

"THE BAD SEED" OR
"THE OTHER BOYS MADE
HIM DO IT"?

In 1991 a Chinese physics student at the University of Iowa named Gang Lu lost an award competition. He appealed the decision unsuccessfully and he subsequently failed to obtain an academic job. On October 31, he entered the physics department and shot his adviser, the person who had handled his appeal, several fellow students and bystanders, and then himself.

Michael Moris, a graduate student at Michigan at the time, noticed that the explanations for Gang Lu's behavior in the campus newspapers focused almost entirely on Lu's presumed qualities—the murderer's psychological foibles ("very bad temper," "sinister edge to his character"), attitudes ("personal belief that guns were an important means to redress grievances"), and psychological problems ("a

darkly disturbed man who drove himself to success and destruction/" "a psychological problem with being challenged"). He asked his fellow student Kaiping Peng what kinds of accounts of the murder were being given in Chinese newspapers. They could scarcely have been more different. Chinese reporters emphasized causes that had to do with the context in which Lu operated. Explanations centered on Lu's relationships ("did not get along with his adviser/" "rivalry with slain student," "isolation from Chinese community"), pressures in Chinese society ("victim of Chinese Top Student' educational policy") and aspects of the American context ("availability of guns in the U.S.").

In order to be sure that their impressions were accurate, Morris and Peng carried out a systematic content analysis of reports in the *New York Times* and the Chinese-language newspaper the *World Journal*. This objective procedure showed that their initial observations were correct. Should the different causal attributions be regarded as mere chauvinism? The American reporters blamed the perpetrator, who happened to be Chinese, whereas the Chinese reporters, perhaps protecting one of their own, blamed situational factors. As it happens, a "control" mass murder allows us to see whether it was chauvinism or worldview that produced the differences in explanation patterns.

In the same year that Gang Lu committed his murders and suicide, an American postal worker in Royal Oak, Michigan, named Thomas McIlvane lost his job. He appealed the decision unsuccessfully to his union and subsequently failed to find a full-time replacement job. On

November 14, he entered the post office where he had previously worked and shot his supervisor, the person who handled his appeal, several fellow workers and bystanders, and then himself

Morris and Peng performed the same kind of content analysis on the *New York Times* and *World Journal* reports of the McIlvane mass murder that they did for the Gang Lu mass murder. They found exactly the same trends as for the Chinese murderer. American reporters focused on McIlvane's personal dispositions—attitudes and traits inferred from past behavior ("repeatedly threatened violence," "had a short fuse," "was a martial arts enthusiast," "mentally unstable"). Chinese reporters emphasized situational factors influencing McIlvane ("gunman had been recently fired," "post office supervisor was his enemy," "influenced by example of a recent mass slaying in Texas").

Morris and Peng gave descriptions of the murders to American and Chinese college students and asked them to rate the importance of a large number of presumed personal attributes and situational factors culled from the newspaper reports. American students, whether explaining the American mass murder or the Chinese one, placed more emphasis on the murderer's presumed dispositions. Chinese students stressed situational factors for both mass murders. Even more impressively, Morris and Peng listed a number of situational factors and asked participants to judge whether, if circumstances had been different, the murder might not have occurred. They asked, for example, if the tragedies might have been averted "if Lu had received a job" or "if McIlvane had had many friends or relatives in Royal Oak." Americans and Chinese partici-

pants responded very differently. The Chinese thought that, in many cases, the murders might very well not have occurred. But the Americans, because of their conviction that it was the murderer's long-established dispositions that were the key to his rampage, felt it was likely that the killings would have occurred regardless of whether circumstances had been different.

CAUSAL ATTRIBUTION EAST AND WEST

It should come as no surprise that Chinese people are inclined to attribute behavior to context and Americans tend to attribute the same behavior to the actor. We saw in the last chapter that East Asians attend more to context than do Americans. And what captures one's attention is what one is likely to regard as causally important. The converse seems equally plausible: If one thinks something is causally important one is likely to attend to it. So a cycle gets established whereby theories about causality and focus of attention reinforce each other.

There is ample evidence that the causal attribution differences mirror the attention differences. The first cross-cultural study of causal attribution, by developmental psychologist Joan Miller, compared Hindu East Indians and Americans. She asked her middle-aged, middle-class participants to describe behavior of an acquaintance that they "considered a wrong thing to have done" and behavior on the part of an acquaintance that they "considered good for someone else." She then asked her participants to explain why the people behaved as they did. American partici-

pants tended to explain the behavior in terms of presumed personality traits and other dispositions of the actor: "Sally is considerate, outgoing, and friendly." The Americans made twice as many such attributions as the Indians. Indians tended to explain behavior in terms of contextual factors: "It was dark and there was no one else to help." The Indians gave twice as many contextual explanations as Americans did.

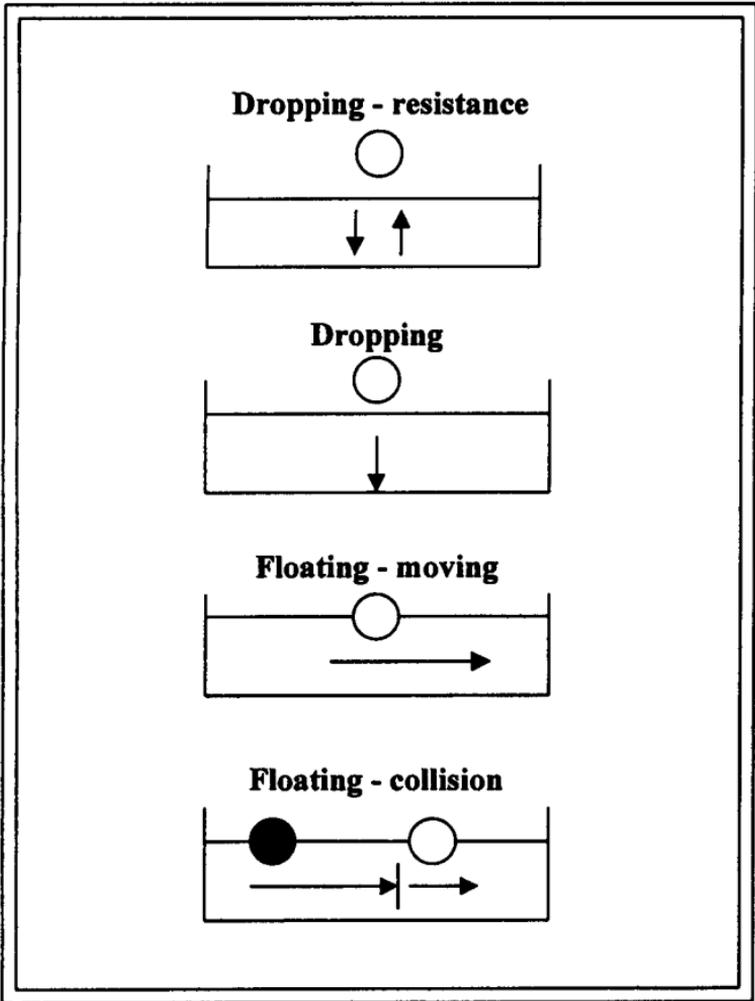
Americans and Indians didn't give different sorts of answers because they had somehow described different kinds of events. When Miller asked Americans to explain behaviors mentioned by Indians, Americans explained them using the same sorts of dispositional explanations they gave for the behaviors they generated themselves. In a particularly important additional demonstration, Miller showed that it takes time to learn how to explain behavior in the culturally sanctioned way. Children in the two cultures didn't differ in the sorts of explanations they gave. Not until adolescence did Indians and Americans begin to diverge in their explanations. To put the icing on the cake of this elegant study, Miller also questioned Anglo-Indians, whose culture is Westernized to a degree. Their attributions, both for dispositions and for contexts, were midway between those of Hindu Indians and Americans.

