confrontation and instead choosing no communication or subtle hints when problems arise.

Coordination of activities (two levels, 12 items) involves individuals' effort at acting considerately so as to work together effectively. High coordination of activities would involve showing up on time to a meeting,

whereas low coordination of activities would involve showing up late.

Division of labor (three levels, 6 items) refers to the specificity of task assignments among teammates, a focus of theories on working relationships in Chinese organizations (Shenkar 1984). High division of labor indicates a complete division of labor, medium division of labor indicates some assignment of roles, and low division of labor indicates no assignment of roles.

Effort towards group goals (three levels, 24 items) is action to promote group gain, and *refraining from leisure* (three levels, 24 items) is action to limit group harm, both of which are consistent with Western theory on *productive cooperation* (Spagnolo 1999) and free-rider theory (Olson 1965, Albanese and Van Fleet 1985). High effort towards group goals involves effort that goes beyond group expectations. Medium effort towards group goals involves effort that meets but does not surpass group expectations. Low effort towards group goals involves effort that fails to meet group expectations. High refraining from leisure involves taking less time away from work than group expectations. Medium refraining from leisure involves taking the expected amount of time away from work. Low refraining from leisure entails taking more time away from work than group expectations.

Equality of output (two levels, 6 items) is concerned with the relative output that each teammate produces, consistent with Western theories on teams (Van Lange 1999). High equality of output indicates that all team members contribute equally, whereas low equality of output indicates a discrepancy in the amount of output each member is contributing.

Friendly relations (two levels, 6 items) is the extent to which team members have friendly relationships beyond the scope of the task, consistent with *guanxi* (the social network of informal relations) being treated as a critical aspect of cooperation in research on Chinese workgroups (Chou et al. 2006). High levels of friendly relations means that group members socialize outside of work and low levels means that group members do not socialize outside of work.

Goal alignment (three levels, 6 items) refers to the internal goal structure in the team, consistent with social interdependence theory's definition of cooperation as a state in which reaching one's goals hinges on others reaching theirs (Johnson and Johnson 1989). High goal alignment indicates a complete alignment of members' goals. Medium goal alignment indicates a mix of aligned and misaligned goals. Low goal alignment indicates a lack of aligned goals.

Group incentive structure (three levels, 6 items) refers to the organization's emphasis on teamwork, consistent with an organizational effort to create a context for cooperation (Hackman 1987). High group incentive structure occurs when the organization values or rewards team

Table 1 Types of Situations Examined in the Cultural Consensus Model Analysis

Situation type (and national origin)	Levels with examples of items
Competition (both)	High (4, $\alpha = 0.81$): "Members try to outperform other members." Low (2, $\alpha = 0.71$): "Members don't try to perform better or faster than other members."
Compromising (United States)	"There are a lot of items at a meeting so the group wants to limit the number of new items raised to two." High (4, $\alpha = 0.74$): "Some members choose not to raise any new items." Medium (4, $\alpha = 0.65$): "Some members choose to raise two items." Low (4, $\alpha = 0.80$): "Some members choose to raise three items."
Confrontation (both)	High (3, $\alpha = 0.58$): "When a member makes a big mistake, others confront her in a group meeting." Low (2, $\alpha = 0.56$): "When a member makes a big mistake, others make subtle hints about her mistake."
Coordination of activities (United States)	"Showing up early to a meeting would provide discussion opportunities not covered in the meeting." High (6, $\alpha = 0.69$): "Some members show up 15 minutes early." Low (6, $\alpha = 0.70$): "Some members show up 5 minutes late."
Division of labor (both)	High (2, $\alpha = 0.73$): "The group divides the project into separate tasks and each member is solely responsible for one task." Medium (2, $\alpha = 0.55$): "The group divides part of the project into separate tasks and each member is solely responsible for one task, and everyone is responsible for working on the rest of the project." Low (2, $\alpha = 0.68$): "The group does not divide the project into separate tasks, and thus no member is solely responsible for any one task."
Effort towards group goals (both)	"The group members agree to each spend at least 20 hours on the project this week." High (8, $\alpha = 0.79$): "Members spend 30 hours on the project." Medium (8, $\alpha = 0.77$): "Members spend 20 hours on the project." Low (8, $\alpha = 0.79$): "Members spend 15 hours on the project."
Equality of output (United States)	High (4, $\alpha = 0.72$): "Each member spends exactly 20 hours on a project." Low (2, $\alpha = 0.70$): "Some members spend 10 hours and others spend 30 hours on the project."
Friendly relations (China)	High (4, $\alpha = 0.66$): "Group members spend a lot of time together outside of work." Low (2, $\alpha = 0.69$): "Group members never spend time together outside of work."
Goal alignment (both)	High (2, $\alpha = 0.69$): "Members all believe in the same goals for the group." Medium (2, $\alpha = 0.68$): "Members agree on some of the goals for the group, but not some other goals." Low (2, $\alpha = 0.67$): "Members don't believe in the same goals for the group."
Group incentive structure (China)	High (2, $\alpha = 0.68$): "The organization rewards project team performance more than individual performance." Medium (2, $\alpha = 0.56$): "The organization rewards project team performance as much as individual performance." Low (2, $\alpha = 0.58$): "The organization rewards project team performance less than individual performance."
Helping (both)	"A few members of the group have unfinished work that needs to get done when they are suddenly told to help others with another task." High (8, $\alpha = 0.78$): "Several members stop their own work immediately and spend the rest of the day helping these others." Medium (8, $\alpha = 0.84$): "Several members go help with the others' task as soon as they're done with some of their own work." Low (8, $\alpha = 0.78$): "Several members are busy with their own work all day so they don't go help the others."
Humility (China)	"When asked what they are working on," High (8, $\alpha = 0.82$): "only mention others' roles on their group task." Medium (8, $\alpha = 0.67$): "mention their own role on their group task." Low (8, $\alpha = 0.77$): "only mention their own role on their group task."
Ingroup vs. outgroup relations (China)	High (2, $\alpha = 0.73$): "Members help other members of this group more than members of other groups." Medium (2, $\alpha = 0.66$): "Members help other members of this group and members of other groups equally." Low (2, $\alpha = 0.64$): "Members help other members of this group less than members of other groups."
Knowledge sharing (both)	"Several members meet to brainstorm some ideas and take notes." High (8, $\alpha = 0.72$): "The members immediately send an email to the whole group." Medium (8, $\alpha = 0.72$): "The members include the ideas in a report a month later." Low (8, $\alpha = 0.77$): "The members don't distribute the notes."
Leadership presence (both)	High (4, $\alpha = 0.55$): "One member manages the others working on the project." Low (2, $\alpha = 0.62$): "No member manages others on the project."
Open communication (United States)	High (2, $\alpha = 0.72$): "The group members make sure any concerns about what to do next are raised." Low (4, $\alpha = 0.76$): "A member is concerned about another member's performance, but does not say anything."
Refraining from leisure (both)	"The group agrees to limit their lunch break today." High (8, $\alpha = 0.74$): "Some members have an hour in between meetings, but choose to take no lunch break." Medium (8, $\alpha = 0.76$): "Some members have an hour in between meetings, but choose to take 30 minutes." Low (8, $\alpha = 0.75$): "Some members have an hour in between meetings and choose to use that hour for lunch."

performance more than individual performance. Medium group incentive structure occurs when teams and individuals are valued equally. Low group incentive structure occurs when the organization favors individuals over teams.

Helping (three levels, 24 items) refers to helping others with their work when they are having trouble, a commonly discussed behavioral manifestation of cooperation (Jones and George 1998). High helping involves choosing to help another over doing one's own work. Medium helping involves balancing one's own work with helping others. Low helping involves choosing to do one's own work instead of helping others with theirs.

Humility (three levels, 24 items) involves deferring credit for task work, consistent with a Confucian principle emphasizing avoiding "showing off" (Allinson 1982). High humility entails taking no credit for one's role in a group task. Medium humility entails taking credit, but also giving other people credit for one's role in a group. Low humility entails giving no credit to others and taking all credit for a group task.

Ingroup-outgroup relations (three levels, 6 items) is the extent to which members have personal relationships that are more favorable with team members than with other groups, consistent with Confucian philosophy's emphasis on concentric circles of relationships (Chen and Chung 1994). High ingroup-outgroup relations indicates ingroup favoritism, medium ingroup-outgroup relations indicates no favoritism, and low ingroup-outgroup relations indicates outgroup favoritism.

Knowledge sharing (three levels, 24 items) refers to providing task-relevant information to others, which is often treated as a behavioral manifestation of cooperation (Chatman and Flynn 2001, Gaertner et al. 1990, Quigley et al. 2007). High knowledge sharing involves sharing information before using it for one's own work. Medium knowledge sharing involves sharing information after using it for one's own work. Low knowledge sharing involves no sharing at all.

Leadership presence (two levels, 6 items) refers to the presence of a leader within a team. High leadership indicates there is a clear leader within the team, and low leadership indicates there is no established leader within the team.

Open communication (two levels, 6 items) involves team members openly discussing issues and problems, which is commonly treated as a component of cooperation (Campion et al. 1996, Gladstein 1984). High levels of open communication involves all team members ensuring that issues are addressed, whereas low levels of open communication involves the lack of open expression when a problem arises.

As Table 1 shows, we generated 203 items to represent the 17 types of workgroup situations just discussed.[1] Some types of situations were represented by more items than others because we tested them in the context of

both a norm created by group members themselves as well as a norm imposed on the group (e.g., by a group leader, supervisor, or set organization-wide) and whether a person's act was mandatory or discretionary (Tyler and Blader 2000). This served to control for the potential influence of contextual factors in Chinese responses. Because our results were consistent across these factors, we combine these data for ease of exposition.

The items were written in English, translated into Chinese by a native Chinese speaker fluent in English, and then translated back into English by a native English speaker fluent in Chinese. We administered original and back-translated questionnaires to 40 participants in the United States from the same participant pool as our questionnaire participants. The mean responses to each question on the original and back-translated questionnaires were highly correlated ($r = 0.93$). A series of chi-square tests compared the two samples' responses for each item on the questionnaire, revealing only one statistically significant difference. This item proved to be a translation error and was dropped. The original version of the questionnaire was used for the full U.S. sample.

Questionnaire Participants
We used student samples from the United States and China to control for current organizational cultural influences in categorization and thus to specifically address differences at the national level. It was also important because the questionnaire was long. Given our focus on workgroup cooperation, a prerequisite for participation in the study was experience working in task groups. The 200 Chinese participants were students at a top-ranked university located in Beijing, China. They were given 50 RMB (USD $6.00) for their participation. Their ages ranged from 17 to 32, averaging 23, and 56% were female. About half (55%) were undergraduate students; the rest were graduate students. The 200 U.S. participants[2] were students (99% undergraduate) at a large public university in the southwestern United States. They received extra credit in a business course. Their ages ranged from 19 to 38, averaging 21, and 41% were female. In all, 69% were Caucasian, 15% were Asian American, 12% were Hispanic, and 4% were African American. We found no effects of demographic factors beyond nationality (China/United States), including gender, years of work experience, overseas experience, foreign language ability, major, and graduate student status.

Procedure and Design
We told questionnaire participants they would be reading about workgroup situations. They answered questions about all 203 items representing the 17 types of situations. The Chinese participants responded by paper and pencil, answering 20–25 items per page. The U.S. participants responded to a computer-presented version of the

questionnaire, answering five items per screen. Then participants reported demographic information. Participants required about an hour to complete the questionnaire.

Participants evaluated each questionnaire item in the same way. First, they stated categorically whether the situation depicted in the item indicated cooperation, yes or no. Then, if they had said yes, the item indicated cooperation, they rated how strongly it did so on a 7-point Likert scale. We focus our analyses on participants' dichotomous "yes" or "no" responses because these data most simply address our question about what situations do and do not indicate cooperation and because the pattern of data from the scale responses was essentially redundant. The greater the proportion of participants who said "yes" to the dichotomous question for a given item, the higher the average scale rating was for that item ($r = 0.78$). Although there can be differences in judgments of category membership (our yes or no question) and of category typicality (our scale question, Diesendruck and Gelman 1999), finding strong correlations is common. For example, across 18 categories, McCloskey and Glucksberg (1978) found a 0.88 correlation.

For the sake of robustness, we randomly assigned equal numbers of Chinese and U.S. participants to one of five between-subject conditions to vary the exact question used to ask whether the items indicated cooperation. Separate groups of participants were asked whether "this is cooperation," "this helps cooperation," "this causes cooperation," "this hinders cooperation," or "this is the opposite of cooperation." The last two questions about "hinders" and "opposites" were asked to distinguish items indicating noncooperation (which should get "yes" responses to the "hinders" and "opposite" questions and "no" responses to the other questions) from items with no clear relation to cooperation (which should get "no" responses to all questions, an outcome found for just 10 items). We analyzed the data from each question type separately and tested for consistency. As a further effort towards robustness, we counterbalanced the order in which participants read the items. Half the participants read the items in one randomly generated order, and the remainder read the items in the reverse order.

Measures

We examined participants' responses to the entire questionnaire to assess whether there was an overall, metacultural consensus about the category of cooperation, as well as whether there were distinct, culture-specific consensus patterns for the two nations. We also separately examined patterns of participants' responses to each type of situation to determine the categorization conventions and their breadth for each specific situation type.

Metacultural Consensus. To assess whether the two nations shared a common understanding of what indicated cooperation, we conducted an analysis consistent with the formal cultural consensus model (Romney et al. 1986; see the appendix). Our analysis began with a participant-by-item matrix of 1s and -1s recording each participant's response to the dichotomous question for each item in the survey. This matrix was transformed into a participant-by-participant agreement matrix using the match method (see the appendix). We first generated five agreement matrices, one for each of the five questions asked (is, helps, causes, hinders, opposite—with hinders and opposite reverse coded), with each matrix representing data from 40 Chinese and 40 U.S. participants. Subsequently, we also examined matrices including all participants, all U.S. participants, and all Chinese participants. The matrices were submitted to unrotated, minimum residuals factor analyses. We tested whether the results of these factor analyses violated the assumptions of the formal cultural consensus model (see the appendix): there should be a single cultural "answer key" (the common truth assumption), and people who are knowledgeable about one subset of the questions should be knowledgeable about another subset of the questions (the monotonicity assumption, Romney et al. 1987). If the assumptions hold for a sample that includes participants from the United States and China, then this indicates the presence of a metacultural category (Medin et al. 2006). Moreover, the first factor loadings for each participant indicate *cultural competence scores*, representing the proportion of the categorization conventions the participant shared with the group.