A favorite activity around the water cooler of a Monday morning is discussing why the game was won or lost. It turns out that the reasons people give for victory or defeat are different in America and Asia. Organizational psychologist Fiona Lee and her colleagues analyzed what sports-writers reported about the causal attributions of soccer

coaches and players in the U.S. and Hong Kong. Americans saw outcomes as being due mostly to the abilities of individual players: "Freshman Simpson leads the team in scoring with eleven goals, but its success lies in its defense." "We've got a very good keeper in Bo Oshoniyi, who was defensive MVP of the finals last year . . ." The attributions of Hong Kong athletes and coaches were more likely to refer to the other team and the context: "We were lucky to go in at the interval with a one-goal advantage and I was always confident we could hold them off. I guess South China was a bit tired after having played in a quadrangular tournament in China."

Attributional differences between Asians and Westerners go deeper than accounts of human behavior. Morris and Peng showed that Chinese tend to attribute the behavior of fish shown in video scenes to external factors and Americans to internal factors. Peng and his colleagues have shown that the differences between Easterners and Westerners go deeper still—to the perception of physical causality. They showed abstract cartoons, like those illustrated on page 117, to Chinese and American women. Each cartoon showed movement of some kind that could be interpreted as hydraulic, magnetic, or aerodynamic. As intended, participants interpreted the top sequence in the illustration as a light object (a "ball") coming to "float" on the liquid. In the cartoon based on the picture beneath it, the circle dropped past the upper line and came to rest on the lower line. As intended, participants saw this movement as a heavy object dropping to the bottom of a container of liquid. Participants were asked to what extent they thought that the object's movements seemed influ-

enced by internal factors (something inside the object or belonging to it had caused it to drop). The Americans reported that they thought the movements were caused more by internal factors than did the Chinese.



Trajectories of motion in computer displays suggestive of liquid in a container.

The British were in charge of Hong Kong for one hundred years and the children there learn English no later than elementary school. Western influence, both culturally and linguistically, remains strong, even under Chinese control since 1997. This makes the city an interesting laboratory for purposes of cross-cultural study.

It turns out that Hong Kong citizens can be encouraged to think in either an Eastern or a Western way by presenting them with images that suggest one culture or the other. Ying-yi Hong and her colleagues showed a vignette similar to the Morris and Peng fish cartoons to students at the University of Hong Kong. But first, they showed them pictures suggestive of either Western or Eastern culture. They showed some participants pictures that are strongly associated with American culture: for example, the House of Representatives, a cowboy on horseback, and Mickey Mouse. They showed other participants pictures strongly associated with Chinese culture: for example, a dragon, a temple, and men writing Chinese characters using a brush. A third group of participants were shown neutral pictures of landscapes. After showing participants a set of pictures, Hong and her colleagues showed them a cartoon of one fish swimming in front of other fish and asked them what they thought was the major reason for the fish's swimming in front of the other fish. Participants who saw the American pictures gave more reasons having to do with motivations of the individual fish and fewer explanations having to do with the other fish or the context than did participants who saw the Chinese pictures. Participants who saw the neutral pictures were in the middle.

Peng and his colleague Eric Knowles studied Asian Americans and found that they could "prime" either their participants' Asian selves or their American selves. They showed students a battery of vignettes of physical movement like those portrayed in the illustration, and asked them to rate the extent to which the object's movement was due to dispositional factors (e.g., shape, weight) vs. contextual factors (e.g., gravity, friction). But first they asked participants either to recall an experience they had that made identity as an American apparent to them or to recall an experience that made their Asian identity apparent. The primes had an effect. Participants who had their American identity primed rated causes internal to the object to be more important than did participants who had their Asian identity primed.

Ara Norenzayan, Incheol Choi, and I asked Korean and American college students a number of questions intended to plumb their theories about the causes of behavior. We asked them to rate the degree to which several paragraphs captured their views about the reasons people behave as they do. The first couple of sentences of each paragraph are reproduced below.

- 1) How people behave is mostly determined by their personality. One's personality predisposes and guides an individual to behave in one way, not in another way, no matter what circumstances the person is in.
- 2) How people behave is mostly determined by the situation in which they find themselves. Situa-

tional power is so strong that we can say it has more influence on behavior than one's personality.

- 3) How people behave is always jointly determined by their personality and the situation in which they find themselves. We cannot claim that either personality or the situation is the only determinant of our behavior.

Koreans and Americans regarded personality (1) as equally important in determining behavior, but Koreans rated situational factors (2) and the interaction between situations and personalities (3) as more important than Americans did.

We also asked participants several questions about their beliefs regarding the malleability of personality. For example, we asked whether they thought that someone's personality is something about them that they can't change very much. The Koreans thought that personalities are more subject to change than the Americans did.

It should hardly be surprising that Americans regard personalities as relatively fixed and Asians regard them as more malleable. This is consistent with the long Western tradition of regarding the world as being largely static and the long Eastern tradition of viewing the world as constantly changing.

Social psychologists Michael Morris, Kwok Leung, and Sheena Sethi (Iyengar) have shown that Easterners and Westerners have preferences for different kinds of negotiation strategies, which may be related to views about pliability of character. Hong Kong and American participants were asked what kind of adjudication they would prefer

when they had to come to an agreement with someone who had behaved in ways that could be construed as belligerent and unreasonable. Hong Kong participants preferred inquisitorial adjudication in which a third party questions the disputants and tries to make a mutually agreeable judgment, whereas Americans were more likely to prefer adversarial adjudication with representation by lawyers.