We also tested for subcultures. Following the approach of Medin et al. (1997), we analyzed whether the second factors from the factor analyses accounted for notable variance, which is evidence of latent subcultures. If so, then we examine whether participants' second-factor loadings were correlated with nationality or any other demographic variable. If so, then separate cultural consensus model analyses can be run for each subculture (e.g., each nation).

Situation-Specific Categorization Conventions. If the results find evidence of consensus, then we can assess categorization conventions for specific types of situations. To do so, we generated a categorization convention measure by weighting participants' answers to each question (-1 for no, 1 for yes) by their cultural competence scores (derived from single-nation cultural consensus model analyses). Thus, we used the results of the cultural consensus model analysis to adjust the raw proportions of "yes" responses such that we draw more heavily from those whose views are generally consistent with others and deemphasize those whose views are generally idiosyncratic. It is a Bayesian adjustment to generate high posterior probabilities of capturing cultural-level knowledge from individual respondents. Each participant's weighted answers were then averaged together for each level of each situation type, and then these were averaged across participants.

The categorization convention scores provide two kinds of information in one scale, analogous to how the correlation coefficient indicates both the direction and strength of the relationship between variables. Categorization convention scores indicate whether there is a convention that a given situation type indicates cooperation (if it is positive) or noncooperation (if it is negative), and how broadly that convention is supported (how close it is to 1 or −1, rather than 0). A −1 means all participants believe that a situation type indicates noncooperation. A 1 means all participants believe that a situation type indicates cooperation. A 0 indicates that there is no convention about whether a situation type indicates cooperation or noncooperation. Categorization convention scores close to 0 (e.g., 0.22 or −0.18) indicate that the convention regarding the situation type is narrowly held. Scores close to 1 or −1 (e.g., 0.87 or −0.91) indicate that the convention regarding the situation type is broadly held.

Results

Our cultural consensus model analyses produced evidence for a metacultural consensus, but with pointed cultural differences. These data support the assertion that cooperation is a cultural category. Subsequent analyses of each specific type of situation revealed areas of metacultural consensus and culture-specific consensus.

Metacultural Consensus

We found clear evidence of an overarching metacultural consensus about the category of cooperation. The results from all five questions—*is*, *helps*, *causes*, *hinders*, and *opposite*—showed consistent consensus patterns (Table 2(a)) and consistent responses more generally (Table 2(b)). Our cultural consensus model analyses met the statistical criteria for satisfying the assumptions of the formal model (Romney et al. 1987, Weller 2007). In support of the common truth assumption, across all of our cultural consensus model analyses, the ratio of the eigenvalues for first factor to second factor had a mean of 6.3:1, which is higher than the conventional 3:1 criterion. In addition, all participants' competence scores ranged between 0 and 1, meeting a second criterion of common truth. Our data also satisfied the monotonicity assumption, because participants' competence scores for different situation types were reliably positively correlated. For example, participants' competence

Table 2(a)   Cultural Consensus Model Analysis Results by Question and Across All Questions

	Metacultural						China	United States
	"Is"	"Helps"	"Causes"	"Hinders" (reverse)	"Opposite" (reverse)	All	All	All
N	80	80	80	80	80	400	200	200
First factor (common)	31.2	33.0	30.0	32.3	31.3	153.5	81.3	85.7
Second factor (subgroup)	5.2	5.8	5.3	3.9	5.4	24.1	10.2	11.1
First:second factor ratio	6.0	5.7	5.6	8.4	5.8	6.4	8.0	7.7
Second factor correlation with national culture	0.59**	0.41**	0.87**	0.70**	0.60**	0.62**	—	—
Metacultural variance (%)	56.9	59.4	52.2	59.4	57.6	57.4	—	—
Culture-specific variance (%)	6.9	6.1	9.7	5.3	7.5	6.6	—	—
Remaining variance (%)	36.2	34.5	38.1	35.3	34.9	34.0	—	—
Cultural competence mean	0.60	0.63	0.57	0.62	0.61	0.59	0.66	0.71
Yes answers (%)	61	57	57	50	50	57	58	56

*p < 0.001.

Table 2(b)   Correlations of the Mean Proportions of Yes Answers to Each Question by Nation and Question Type

Nation	Question type	1	2	3	4	5	6	7	8	9
China	1. Is									
	2. Helps	0.94**								
	3. Causes	0.93**	0.95**							
	4. Hinders (reversed)	0.91**	0.94**	0.95**						
	5. Opposite (reversed)	0.92**	0.94**	0.96**	0.96**					
United States	6. Is	0.80**	0.80**	0.75**	0.77**	0.77**				
	7. Helps	0.80**	0.82**	0.76**	0.80**	0.78**	0.95**			
	8. Causes	0.76**	0.77**	0.70**	0.72**	0.71**	0.92**	0.95**		
	9. Hinders (reversed)	0.76**	0.79**	0.76**	0.83**	0.81**	0.91**	0.93**	0.87**	
	10. Opposite (reversed)	0.76**	0.77**	0.72**	0.77**	0.76**	0.93**	0.94**	0.90**	0.93**

*p < 0.001.

scores from a cultural consensus model analysis using the items for effort towards group goals were reliably correlated with their competence scores using the items for knowledge sharing, $r = 0.56$, $p < 0.001$. Accordingly, we have empirical evidence supporting the claim that across China and the United States, there is a metacultural consensus about the cultural category of cooperation.

Culture-Specific Consensus

We also found evidence of systematic cultural differences in beliefs about the category of cooperation. The second-factor eigenvalues were notable, accounting for an average of 12.4% of the variance for all five questions asked. This is evidence of subcultures (Atran et al. 2005). Nationality was strongly correlated with participants' loadings on the second factors, with a mean correlation of 0.63, $p_{\min} < 0.001$. The second-factor loadings were not significantly correlated with any other demographic variables. The implication is that the latent subculture associated with the second factor is related to nationality. We found little support for claiming there were additional meaningful factors, so our cultural consensus model analyses stopped at this first subculture linked to nationality. Thus, the results of our cultural consensus model analyses show evidence of a metacultural consensus about the category of cooperation and further show evidence of culture-specific consensus: China and the United States have distinct cultural categories of cooperation.

As an indication of the extent of the metacultural consensus and culture-specific consensus, the analysis of the overall sample found that 57% of the variance is explained by the metacultural consensus and 7% of the variance is explained by unique, culture-specific consensus. These numbers are comparable to cross-national studies of beliefs about emotions (51% and 15%, respectively, Moore et al. 1999) and beliefs about diseases (52% and 6%, respectively, Weller and Baer 2002).

Patterns of Consensus for Specific Types of Situations

To analyze the content of the cultural categories of cooperation in China and the United States, we present the categorization convention scores for each level of each type of situation (Table 3). We group the situation types according to broad patterns found in the cultural consensus model analysis—metacultural consensus and culture-specific consensus. We further break out kinds of culture-specific consensus, based on the ways in which the patterns for the situation types differed between China and the United States.

The tables and text reporting the categorization convention scores also report the results from a series of statistical tests on the categorization convention scores. Within each nation, we used one-sample, two-tailed

t-tests to compare the categorization convention scores of each level of each situation type to the chance, no categorization convention, level of 0. We also examined whether the categorization convention scores differed across nations using *t*-tests. To adjust for the large number of statistical analyses, we used a false discovery rate analysis (with dependency adjustment, Benjamini and Yekutieli 2001) that limited the number of significant results due to chance alone to one out of the total number of tests; this analysis resulted in an effective alpha level of 0.007.

Situation Types Showing Metacultural Consensus. We found that 7 of the 17 situation types showed consistent qualitative patterns in both China and the United States. Specifically, high ($C_{\text{China}} = 0.86$; $C_{\text{U.S.}} = 0.86$) and medium ($C_{\text{China}} = 0.66$; $C_{\text{U.S.}} = 0.78$) group incentive structure, in which organizations reward group outcomes, indicated cooperation; and low ($C_{\text{China}} = -0.62$; $C_{\text{U.S.}} = -0.46$) group incentive structure, in which organizations only reward individual outcomes, indicated noncooperation. The existence of friendly relations indicated cooperation ($C_{\text{China}} = 0.78$; $C_{\text{U.S.}} = 0.68$), and not having friendly relations indicated noncooperation for both nations ($C_{\text{China}} = -0.68$; $C_{\text{U.S.}} = -0.44$), although with somewhat more broadly held categorization conventions in China. It was also the case that in both the United States and China, high effort towards group goals ($C_{\text{China}} = 0.84$; $C_{\text{U.S.}} = 0.66$), high refraining from leisure ($C_{\text{China}} = 0.70$; $C_{\text{U.S.}} = 0.80$), and high coordination of activities ($C_{\text{China}} = 0.74$; $C_{\text{U.S.}} = 0.78$) all indicated cooperation. Medium levels of effort towards group goals ($C_{\text{China}} = 0.44$; $C_{\text{U.S.}} = 0.42$) and refraining from leisure ($C_{\text{China}} = 0.70$; $C_{\text{U.S.}} = 0.52$) were also consistently considered cooperative, with a more broadly held convention in China. Low effort towards group goals ($C_{\text{China}} = -0.70$; $C_{\text{U.S.}} = -0.78$), low refraining from leisure ($C_{\text{China}} = -0.76$; $C_{\text{U.S.}} = -0.86$), and low coordination of activities ($C_{\text{China}} = -0.74$; $C_{\text{U.S.}} = -0.86$) all indicated noncooperation. We found that high knowledge sharing ($C_{\text{China}} = 0.66$; $C_{\text{U.S.}} = 0.82$) indicated cooperation, and low knowledge sharing ($C_{\text{China}} = -0.78$; $C_{\text{U.S.}} = -0.90$) indicated noncooperation. Medium knowledge sharing, representing situations in which someone first uses information but eventually shares the information, showed little consensus in either nation ($C_{\text{China}} = 0.18$; $C_{\text{U.S.}} = 0.06$). There were broadly held conventions that high goal alignment ($C_{\text{China}} = 0.92$; $C_{\text{U.S.}} = 0.94$) indicated cooperation, whereas low goal alignment ($C_{\text{China}} = -0.70$; $C_{\text{U.S.}} = -0.80$) indicated noncooperation. There was a categorization convention in China that medium goal alignment indicated cooperation, but there was no U.S. consensus ($C_{\text{China}} = 0.54$; $C_{\text{U.S.}} = 0.00$). These findings show that the metacultural consistency found in the cultural consensus model analysis was based on a set of categorization conventions showing highly similar U.S. and Chinese patterns about what indicates cooperation.

Table 3   Categorization Convention Scores for Situation Types in China and the United States

Metacultural consensus	Situation types	Level	China	United States
Matching cultural conventions	Group incentive Structure	High	0.86	0.86
		Med	0.66	0.78
		Low	−0.62	−0.46
	Friendly relations	High	0.78	0.68
		Low	−0.68	−0.44*
	Effort towards group Goals	High	0.84	0.66*
		Med	0.44	0.42
		Low	−0.70	−0.78
	Refraining from Leisure	High	0.70	0.80
		Med	0.70	0.52*
		Low	−0.76	−0.86*
	Coordination of Activities	High	0.74	0.78
		Low	−0.74	−0.86
	Knowledge sharing	High	0.66	0.82
		Med	0.18	0.06
		Low	−0.78	−0.90
	Goal alignment	High	0.92	0.94
		Med	0.54	0.00*
		Low	−0.70	−0.80

Culture-specific consensus	Situation types	Level	China	United States
Contrasting cultural conventions	Competition	High	0.36	−0.54*
		Low	−0.56	0.52*
	Confrontation	High	−0.18	0.24*
		Low	0.38	−0.54*
	Helping	High	−0.18	0.22*
		Med	0.80	0.58*
		Low	−0.28	−0.70*
Distinct cultural conventions	Division of labor	High	0.66	0.50
		Med	0.00	−0.06
		Low	−0.66	0.00*
	Leadership Presence	High	0.46	0.34
		Low	−0.48	0.02*
	Ingroup-outgroup Relations	High	0.80	0.40*
		Med	0.22	0.74*
		Low	−0.52	−0.36
Matching cultural conventions with different breadths	Equality of output	High	0.58	0.72
		Low	−0.22	−0.68*
	Open communication	High	0.80	0.86
		Low	−0.38	−0.90*
	Compromising	High	0.06	0.08
		Med	0.52	0.44
		Low	−0.26	−0.70*
	Humility	High	0.22	0.20
		Med	0.56	0.06*
		Low	−0.90	−0.52*

Notes. *Indicates a significant difference between the Chinese and United States categorization convention scores. Underlining (e.g., 0.02) indicates a lack of a categorization convention. The significance levels for national differences and lack of a categorization convention were based on a false discovery rate analysis.

Culture-Specific Consensus: Contrasting Conventions. We found that 3 of the 17 situation types showed contrasting patterns in China and in the United States. In the United States, competition within the group indicated noncooperation ($C_{\text{U.S.}} = -0.54$), and a lack of competition within the group indicated cooperation ($C_{\text{U.S.}} = 0.52$). In striking contrast, in China, competition within the group indicated cooperation ($C_{\text{China}} = 0.36$) and a lack of competition within the group indicated noncooperation ($C_{\text{China}} = -0.56$). For confrontation, the convention in China was that avoiding (i.e., low) confrontation ($C_{\text{China}} = 0.38$) was cooperative and

open (high) confrontation was noncooperative ($C_{China} = -0.18$). The U.S. pattern was reversed: avoiding confrontation was noncooperative ($C_{U.S.} = -0.54$) and open confrontation was cooperative ($C_{U.S.} = 0.24$). However, we are tentative about the results for confrontation because the reliabilities for these items were low. For helping, the contrasting conventions were localized. For high levels of helping, the consensus was in the opposite direction in the two nations, such that the Chinese consensus ($C_{China} = -0.18$) was that high helping indicated noncooperation, and the U.S. consensus ($C_{U.S.} = 0.22$) was that high helping indicated cooperation. In both nations, but particularly China, moderate amounts of helping ($C_{China} = 0.80$; $C_{U.S.} = 0.58$) indicated cooperation. Low amounts of helping ($C_{China} = -0.28$; $C_{U.S.} = -0.70$), particularly in the United States, indicated noncooperation. Therefore, in the United States the more helping, the more cooperative (a linear pattern), but in China only a moderate amount of helping is cooperative (a curvilinear pattern). The results for competition, confrontation, and helping show that cultures can generate opposing beliefs about what indicates cooperation. They also show that the culture-specific consensus found in the cultural consensus model analyses can be localized to specific situation types on which the two nations showed different beliefs.