Should we assume that Asians have theories of human personality that are fundamentally different from those of Westerners? Do Asians believe that people differ from one another only very slightly? Or do they see differences, but in terms of traits that would seem odd or irrelevant to Westerners?

Probably the answer to all of these questions is no. When I was in China in 1982, toward the end of the Cultural Revolution, the society was still somewhat shell-shocked and secretive, having just spent thirty years undergoing a convulsive social and economic experiment. The culture was and is dramatically different from that of the West in ways that I could not have articulated at the time. As this book shows, there are marked differences in worldviews, perception, and thought processes. Yet within three weeks I found that I was able to gossip with my hosts about other Chinese. We could talk about Fung's decency and humility, Chan's arrogance, Lin's reserve, understanding each other perfectly. Fortunately there is better evidence than my anecdote available. Researchers have produced a large amount of evidence indicating that theories of personality in the East are quite similar to

those in the West. Major personality trait factors—labeled the Big Five by personality theorists—are repeatedly found in Western populations. These same factors tend to be found when the Western personality tests are translated and given to Chinese, Koreans, or Japanese, though sometimes only four of the factors are identified.

Cultural psychologists Kuo-shu Yang and Michael Bond have found that there is also pretty good replication when test items are not translated from Western languages, but rather are generated by researchers using items based on behavior descriptions common in the local culture. In a subsequent effort to develop an "indigenous" Chinese personality inventory, Fanny Cheung and her colleagues selected items descriptive of personality from popular contemporary Chinese novels, books of Chinese proverbs, and descriptions of themselves and others offered by ordinary people and by professional psychologists. Based on these items, Cheung and her colleagues constructed a "Chinese Personality Assessment Inventory." They administered this inventory to a large sample of people in Hong Kong and mainland China. They found four factors, three of which corresponded roughly to extraversion, neuroticism, and conscientiousness, the most robust of the Big Five factors in the West. Interestingly, the researchers found a factor that does not emerge in Western-developed tests, which they described as the "Chinese tradition" factor, a construct that captures personality descriptions related to maintenance of interpersonal and inner harmony. It would be intriguing to see if this factor could be found in a version of the Chinese inventory if it were to be translated into Western languages. Harmony is not the first characteristic

that occurs to Western researchers when thinking about personalities, but the dimension might nevertheless be meaningful to Westerners.

AVOIDING THE FUNDAMENTAL ATTRIBUTION ERROR

It appears that Easterners and Westerners don't seem to differ that much in the personality dimensions they use. Why is it then that Westerners rely so much more heavily on personality traits in explaining behavior? The answer seems to be that Easterners are more likely to notice important situational factors and to realize that they play a role in producing behavior. As a consequence, East Asians are less susceptible to what social psychologist Lee Ross labeled the "Fundamental Attribution Error" (or FAE for short).

Imagine that you see a college student being asked to show possible donors around the campus for a day and that for this service the student is offered only a small amount of money—less than the minimum wage—and imagine that the student refuses. Do you suppose you would think it is likely that the student would volunteer to help in an upcoming Red Cross blood drive? Probably not very likely. But suppose a friend of yours had seen another student offered a reasonable amount of money—say, 50 percent above the minimum wage—to show the donors around and the student had agreed to do so. Do you suppose the friend would think it is likely that the student would help in the blood drive? Probably more

likely than you thought your student would be. If so, both you and your friend would be showing a version of the FAE: attributing behavior to a presumed disposition of the person rather than to an important situational factor—namely money—that was the primary driving force behind the behavior.

This error—ignoring the situation and inventing strong dispositional explanations for behavior—is a highly pervasive one. It makes people mistakenly confident that a person they see being interviewed for an important job is rather nervous by nature, that a person they see being withdrawn at a particular party (where the person happens to know no one) is rather shy in general, that a person who gives a good talk on a subject they know well, to a familiar audience, is a polished speaker and a confident person to boot.

The first solid experimental demonstration of the error was by the noted social psychologist Edward E. Jones and his colleagues. In a study published in 1967, they asked college students to read a speech or essay allegedly written by another student. This other student will be called the "target." It was made clear that the target had been required to write the speech or essay upholding a particular side of a particular issue. For example, the target had been told to write an essay in a political science class favoring Castro's Cuba or to give a speech in a debate class opposing the legalization of marijuana. Participants were asked to indicate what they thought was the actual opinion of the target student who wrote the essay or gave the speech. The sharp situational constraints should have made the participants recognize that they had learned

nothing about the target's real views, but in fact they were heavily influenced by what the target said. If the target said he was in favor of Castro's handling of Cuba, participants assumed he was actually inclined toward that opinion; if the target said he was opposed to the legalization of marijuana, participants tended to assume he was of that view.

As it turns out, this illusion is sufficiently powerful that even East Asians are susceptible. Chinese, Japanese, and Koreans have all participated in versions of this experiment and have been found to infer that the targets actually have attitudes corresponding to the views they read in the essay. But there is a difference between East Asian and American susceptibility: East Asians do not make the error if they are first placed in the target's shoes. Incheol Choi and I placed participants themselves into the situation of being required to write an essay on a particular topic, taking a particular stance, and using a particular set of four arguments in writing their essay. Then they read an essay by a person who, they knew, had been in the same situation they themselves had been. This had precisely no effect on Americans: Their dispositional inferences about others were as strong as if they had not themselves experienced exactly the target person's situation. But the experience rendered Koreans almost impervious to the error.

Other evidence indicates that making situational factors salient has a greater effect on Asians than on Westerners. Ara Norenzayan, Incheol Choi, and I asked American and Korean college students to read one of two scenarios and then to guess whether a target person would give someone bus fare. Both scenarios began in the following way:

You just met a new neighbor, Jim. As you and Jim are taking a walk in the neighborhood, a well-dressed man approaches Jim and explains that his car is broken down and he needs to call a mechanic. Then with a somewhat embarrassed voice, the man asks Jim for a quarter to make the phone call. You find that Jim searches his pocket and, after finding a quarter, gives it to the man. On another day Jim is walking toward the bus stop to catch the bus to work. As he is walking, a teenager carrying some books approaches Jim and politely asks him if he can borrow a dollar for a bus ride, explaining that he forgot his wallet at home and needs to get a ride to school.