Culture-Specific Consensus: Distinct Conventions. We found that 3 of the 17 situation types showed distinct patterns in China and in the United States. For the Chinese, high division of labor ($C_{China} = 0.66$) and high leadership presence ($C_{China} = 0.46$) indicated cooperation, and low division of labor ($C_{China} = -0.66$) and low leadership presence ($C_{China} = -0.48$) indicated noncooperation. There was no categorization convention for medium division of labor ($C_{China} = 0.00$). In the United States, there were only categorization conventions that high division of labor ($C_{U.S.} = 0.50$) and high leadership presence ($C_{U.S.} = 0.34$) indicated cooperation. There were no categorization conventions for medium ($C_{U.S.} = -0.06$) and low ($C_{U.S.} = 0.00$) levels of division of labor and for low leadership presence ($C_{U.S.} = 0.02$). The reliability of the leadership presence levels was low; either the items do not adequately reflect leadership or there is no cultural consensus about leadership, as indicated by the lack of U.S. categorization conventions. For ingroup-outgroup relations, both nations agreed that low levels (outgroup favoritism) indicated noncooperation ($C_{China} = -0.52$; $C_{U.S.} = -0.36$). Both nations also agreed that medium (ingroup-outgroup equality) and high levels (ingroup favoritism) indicated cooperation, but to differing extents, implying contrasting beliefs about ingroup-outgroup favoritism. There was a broadly held categorization convention in China that ingroup favoritism indicated cooperation ($C_{China} = 0.80$), but only a narrowly held categorization convention that ingroup-outgroup equality indicated

cooperation ($C_{China} = 0.22$). In contrast, in the United States there was a broadly held categorization convention that ingroup-outgroup equality indicated cooperation ($C_{U.S.} = 0.74$), but a more narrowly held categorization convention regarding ingroup favoritism ($C_{U.S.} = 0.40$). Thus, distinct conventions indicate a second kind of culture-specific variation that rests not on opposing beliefs, but merely different beliefs.

Culture-Specific Consensus: Differing Breadths of Conventionality. For the remaining four situation types, we found qualitative agreement across nations in what the categorization conventions were, but quantitative differences in how broadly the conventions were held. In both countries, high equality of output ($C_{China} = 0.58$, $C_{U.S.} = 0.72$) indicated cooperation and low equality of output ($C_{China} = -0.22$, $C_{U.S.} = -0.68$) indicated noncooperation, but with a more narrowly held categorization convention in China. Open communication indicated cooperation ($C_{China} = 0.80$; $C_{U.S.} = 0.86$) and a lack of open communication indicated noncooperation ($C_{China} = -0.38$; $C_{U.S.} = -0.90$), with a more narrowly held categorization convention in China. Moderate amounts of compromising ($C_{China} = 0.52$; $C_{U.S.} = 0.44$) indicated cooperation in both nations. Low amounts of compromising ($C_{China} = -0.26$; $C_{U.S.} = -0.70$) indicated noncooperation, with a more narrowly held convention in China. There was no consensus about a high amount of compromising ($C_{China} = 0.06$; $C_{U.S.} = 0.08$). Finally, we found that low humility indicated noncooperation ($C_{China} = -0.90$; $C_{U.S.} = -0.52$), particularly for those in China. High humility indicated cooperation in both nations, but the categorization convention was narrowly held ($C_{China} = 0.22$; $C_{U.S.} = 0.20$). For medium levels of humility (mentioning both one's own contributions and those of others), there was a broadly held categorization convention in China that this indicated cooperation ($C_{China} = 0.56$), and no U.S. consensus ($C_{U.S.} = 0.06$). Thus even if cultures generate the same categorization conventions, they can still differ in how broadly those conventions are held.

Robustness Checks
We conducted robustness checks to test whether particular issues with our questionnaire and our participants influenced our results. We compared the pattern of results using all 203 questionnaire items to the pattern of results using two randomly drawn items for each level of each situation type so that all levels of all situations types were equally represented. These data showed a very similar pattern of results as the full set of items (e.g., highly similar cultural competence scores). We also found similarities in results across the five questions, *is*, *helps*, *causes*, *hinders*, and *opposite*, confirmed that a back-translation of the questionnaire yielded a

highly similar pattern of results, and found no differences in results between the two orders in which participants read the items. Thus, the choices we made in generating and testing the questionnaire do not appear overly critical.

We also found no evidence of response biases. The average percentage of "Yes" responses was higher, similar for those in China, 55% (SD = 29%) and the United States, 53% (SD = 28%). We compared results from two types of cultural consensus model analysis, one using the match method and a second using the covariance method (Weller 2007), because if participants' cultural competence scores from the match method were higher than those from the covariance method, this would indicate a response bias. However, a paired t-test on the cultural competence scores from analyses using the entire sample showed no significant differences, t (399) = 0.93, $p = 0.35$; the average cultural competence scores were within 0.02 of each other. Thus, we have no evidence of response biases, providing further confidence in our findings.

A final concern over robustness was due to the student status and relatively little work experience of our participants. So, we replicated our findings for three types of situations with a sample of full-time working professionals enrolled in executive MBA programs in the United States and China, all of whom had over five years of work experience. We asked 75 Native English-speaking participants in the United States ($M_{age} = 29.5$, $SD_{age} = 3.2$, 26% female) and 56 Native Chinese-speaking participants in China ($M_{age} = 31.6$, $SD_{age} = 4.1$, 38% female) to rate whether 12 items representing high and low levels of competition, effort towards group goals, and knowledge sharing indicated cooperation. Because 12 items is a small number for running a cultural consensus model analysis, we compared the main sample to this supplemental sample using the mean proportions of "yes" answers for each level of each situation type. This means the data are on a 0 to 1 scale, rather than the -1 to 1 categorization convention scale. Accordingly, for these data, a 0 is like a -1 on the categorization convention scale, a 0.50 is like a 0 on the categorization convention scale, and a 1 has a similar interpretation as a 1 on the categorization convention scale. We found that these proportions for the supplemental sample were highly consistent ($r = 0.98$) with the proportions from our main sample. We replicated that high effort ($M_{CH} = 0.81$, $M_{U.S.} = 0.86$) and high knowledge sharing ($M_{CH} = 0.81$, $M_{U.S.} = 0.86$) indicated cooperation, and low effort ($M_{CH} = 0.18$, $M_{U.S.} = 0.04$) and low knowledge sharing ($M_{CH} = 0.25$, $M_{U.S.} = 0.10$) indicated noncooperation (because they were below 0.50) in both countries. We also replicated that high competition indicated cooperation in China ($M_{CH} = 0.64$) and noncooperation in the United States ($M_{U.S.} = 0.30$), whereas low competition indicated cooperation in the United States ($M_{U.S.} = 0.70$)

and noncooperation in China ($M_{U.S.} = 0.21$). The consistency in the pattern of findings provides evidence that the particular participants in our primary sample did not unduly distort our results. Given the consistency across all the robustness checks, there are grounds for confidence in the data we report.