In a version of the scenario read by one group of participants, Jim searches his pocket and discovers that he has several dollars; in a version read by other participants he discovers that he has only enough money for his own bus fare. Korean participants were more likely to recognize that Jim would be inclined to give the teenager the money if he finds he has several dollars than if he finds he has only one.

We gave participants a total of six different scenarios, each having their two different versions, and found that for each one the Koreans were more responsive to the situational information than the Americans were, predicting that a given behavior was more likely if situational factors facilitated it than if situational factors discouraged it.

So the evidence on causal attribution dovetails with

the evidence on perception. Westerners attend primarily to the focal object or person and Asians attend more broadly to the field and to the relations between the object and the field. Westerners tend to assume that events are caused by the object and Asians are inclined to assign greater importance to the context.

BUILDING CAUSAL MODELS

Differences in causal reasoning between Easterners and Westerners are broader than just preferences for field vs. object. Westerners seem to engage in more causal attribution, period. Historian Masako Watanabe has made this point beautifully in her studies of the ways Japanese and American elementary school and college students and their teachers deal with historical events.

Japanese teachers begin with setting the context of a given set of events in some detail. They then proceed through the important events in chronological order, linking each event to its successor. Teachers encourage their students to imagine the mental and emotional states of historical figures by thinking about the analogy between their situations and situations of the students' everyday lives. The actions are then explained in terms of these feelings. Emphasis is put on the "initial" event that serves as the impetus to subsequent events. Students are regarded as having good ability to think historically when they show empathy with the historical figures, including those who were Japan's enemies. "How" questions are asked frequently—about twice as often as in American classrooms.

American teachers spend less time setting the context than Japanese teachers do. They begin with the *outcome*, rather than with the initial event or catalyst. The chronological order of events is destroyed in presentation. Instead, the presentation is dictated by discussion of the causal factors assumed to be important ("The Ottoman empire collapsed for three major reasons"). Students are considered to have good ability to reason historically when they are capable of adducing evidence to fit their causal model of the outcome. "Why" questions are asked twice as frequently in American classrooms as in Japanese classrooms.

Watanabe labels American historical analysis as "backward" reasoning because events are presented in effect-cause order. She notes the similarity of this to goal-oriented reasoning: define the goal to be achieved and develop a model that will allow you to attain it. She also notes that goal orientation is more characteristic of Westerners, with their sense of personal agency, than it is of Asians. This insight helps us to understand why it was the Greeks and not the Chinese who engaged in causal modeling of natural phenomena. Modeling events in a "backward," causal-analysis fashion comes more naturally to people who are at liberty to set their own goals with respect to an object and to come up with schemes to achieve them. Watanabe quotes an American instructor of English as a second language as saying that "it is very difficult for American teachers to understand Japanese students' essays because we don't see any causality in them, and . . . the relation of cause and effect is elementary logic in the United States."

Consistent with the lesser complexity of the world they live in, Westerners see fewer factors as being relevant to an understanding of the world than Easterners do. Incheol Choi and his colleagues described the Chinese physics student murder story to American and Korean participants. Choi and colleagues then provided one hundred items of information concerning the student, the professor, the school, and so on and asked their participants to rule out factors that could not be considered to be of possible relevance for establishing a motive for the slaying. Korean participants regarded only 37 percent of the items of information as irrelevant. American participants thought 55 percent of the items were likely to be irrelevant. (They also studied Asian American participants and found them to be in between European Americans and Koreans.)

Choi and his colleagues also found evidence that the tendency to see so many factors as relevant to the outcome was related to the degree to which the individual held holistic beliefs about the world. They asked their participants to answer a "holism" questionnaire indicating the extent to which they believed that events are related to one another. Some examples:

- Everything in the universe is somehow related to everything else.
- It's not possible to understand the pieces without considering the whole picture.

Choi and colleagues found that Koreans were more holistic in their beliefs than Americans. Moreover, the

more holistic the individual, whether American or Korean, the more reluctant to assume that a particular item of information might be irrelevant.

But open-mindedness and the belief that the world is complex can also have their disadvantages, as we'll see next.

AVOIDING HINDSIGHT

The Soviet Union's demise in 1991 may be one of the few historical events that has not seemed inevitable after the fact to large numbers of historians, both lay and professional. The fall of the Roman Empire, the rise of the Third Reich, and the American success in reaching the moon before the Russians, not to mention less momentous events, are routinely seen as inevitable by commentators, who, one strongly suspects, could not have predicted them. We tend to have two problems when we try to "predict" the past: (1) believing that, at least in retrospect, it can be seen that events could not have turned out other than they did; and (2) even thinking that in fact one easily could have predicted *in advance* that events would have turned out as they did.

How do we know that people are inclined to make these errors? Cognitive psychologist Baruch Fischhoff worked out a clever method for showing that people overestimate the extent to which they could have predicted the outcome of a given event and are less surprised by unusual turns of events than they should be. Fischhoff gave his participants enough information to set the stage

for various historical events. For example, Fischhoff described the situation in 1814 in Bengal when the British were attempting to consolidate their control of India. They had to deal with raids by the Gurkas of Nepal. The British commander decided to deal with the Gurkas by invading their mountain territory. Details of the situation at the time of the invasion were provided and Fischhoff then asked his participants how likely they thought various outcomes were. He gave other participants the same information, but also told them the actual outcome (a stalemate). He asked these participants how likely they *would have thought* the outcome would be if they had not been told what it was. Fischhoff found that if his participants knew the outcome, they routinely overestimated the likelihood they would have assigned to it in advance.

Incheol Choi and I reasoned that it may be easier to avoid the hindsight fallacy if one is inclined to construct explicit causal models of the world. Explicit models are likely to turn up factors that could suggest more than one outcome and as a result one may be less inclined to be confident that some particular outcome would have occurred. Moreover, one can be surprised when one's predictions turn out to be wrong. Surprise is likely to prompt a search for possibly relevant factors and to revision of the model that in turn can result in a more accurate understanding of the world. On the other hand, if modeling is less explicit, and if large numbers of factors are considered to be potentially relevant to any given outcome, then it may be easy to think of reasons why a particular event might have turned out the way it did. We tested these notions in a series of experiments comparing Koreans and Americans.

We told participants in one study about a young seminary student, who, they were assured, was a very kind and religious person. Heading across campus to deliver a sermon, he encountered a man lying in a doorway asking for help. We told participants that the seminarian was late to deliver his sermon.