Discussion

We examined U.S. and Chinese lay beliefs about cooperation and provide the empirical grounds for characterizing cooperation as a cultural category and for showing that what it means to cooperate is culturally conditioned. A cultural consensus model analysis revealed a broad base of consistent beliefs about cooperation across the United States and China, as well as focused national differences. Therefore, we provide motivation for updating our theories of cooperation by incorporating people's lay beliefs about the cultural category cooperation—what they likely believe and what kinds of variation in beliefs to expect across cultures and across individuals.

Establishing that cooperation is a cultural category with metacultural and culture-specific conventional meanings, as well as individual differences in beliefs, provides grounds for reconsidering core assumptions underlying theories of cooperation. Most research on cooperation assumes that people perceive properties of settings (e.g., incentive structures, group dynamics, Johnson et al. 2006), and that those perceptions lead people to take certain kinds of actions (e.g., helping, knowledge sharing, Beersma and De Dreu 1999, Hornstein and Deutsch 1967, Kelley and Stahelski 1970, Johnson et al. 2006). Our data raise two issues about using perceptions of settings as the cognitive mediator governing cooperative action. The first issue is that if it is universal properties of settings that matter, these theories have to generate universal claims about what cooperation is. However, we found cultural variation in what people think indicates cooperation. The second issue is that these theories fix the relation between settings and actions, usually without explanation: perceiving that people's goals are aligned leads (for some reason) to helping and not to competition. However, our data imply that it is a cultural convention, not a universal truth, to say that helping is cooperative (cf. Flynn 2006) and competition is not (cf. Rappaport 1965). Thus, our data provide grounds for an alternative model of the cognitive mediation of cooperative action.

The Cultural Category of Cooperation and the Cognitive Mediation of Cooperative Action

We posit that cultural categories play the key mediating role between settings and actions. Rather than claim only that people perceive properties of settings (e.g., that there are friendly relations among group members), we further claim that people categorize settings on the basis of those properties (e.g., that the setting is cooperative

because having friendly relations among group members is cooperative). In this way, we can allow for variation in what aspects of settings people believe indicate cooperation, and we can let people's understandings of cooperation govern their selection of actions.

Categories are also critical for addressing the second cognitive mediation problem, how to link settings to actions. There is only one sustained attempt to address linking settings and actions, which is Deutsch's (2000) discussion of what he termed the crude law of social relations. The crude law claims that when it comes to social relations like cooperation, their causes and their effects are mutually reinforcing, that some properties of settings necessarily lead people to engage in particular actions, and that some kinds of actions necessarily lead to certain kinds of settings. Without assuming that the crude law of social relations holds, social interdependence theory (Deutsch 1949, Johnson et al. 1989) cannot generate its core predictions that positive interdependence (goal alignment; its key aspect of settings) spurs promotive interaction patterns (e.g., helping and knowledge sharing), and that promotive interaction patterns in turn beget positive interdependence. However, the crude law of social relations is a description, not an explanation. We explain the link between settings and actions by using cultural categories.

That cultural categories can provide the linking function claim is grounded in our data. We found metacultural consensus regarding categorization conventions for both settings (group incentive structure, friendly relations, and goal alignment) and actions (effort towards group goals, refraining from leisure, coordination of activities, and knowledge sharing). Therefore, settings and actions can be linked through their common membership in the cultural category of cooperation. For example, if people interpret an aspect of a setting, such as having group incentives, as indicating cooperation because of an existing categorization convention, then people can respond with an action, such as knowledge sharing, for which there is also a categorization convention indicating cooperation. Likewise, if teammates have been taking actions that are conventionally categorized as cooperation, such as effort towards group goals, then they can infer that others' goals are likely to be aligned, because having aligned goals is also conventionally categorized as cooperation. Including both settings and actions within one category might seem to make the category of cooperation theoretically muddy because it applies to a hodge-podge of situation types. However, when regarded from the perspective of category use (Markman and Ross 2003), as we have done, the inclusion of both settings and actions in the same category simplifies the practice of cooperation.

Having the category of cooperation serve as the cognitive mediator between settings and actions allows us to account for people having different beliefs about what

indicates cooperation and to explain how people link settings and actions. We can explain Deutsch's crude law of social relations and explain *why* Deutsch's crude law is crude: the links between settings and actions are crude because the cultural category of cooperation includes many and varied situation types, and, as we will further discuss, there is variation in the breadth of the conventions underlying the category of cooperation.

The Content of the Cultural Category of Cooperation

Our account of the cognitive mediation of cooperation action is a multilevel explanation (Figure 1). We used the cultural consensus model analyses to suggest that individuals' beliefs derived from three sources: metacultural conventions, or categorization conventions that were consistent across cultures; culture-specific conventions, or categorization conventions stemming from one culture; and idiosyncratic personal experience. Thus, the content of individuals' beliefs about settings and actions is largely derived from cultural-level categorization conventions. The cultural conventions, in turn, must have some origin, and so we posit both metacultural and culture-specific antecedents.

We found metacultural consensus for seven categorization conventions (listed in Table 3). The list might shrink upon examining further cultures or grow if new situation types are examined. However, if we take these categorization conventions as metacultural, it implies integrating all of them into research definitions of cooperation. Smith and colleagues (1995, p. 10) observed that "one difficulty in interpreting the theory and research on cooperation stems from the numerous definitions of cooperation scholars have offered without making much attempt to reference other usages of the term." Our data provide a possible answer for why definitions vary: each captures only some of the categorization conventions that people include in their categories of cooperation. Cultural categories provide a new basis for integrating the range of content included in cooperation and explaining why that content is so varied.

Incorporating the range of content—all the specific situation types—included in cultural categories of cooperation provides a basis for making predictions about chains of reciprocity across different kinds of actions. For example, our categories account can predict that helping can spur knowledge sharing, which can spur open communication. Further, we can predict that a majority in China and a minority in the United States could experience other group members competing with them, categorize it as cooperation, and reciprocate with another cooperative behavior, such as knowledge sharing. Our data also suggest that a majority in China and a minority in the United States who could experience a group member helping a team member would categorize it as noncooperation, and reciprocate by refusing to share