In condition A, participants did not know what the seminary student had done, and we asked them to tell us what they thought was the probability that the target would help and how surprised they would be if they were to find out that he had not helped. Both Koreans and Americans reported about an 80 percent probability that the target would help and indicated that they would be quite surprised if he did not. In condition B, we told participants that the seminary student had helped the victim and in condition C, we told participants that the target had not helped the victim. Participants in conditions B and C were asked what they believed they *would have* regarded as the probability that the student would have helped—if in fact they had not been told what he did—and also how surprised they were by his actual behavior. Again, both Koreans and Americans in condition B indicated they would have thought the probability of helping was about 80 percent and both groups reported no surprise that he did help. Americans in condition C, in which the student unexpectedly did not help the victim, also reported that they would have thought the probability was about 80 percent that the student would have helped and they reported a great deal of surprise that he did not do so. In contrast, Koreans in condition C reported that they would have thought the probability was only about 50 percent that the student

would have helped and they reported little surprise that he did not. So Americans experienced surprise where Koreans did not and Koreans showed a pronounced hindsight bias, with many indicating they thought they knew something all along which in fact they did not. (The scenario in our study described an actual experiment done with students at Princeton Theological Seminary. The fine young men of that study were very likely to offer help to the groaning man in the doorway—unless they were in a hurry, in which case most did not.)

Choi and I conducted another study that indicates that Easterners are not as surprised by unanticipated outcomes as Americans are. We described studies to American and Korean participants and either gave them one hypothesis about each study or two conflicting hypotheses—one that predicted the actual outcome of the study and one that predicted the opposite. For example, some participants were told about a study examining the hypothesis that realism increases mental health. Other participants were told that that hypothesis was being considered, as well as an alternative one that optimism promotes mental health. Then all participants read that actual research findings indicate that realism promotes mental health. We asked participants to indicate how surprising and interesting the finding was. Americans reported being more surprised—and found the study to be more interesting—when we had presented two strongly competing hypotheses, whereas Koreans were no more surprised or interested when presented with two opposing hypotheses than when presented only with the one that predicted the actual finding.

Easterners are almost surely closer to the truth than Westerners in their belief that the world is a highly complicated place and Westerners are undoubtedly often far too simple-minded in their explicit models of the world. Easterners' failure to be surprised as often as they should may be a small price to pay for their greater attunement to a range of possible causal factors.

On the other hand, it seems fairly clear that simple models are the most useful ones—at least in science—because they're easier to disprove and consequently to improve upon. Most of Aristotle's physical propositions have turned out to be demonstrably false. But Aristotle had testable propositions about the world while the Chinese did not: It was Westerners who established what the correct physical principles are. The Chinese may have understood the principle of action at a distance, but they had no means of proving it. When it was proved true, it was by Western scientists who did not initially believe in it and who were actually trying to establish that all motion was of the billiard ball type, with objects moving only because they come into contact with some other object.

Westerners' success in science and their tendency to make certain mistakes in causal analysis derive from the same source. Freedom to pursue individual goals prompts people to model the situation so as to achieve those goals, which in turn encourages modeling events by working backward from effects to possible causes. When there is systematic testing of the model, as in science, the model can be corrected. But Westerners' models tend to be limited too sharply to the goal object and its properties,

slighting the possible role of context. When it is everyday life—all too often a buzzing confusion—that is being modeled, recognition of error is more difficult. A mistaken model will be difficult to correct. So despite their history of scientific-mindedness, Westerners are particularly susceptible to the Fundamental Attribution Error and to overestimating the predictability of human behavior.

As we shall see next, Westerners' preferred simplicity and Easterners' assumed complexity encompass more than their approaches to causality. Their preferences extend to the ways that knowledge is organized more generally.

IS THE WORLD MADE UP
OF NOUNS OR VERBS?

Jorge Luis Borges, the Argentine writer, tells us that there is an ancient Chinese encyclopedia entitled *Celestial Emporium of Benevolent Knowledge* in which the following classification of animals appears: "(a) those that belong to the emperor, (b) embalmed ones, (c) those that are trained, (d) suckling pigs, (e) mermaids, (f) fabulous ones, (g) stray dogs, (h) those that are included in this classification, (i) those that tremble as if they were mad, (k) those drawn with a very fine camel's hair brush, (l) others, (m) those that have just broken a flower vase, (n) those that resemble flies at a distance.

Though Borges may have invented this classification for his own purposes, it is certainly the case that the ancient Chinese did not categorize the world in the same sorts of ways that the ancient Greeks did. For the Greeks,

things belonged in the same category if they were describable by the same attributes. But the philosopher Donald Munro points out that, for the Chinese, shared attributes did not establish shared class membership. Instead, things were classed together because they were thought to influence one another through *resonance*. For example, in the Chinese system of the Five Processes, the categories spring, east, wood, wind, and green all influenced one another. Change in wind would affect all the others—in "a process like a multiple echo, without physical contact coming between any of them." Philosopher David Moser also notes that it was similarity between classes, not similarity among individual members of the same class, that was of interest to the ancient Chinese. They were simply not concerned about the relationship between a member of a class ("a horse") and the class as a whole ("horses").

In fact, for the Chinese there seems to have been a positive antipathy toward categorization. For the ancient Taoist philosopher Chuang Tzu, "... the problem of . . . how terms and attributes are to be delimited, leads one in precisely the wrong direction. Classifying or limiting knowledge fractures the greater knowledge." In the *Tao Te Ching* we find the following dim view of the effects of relying on categories.

The five colors cause one's eyes to be blind.

The five tones cause one's ears to be deaf.

The five flavors cause one's palate to be spoiled.

The lack of interest in classes of objects sharing the same properties is consistent with the basic scheme that

the ancient Chinese had for the world. For them, the world consisted of continuous substances. So it was a *part-whole* dichotomy that made sense to them. Finding the features shared by objects and placing objects in a class on that basis would not have seemed a very useful activity, if only because the objects themselves were not the unit of analysis. Since the Greek world was composed of objects, an *individual-class* relation was natural to them. The Greek belief in the importance of that relation was central to their faith in the possibility of accurate inductive inferences: Learning that one object belonging to a category has a particular property means that one can assume that other objects belonging to the category also have the property. If one mammal has a liver, it's a good bet that all mammals do. A focus on the *one-many*, individual-class organization of knowledge encourages induction from the single case; a part-whole representation does not.