Figure 1   Cultural Categories and the Cognitive Mediation and Cultural Moderation of Cooperative Action
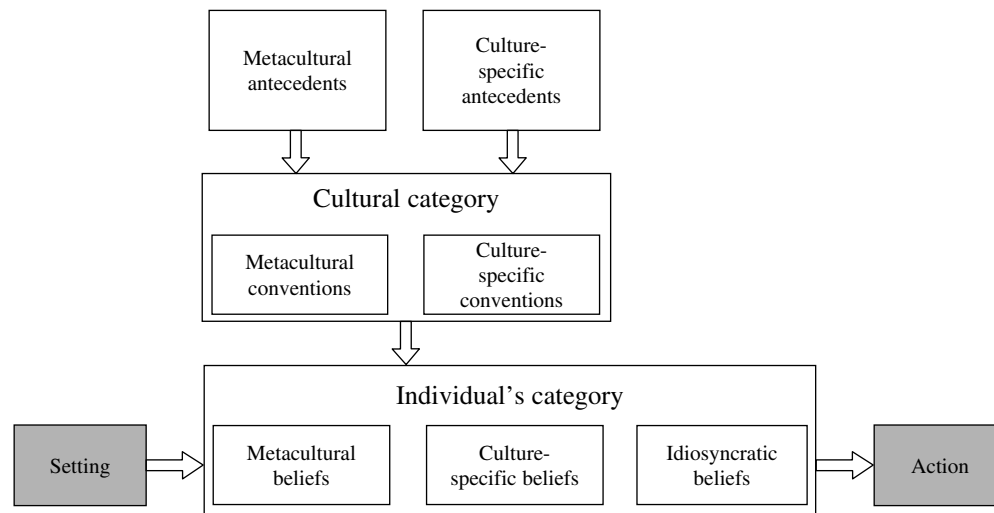
knowledge. These are directly testable predictions and ones that current theories of cooperation cannot make.

Culture as a Moderator of Cognitive Mediation

We also found different, and sometimes starkly contrasting, beliefs about whether and how competition, confrontation, helping, ingroup-outgroup relations, division of labor, and leadership presence indicate cooperation. These situation types are sufficiently large in number, sufficiently central to discussions of cooperation, and showed sufficiently broadly held within-nation categorization conventions to conclude that what it means to cooperate varies by culture. The implication is that how settings are linked to actions is moderated by culture.

Most cultural research on cooperation examines how cultural values moderate the relationship between settings and actions, and rely on motivations rather than cognitions as the mediating mechanism (e.g., Kirkman and Shapiro 2001). Findings in this literature have been inconsistent, with some finding more cooperation for collectivists (e.g., Eby and Dobbins 1997, Wagner 1995), others more cooperation for individualists (e.g., Yamagishi 1988), and others finding moderators (e.g., Chen and Li 2005). The systematic differences in people's own beliefs about cooperation that we found provide a basis for another kind of cultural research on cooperation, one that starts with the premise that people can simply disagree about what cooperation is. We found three kinds of cultural differences in categorization conventions of cooperation: contrasting conventions, distinct conventions, and matching conventions with different breadths of conventionality.

Contrasting Conventions. We found evidence of several contrasting categorization conventions between the United States and China, but the most striking example is that there was a consensus in the United States that competition indicates noncooperation and a consensus in China that competition indicates cooperation. The distinction between cooperation and competition is often treated as fundamental and a logical necessity, but our data suggest a clear role for cultural construction, and that culture moderates the relationship between cooperation and competition.

Most theories of cooperation claim that the relationship between cooperation and competition is like the U.S. convention, as opposites that people choose between (e.g., Deutsch 1949, Rappaport and Chammah 1965). A recent alternative is work on "coopetition" (Brandenburger and Nalebuff 1996, Tsai 2002, Xie et al. 2006). Coopetition research posits that cooperation and competition are distinct concerns, and hence they can overlap within the same setting. Researchers are still divided on exactly what coopetition is, however, variously claiming that cooperation and competition are orthogonal dimensions of outcomes (Brandenburger and Nalebuff 1996), distinct behaviors that can co-occur within a relationship (Tsai 2002), and orthogonal kinds of action preferences (Xie et al. 2006). However, none of these accounts can explain the categorization convention in China: an act of competition is, in itself, an act of cooperation, and a failure to compete is, in itself, an act of noncooperation. We propose that cooperation and competition are both cultural categories, and for at least some cultures, acts of competition can also be categorized as acts of cooperation. Thus, how settings are linked to actions may not rest merely on what seems obvious or logical to researchers, nor can variation simply be a matter of ambiguity.

Distinct Conventions. Another kind of cultural difference in categorization conventions is distinct conventions. For example, we found consensus among the Chinese that establishing a division of labor and a team

leader indicate cooperation and not establishing a division of labor and not establishing a leader indicate noncooperation. Although cooperation is commonly discussed as being concerned with working together, and divisions of labor and the presence of leaders are commonly discussed as central contributors to enabling people to work together, we found no overarching categorization conventions in the United States about division of labor and leadership presence. The implication is that although most Chinese are likely considering these aspects of role structure as part of cooperation, people in the United States are either not thinking about them as part of cooperation, or are divided in their beliefs. It may not be coincidence that there are also divisions among Western scholars (e.g., Beech and Crane 1999, Cohen and Bailey 1997, Manz and Sims 1987). More broadly, this finding shows that different cultures can generate categories of cooperation with different category boundaries.

Matching Conventions with Different Breadths of Conventionality. Culture can also generate quantitative differences in conventions, and we found substantial differences in how broadly held some categorization conventions were. This finding in itself provides empirical support for the claim that cultural groups are heterogeneous (Gelfand et al. 2007, Tsui et al. 2007). Further, we also found cultural differences in the breadth of categorization conventions. For example, having each group member contribute equally indicates cooperation more broadly among those in the United States than those in China. We predict that the more narrowly held categorization conventions are, the more likely there will be misunderstandings about cooperative actions. Thus, latent in the categorization convention scores in Table 3 are predictions about how difficult sustaining cooperation will be in particular types of situations.

Antecedents Shaping the Cultural Category of Cooperation

In addition to analyzing the content of the cultural category of cooperation (the situations people categorize as cooperative), we can also analyze the potential antecedents that shape that content. The metacultural and cultural-specific conventions we found suggest the existence of metacultural and culture-specific antecedents. Examining the specific situation types that showed metacultural and culture-specific conventions could provide insight into what some of those antecedents might be.

Metacultural Antecedents. One possibility to explain why some situation types are consistently categorized as cooperation in both the United States and China is that there are lawful regularities in social interaction present in any group. These regularities can be antecedent factors shaping cultural categories of cooperation in consistent ways across cultures (cf. Sperber

and Hirschfeld 2004, Gentner and Boroditsky 2001). For example, evolutionary perspectives on cooperation point to a preference towards effort towards group goals and refraining from leisure in the most primitive of tribes (Price 2006). Therefore, our data showing consistent beliefs about effort towards group goals and refraining from leisure indicating cooperation may be a reflection of regularities in social interaction that provide one basis for generating categorization conventions for cooperation. Other situation types, such as knowledge sharing and coordination of activities, may reflect regularities in social interaction that facilitate effort towards a group goal, and so become part of the same cultural category. An additional possibility for why there are consistent categorization conventions in the United States and China is that both are nations embedded in a global culture (Gould and Grein 2009). Thus, metacultural consistencies for these two nations could be a product of cultural constructivism occurring at a higherlevel of analysis. Both factors could be contributing to the categorization conventions we found in people's beliefs about cooperation. Studying cultural interaction, non-globally integrated societies, child development, and animal behavior (e.g., Tomasello 2007) could all advance our understanding of metacultural antecedents.