**CATEGORIES vs. RELATIONSHIPS IN
MODERN THOUGHT**

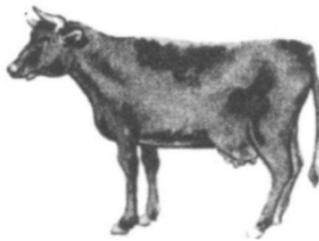
Once again, we have a case of very different intellectual traditions in ancient Greece and ancient China, and once again we can ask whether the mental habits of ancient philosophers resemble the perception and reasoning of ordinary people today. We might expect, based on the historical evidence for cognitive differences and our theory about the social origins of them, that contemporary Westerners would (a) have a greater tendency to categorize objects than would Easterners; (b) find it easier to learn

new categories by applying rules about properties to particular cases; and (c) make more inductive use of categories, that is, generalize from particular instances of a category to other instances or to the category as a whole. We might also expect that Easterners, given their convictions about the potential relevance of every fact to every other fact, would organize the world more in terms of perceived relationships and similarities than would Westerners.

Take a look at the three objects pictured in the illustration on page 141. If you were to place two objects together, which would they be? Why do those seem to be the ones that belong together?

If you're a Westerner, odds are you think the chicken and the cow belong together. Developmental psychologist Liang-hwang Chiu showed triplets like that in the illustration to American and Chinese children. Chiu found that the American children preferred to group objects because they belonged to the "taxonomic" category, that is, the same classification term could be applied to both ("adults," "tools"). Chinese children preferred to group objects on the basis of relationships. They would be more likely to say the cow and the grass in the illustration go together because "the cow eats the grass."

Li-jun Ji, Zhiyong Zhang, and I obtained similar results comparing college students from the U.S with students from mainland China and Taiwan, using words instead of pictures. We presented participants with sets of three words (e.g., panda, monkey, banana) and asked them to indicate which two of the three were most closely related. The American participants showed a marked pref-

**A****B**

What goes with this? **A** or **B**

Example of item measuring preference for grouping
by categories vs. relationships.

erence for grouping on the basis of common category membership: Panda and monkey fit into the animal category. The Chinese participants showed a preference for grouping on the basis of thematic relationships (e.g., monkey and banana) and justified their answers in terms of relationships: Monkeys eat bananas.

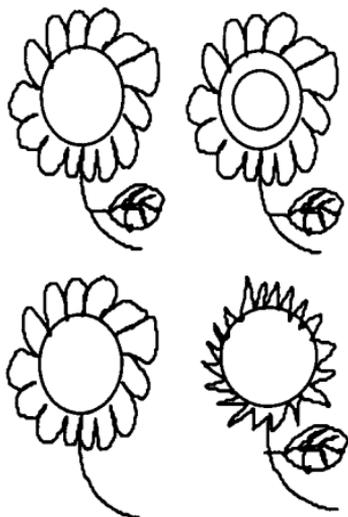
If the natural way of organizing the world for Westerners is to do so in terms of categories and the rules that define them, then we might expect that Westerners' per-

ceptions of similarity between objects would be heavily influenced by the degree to which the objects can be categorized by applying a set of rules. But if categories are less salient to East Asians, then we might expect that their perceptions of similarity would be based more on the family resemblance among objects.

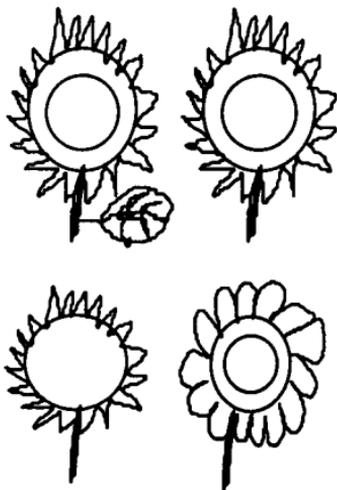
To test this possibility, Ara Norenzayan, Edward E. Smith, Beom Jun Kim, and I gave schematic figures like those shown in the illustration on page 143 to Korean, European American, and Asian American participants. Each display consisted of an object at the bottom and two groups of objects above it. The participants' job was just to say which group of objects the target object seemed more similar to. You might want to make your own judgment about the objects in the illustration before reading on.

Most of the Koreans thought the target object was more similar to the group on the left, whereas most of the European Americans thought the object was more similar to the group on the right. The target object bears a more obvious family resemblance to the group on the left, so it's easy to see why the Koreans would have thought the object was more similar to that group, and on average they did so 60 percent of the time. But there is a simple, invariant rule that allows you to place the target object into a category that it shares with the group on the right. The rule is "has a straight (as opposed to curved) stem." European Americans typically discovered such rules and, 67 percent of the time, found the target object to be more similar to the group with which it shared the rule-based category. Asian American judgments were in between but more similar to those of the Koreans.

Group 1



Group 2



Target Object



Example of item measuring whether judgments of similarity are based on family resemblance or rules.

Categories are sometimes learned by applying rules to features. We come to know that rabbits are mammals because we are taught a rule that animals that nurse their young are mammals. (That's true for categories defined formally, in any case. Actually, most people probably learn what

mammals are by ostention: "that rabbit is a mammal," "that lion is a mammal." The "folk" category that is learned is then induced from the common properties observed—fur-bearing, four-footed, etc.)

Explicit modeling or rule-making seems to be less characteristic of the causal explanations of East Asians than of Westerners. If Asians are less likely to use rules to understand the world, and less likely to make use of categories, they might find it particularly hard to learn categories by applying explicit rules to objects. In order to test this possibility, Ara Norenzayan and his colleagues showed color cartoon figures like those rendered in black and white in the illustration on page 145 to East Asian, Asian American, and European American students at the University of Michigan. We told participants that they would be learning how to classify the animals as being either from Venus or from Saturn.

We told participants that an animal was from Venus if it had any three of five features: curly tail, hooves, long neck, mouth, and antennae ears. Otherwise, the creature was from Saturn. The animal on the left at the top (seen as blue by participants) meets the criteria for being from Venus; the one on the right (seen as red) doesn't and has to be put in the Saturn category. After participants had learned how to classify animals correctly, we tested how much control they had over the categories by showing them new animals and seeing how fast and accurately they could classify them. The new animals included two types that resembled previously seen ones. Some animals were "positive matches": They looked like an animal participants had seen before during the training trials and they

TRAINING PHASE

Known Venus



Known Saturn



TEST PHASE: Positive Match

Venus



TEST PHASE: Negative Match

Saturn



Example of cartoon animals used for study of ease of learning categories based on rules.

belonged to the same category in terms of the rules concerning their features. Other animals were "negative matches": They looked like an animal that had been seen before, but in terms of the rules, they belonged to a different category from the one seen in training. The animal on the lower left is a positive match for the one on the left above: It looks like the one categorized as being from

Venus and the rules also indicate that it is. The one on the lower right is a negative match: It looks like the Venus animal but the rules say it's not.