Culture-Specific Antecedents. The culture-specific conventions that we found suggest that there are also cultural-specific antecedents to some aspects of the category of cooperation. As just one of many possible examples, the contrasting conventions regarding confrontation align with differences in cultural values regarding harmony (Chen and Chung 1994, Leung et al. 2002), suggesting that cultural values might be a culture-specific antecedent. The Chinese convention about competition suggests that cultural philosophies might be a second culture-specific antecedent, because it could be a product of Taoist (Peng et al. 2006) philosophical influences to integrate seemingly opposite concepts and Confucian (King 1985) philosophical influences to find a middle way (Chen 2002).

Implications for Culture Research

We made a number of claims about cooperation for which there could well be parallels for other core theoretical constructs in organizational science, such as trust, leadership, and change. We could study the content of these other possible cultural categories by deriving consensus beliefs from cultural members and assessing how broadly those beliefs are held for each type of situation. Researchers' definitions of theoretical constructs are important. However, if actors in organizations and cultural groups are themselves using categories to interpret and guide their behaviors, then examining lay beliefs is also important. What we have outlined is an approach to investigating such cultural knowledge and

an elaborated model of the cognitive mediation between settings and actions.

The cultural consensus approach that we used also expands the possibilities organizational researchers have to study knowledge at a social level. We examined national cultures and asked questions that were not specific as to, for example, the particular organization in which the actions were occurring. Thus, although our analysis did not find within-nation subcultures, we may not have provided the detail necessary to do so. We also did not examine representative samples. Still, these are not limitations of the cultural consensus model methodology, but of the specific methodological choices we made. The method allowed us to uncover areas of consistency across cultures, areas of contrast across cultures, and areas of heterogeneity within cultures. The cultural consensus approach not only assesses the degree of heterogeneity within cultures, but examines the structure of heterogeneity, such as whether heterogeneity is associated with subcultures or individual variation. The cultural consensus approach also provides a basis for identifying individuals with high and low cultural competency, which could itself be the focus of research. As a simple example, does network centrality predict cultural competency? Or, does cultural competency with beliefs key to organizational culture, such as organizational identity, predict achievement within the organization? Finally, the cultural consensus model approach allows researchers to estimate social- or cultural-level knowledge from individual beliefs, taking into consideration respondents' cultural competencies rather than assuming respondents are equally knowledgeable. With smaller data sets, this can be a notable advantage. We can do more than just average our data.

To conclude, we see potential in mapping out the cultural category of cooperation and the specific categorization conventions on which it rests. We have provided insight into assessing people's interpretations of what indicates cooperation that can advance research on when and why people cooperate. This should allow us, for example, greater ability to predict when groups are more and less likely to sustain cooperation. More broadly, we have outlined an approach to researching topics that are not only discussed by researchers, but also commonly discussed by organizational actors themselves.

Appendix. Cultural Consensus Model Analyses for Organizational Research

The cultural consensus model (CCM) approach was developed by anthropologists to assess cultural knowledge (Romney et al. 1986, Weller 2007). It is a theoretical and statistical approach to estimating group-level knowledge from individual-level data. CCM analyses can assess whether there are commonly held beliefs within and across cultural groups, determine what those common beliefs are, and enable comparisons between individuals' beliefs and the common beliefs of the cultural group.

A CCM analysis examines consistency in how different individuals respond to questions. The formal model of Romney et al. (1986) is defined for categorical data (e.g., responses to a list of true/false questions). The statistical approach has been extended to accommodate ordinal and interval data (Romney et al. 1987, Weller and Mann 1997). The formal model makes several assumptions: the local independence assumption, that participants' responses are generated individually; the common truth assumption, that there is a common underlying cultural answer key; and the homogeneity assumption, that the items are equally difficult. The homogeneity assumption is strict, and simulation results suggest that a weaker monotonicity assumption is sufficient (Romney et al. 1987): participants who best know the culturally correct responses for one subset of questions should best know the responses for another subset.

A CCM analysis starts with a participant-by-response matrix. From this, a second participant-by-participant matrix is made that records pairwise similarities in participants' responses. The similarities are either covariances or the proportions of matching responses (the "match" method, Weller and Mann 1997), corrected for chance responding. For the match method, the adjustment for chance responding is to subtract from each proportion 1/(number of possible responses), then divide by $1 - 1/n$. The corrected-for-chance similarity matrix is submitted to a minimum residual factor analysis without rotation.

Three conditions need to hold empirically to claim that the model's assumptions are met and that there is a consensus: the first factor should be substantially larger than the second (with a conventional threshold of a 3:1 ratio); each respondent's first-factor loadings, which are termed cultural competency scores, should fall in the range 0 to 1 (implying all participants are drawing from a common cultural answer key); and participants' cultural competency scores for different subsets of items should be positively correlated. The three conditions imply that there is a dominant set of cultural conventions about a single, coherent domain of knowledge. If the three statistical criteria fail to hold, then the CCM results support the conclusion that there is no cultural consensus about a domain. If the statistical criteria are met, it licenses further examination and conclusions. Participants' cultural competency scores indicate the proportion of the cultural answer key that they know or share with the group. The cultural competency scores are used to determine the culturally correct response to each question, with an accompanying Bayesian posterior probability that the empirically derived answer accurately estimates the true cultural answer. Thus, CCM analyses estimate cultural-level knowledge by taking into consideration participants' varying cultural competencies.

Finding evidence of consensus implies a dominant cultural answer key, but does not rule out subcultures with still more consistent understandings. One can find subgroups by subtracting a matrix generated from the products of participants' cultural competence scores from the original agreement matrix and examine whether the residual matrix shows clusters of agreement (e.g., by using QAP matrix correlations). Or, one can find subgroups by examining the initial factor analysis for whether there are factors beyond the first that are notable, and whether the loadings on those factors are related to indicators of subgroup membership, such as demographic characteristics (e.g., Medin et al. 1997). We reported the second approach but found support using both types of analyses. If subgroups are identified, researchers can examine the specific questions that distinguish the subgroups and estimate the average pairwise agreement within and between cultural groups to estimate the proportion of variance accounted for by the metacultural consensus and culture-specific consensus (Moore et al. 1999, Weller and Baer 2002).

Formal CCM analyses can be run using ordinary statistical software, albeit with some effort at generating the corrected-for-chance matrices. In addition, UCINET 6 (Borgatti et al. 2002) has built-in procedures for conducting cultural consensus model analyses, including generating corrected-for-chance pairwise agreement matrices, factor analyses (albeit with limited detail), competency scores, second-factor loadings, and QAP analyses. An informal CCM analysis does not require correcting for chance and uses correlations for its agreement matrix, so it can be run using standard statistical software.

Endnotes

[1]In addition, we dropped six items because debriefing and data patterns suggested they were ambiguous or misinterpreted, and one item because of a translation error identified in our back-translation test.

[2]Our full U.S. sample included 324 participants. Because cultural consensus model analyses have greater fidelity if there are equal numbers of participants from each sample, we included the first 200 U.S. participants who were U.S. citizens and native English speakers. Their pattern of data accurately reflects the pattern for the full U.S. sample.

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Joshua Keller is an assistant professor in the Division of Strategy, Management and Organization at the Nanyang Business School. He received his Ph.D. in management from the University of Texas at Austin. He currently studies the impact of culture and cognition on organizations.

Jeffrey Loewenstein is an assistant professor of management at the University of Texas at Austin's McCombs School of Business. He studies cognition, often by examining analogies and vocabularies.