The Asian participants took longer to make their judgments about whether the animal was from Venus or Saturn than either the European Americans or Asian Americans. The three groups of participants were equally fast and equally accurate for the positive matches, for which both memory for the previously seen example and correct applications of the rules defining the category would produce the correct answer. But for the negative matches, which could be classified correctly only if the rules were remembered and applied correctly, Asian participants made twice as many classification errors as either European Americans or Asian Americans did. Categorization by rules seems not to come as easily to Easterners as to Westerners.

Which of the two arguments below, both ending in the conclusion "rabbits have enzyme Q in their blood," seems more convincing to you? Why?

(1)

Lions have enzyme Q in their blood

Tigers have enzyme Q in their blood

Rabbits have enzyme Q in their blood

(2)

Lions have enzyme Q in their blood

Giraffes have enzyme Q in their blood

Rabbits have enzyme Q in their blood

Most Westerners who have been asked this sort of question say that argument 2 is better. They give as their reason some version of a "diversity" or "coverage" argu-

merit. Lions and tigers are rather similar animals in many ways, so they don't cover the mammal category, to which rabbits belong, very well. Lions and giraffes give better coverage of the mammal category because they're more different from each other. Now consider the arguments below, both ending in the conclusion "mammals have enzyme Q in their blood." Which seems more convincing to you?

(1)

Lions have enzyme Q in their blood

Tigers have enzyme Q in their blood

 Mammals have enzyme Q in their blood

(2)

Lions have enzyme Q in their blood

Giraffes have enzyme Q in their blood

 Mammals have enzyme Q in their blood

Again, most Westerners say the second argument is more convincing and give as their reason that the coverage of the mammal category is better for the second argument than for the first.

Incheol Choi, Edward E. Smith, and I gave problems like those above to Korean and American college students. Koreans, but not Americans, were more likely to prefer the second argument when the category was mentioned in the conclusion. For Koreans, the mammal category was not salient unless it was highlighted by actually referring to it. As a result, the diversity principle was more important to their inferences when they were explicitly reminded that the objects in question were mammals. One likely consequence of the low salience of categories for Easterners is that they do not fuel inductive inferences for Easterners as much as for Westerners.

**GROWING UP IN A WORLD OF
OBJECTS vs. RELATIONSHIPS**

How is it possible that Easterners today have relatively little interest in categories, find it hard to learn new categories by applying rules about properties, and make little spontaneous use of them for purposes of induction? Why are they so much more inclined to consider relationships in their organization of objects than Westerners are? Surely not just because ancient Chinese philosophers had little use for categories and were more interested in part-whole relationships and thematic resemblances than in category-member classifications. It seems dubious that philosophers' concerns would have affected judgments about everyday objects even by their contemporaries. If relationships, and not categories, are relatively important to East Asians today, there must be factors that still operate in the socialization of children that prompt such different styles of perception and reasoning. Before looking for such factors, let's consider some important differences between categories and relationships.

Categories are denoted by nouns. It seems obvious that nouns would be easier for a young child to learn than verbs. All you have to do to learn that the animal you just saw is a "bear" is to notice its distinctive features—huge size, large teeth and claws, long fur, ferocious appearance—and you can store that object away with its label. The label is then available for application to any other object having that set of properties.

Relationships, on the other hand, involve, tacitly or explicitly, a verb. Learning the meaning of a transitive verb

normally involves noticing two objects and some kind of action that connects them in some way. "To throw" means to use your arm and hand to move an object through the air to a new location. Merely pointing at the action does not guarantee that someone will know what you're referring to.

Because of their relative ambiguity, it's harder to remember verbs; verbs are more likely to be altered in meaning than nouns when a speaker communicates to another person or when one person paraphrases what another has said; and it's harder to correctly identify verbs than nouns when they're translated from one language to another. Moreover, the meaning of verbs, and other terms that describe relations, differs more across different languages than simple nouns do. "Verbs," says cognitive psychologist Dedre Gentner, "are highly reactive; nouns tend to be inert."

Given these differences between nouns and verbs, it is scarcely surprising that Gentner finds that children learn nouns much more rapidly than they learn verbs. In fact, toddlers can learn nouns at rates of up to two per day. This is much faster than the rate at which they learn verbs.

Gentner quite reasonably guessed that the large noun advantage would be universal. But it turns out not to be. Developmental psycholinguist Twila Tardif and others have found that East Asian children learn verbs at about the same rate as nouns and, by some definitions of what counts as a noun, at a significantly faster rate than nouns. There are several factors that might underlie this dramatic difference.

First, verbs are more salient in East Asian languages

than in English and many other European languages. Verbs in Chinese, Japanese, and Korean tend to come either at the beginning or the end of sentences and both are relatively salient locations. In English, verbs are more commonly buried in the middle.

Second, recall from chapter 3 the father I overheard quizzing his child about the properties of pants. Western parents are noun-obsessed, pointing objects out to their children, naming them, and telling them about their attributes. Strange as it may seem to Westerners, Asians don't seem to regard object naming as part of the job description for a parent. Developmental psychologists Anne Fernald and Hiromi Morikawa went into the homes of Japanese and Americans having infants either six, twelve, or nineteen months old. They asked the mothers to clear away the toys from a play area and then they introduced several that they had brought with them—a stuffed dog and pig and a car and a truck. They asked the mothers to play with the toys with their babies as they normally would. They found big differences in the behavior of mothers even with their youngest children. American mothers used twice as many object labels as Japanese mothers ("piggie," "doggie") and Japanese mothers engaged in twice as many social routines of teaching politeness norms (empathy and greetings, for example). An American mother's patter might go like this: "That's a car. See the car? You like it? It's got nice wheels." A Japanese mother might say: "Here! It's a vroom vroom. I give it to you. Now give this to me. Yes! Thank you." American children are learning that the world is mostly a place with objects, Japanese children that the world is mostly about relationships.

Third, we know that naming objects that share a common set of properties results in infants' learning a category formed of objects sharing those features. Naming objects sharing features also prompts them to attend to features that would allow them to form other categories based on similar sets of properties. Developmental psychologists Linda Smith and her colleagues randomly assigned seventeen-month-old children either to a control condition or to a condition in which, for nine weeks, they repeatedly played with and heard names for members of unfamiliar object categories that were defined by shape: for example, "cup." This taught the toddlers to attend to shape and to form categories for objects—even those seen outside the experimental setting—that could be grouped on the basis of some set of defining features. The result was that trained children showed a dramatic increase in acquisition of new object names during the course of the study.

Fourth, generic nouns (that is, category names) in English and other European languages are often marked by syntax. When the conversation turns to waterfowl, you can say "a duck," "the duck," "the ducks," or "ducks." The last term is a generic one and the syntax tells you this. It's normally obligatory to indicate whether you're speaking about an object or a class of objects, though sometimes the context can do the job. But in Chinese and other Sinitic languages, contextual and pragmatic cues can be the only kinds of cues the hearer has to go on. The presence of a duck that has just waddled over from a pond to beg food, for example, would indicate that it is "the duck" one is talking about, rather than "a duck," "the ducks," or "ducks." Developmental psychologists Susan Gelman and

Twila Tardif studied English-speaking mothers and Mandarin Chinese-speaking mothers and found that, across a number of contexts, generic utterances were more common for the English-speaking mothers.

Finally, there is direct evidence that Eastern children learn how to categorize objects at a later point than Western children. Developmental psycholinguists Alison Gopnik and Soonja Choi studied Korean-, French-, and English-speaking children beginning when they were one and a half years old. They found that object-naming and categorization skills develop later in Korean speakers than in English and French speakers. The investigators studied means-ends judgments (for example, figuring out how to take things out of a container), and categorization, which they studied by showing children four objects of one kind and four of another, such as four flat, yellow rectangles and four small human figures, and telling them to "fix these things up," that is, put them together in some way that makes sense. English- and French-speaking toddlers mastered the means-end tasks and the categorization tasks at about the same age. Korean toddlers learned categorization almost three months later than means-end abilities.

DISPOSITIONS, STABILITY, AND CATEGORIES

The ancient Greeks were fond of categories and used them as the basis for discovery and application of rules. They also believed in stability and understood both the physical and social worlds in terms of fixed attributes or dispositions. These are not unrelated facts, nor is it a coin-

vidence that the ancient Chinese were uninterested in categories, believed in change, and understood the behavior of both physical and social objects as being due to the interaction of the object with a surrounding field of forces.

If the world is a stable place, then it is worthwhile trying to develop rules to understand it and refining the categories to which the rules apply. Many of the categories used to understand the world refer to presumed qualities of the object: hardness, whiteness, kindness, timidity. Easterners of course use such categories as well, but they are less likely to abstract them away from particular objects: There is the whiteness of the horse or the whiteness of the snow in ancient Chinese philosophy, but not whiteness as an abstract, detachable concept that can be applied to almost anything. In the Western tradition, objects have essences composed of mix-and-match abstract qualities. These essences allow for confident predictions about behavior independent of context. In the Eastern tradition, objects have concrete properties that interact with environmental circumstances to produce behavior. There was never any interest in discussing abstract properties as if they had a reality other than being a characteristic of a particular object.

Most importantly, the dispositions of objects are not necessarily stable for Easterners. In the West, a child who performs poorly in mathematics is likely to be regarded as having little math ability or perhaps even as being "learning disabled." In the East, such a child is viewed as needing to work harder, or perhaps her teacher should work harder, or maybe the setting for learning should be changed.

The obsession with categories of the either/or sort runs through Western intellectual history. Dichotomies abound in every century and form the basis for often fruitless debates: for example, "mind-body" controversies in which partisans take sides as to whether a given behavior is best understood as being produced by the mind independent of any biological embodiment, or as a purely physical reaction unmediated by mental processes. The "nature-nurture" controversy is another debate that has often proved to generate more heat than light. As evolutionary biologist Richard Alexander has pointed out, nearly all behaviors that are characteristic of higher order mammals are determined by both nature and nurture. The dichotomy "emotion-reason" has obscured more than it has revealed. As Hume said, "reason is and ought to be the slave of passion"; it makes sense to separate the two for purposes of analysis only. And it's been suggested that the distinction between "human" and "animal" insisted upon by Westerners made it particularly hard to accept the concept of evolution. In most Eastern systems, the soul can take the form of any animal or even God. Evolution was never controversial in the East because there was never an assumption that humans sat atop a chain of being and somehow had lost their animality.

Throughout Western intellectual history, there has been a conviction that it is possible to find the necessary and sufficient conditions for any category. A square is a two-dimensional object with four sides of equal length and four right angles. Nothing lacking these properties can be a square and anything having those properties is definitely a square. Ludwig Wittgenstein, in his *Philosophical*

Investigations, brought the whole necessity-and-sufficiency enterprise crashing to earth in the West. Wittgenstein argued to the satisfaction (or rather, dismay) of even the most analytic of Western philosophers that establishing necessary and sufficient conditions for any complex or interesting category, such as a "game" or a "government" or an "illness," was never going to be possible. A thing can be a game even if it is not fun, even if played alone, even if its chief goal is to make money. A thing is not necessarily a game even if it is fun or is a nonproductive activity engaging several people in pleasurable interaction. Wittgenstein's sermon would never have been needed in the East. The pronouncement that complex categories cannot always be defined by necessary and sufficient conditions would scarcely have been met with surprise.

IS IT LANGUAGE THAT DOES THE JOB?

Given the substantial differences in language usage between Easterners and Westerners, is it possible that it is merely language that is driving the differences in tendency to organize the world in terms of verbs vs. nouns? Are the findings about knowledge organization simply due to the fact that Western languages encourage the use of nouns, which results in categorization of objects, and Eastern languages encourage the use of verbs, with the consequence that it is relationships that are emphasized? More generally, how many of the cognitive differences documented in this book are produced by language?

There are in fact a remarkable number of parallels

between the sorts of cognitive differences discussed in this book and differences between Indo-European languages and East Asian languages. The parallels are particularly striking because East Asian languages, notably Chinese and Japanese, are themselves so different in many respects, yet nevertheless share many qualities with one another that differentiate them from Indo-European languages.

In addition to the practices already discussed—pointing and naming, location of verbs in sentences, marking of nouns as generic, and so on—there are several ways in which language usage maps onto differences in category usage.

The Western concern with categories is reflected in language. "Generic" noun phrases are more common for English speakers than for Chinese speakers, perhaps because Western languages mark in a more explicit way whether a generic interpretation of an utterance is the correct one. In fact, in Chinese there is no way to tell the difference between the sentence "squirrels eat nuts" and "this squirrel is eating the nut." Only context can provide this information. English speakers know from linguistic markers whether it is a category or an individual that is being talked about.

Greek and other Indo-European languages encourage making properties of objects into real objects in their own right—simply adding the suffix "ness" or its equivalent. The philosopher David Moser has noted that this practice may foster thinking about properties as abstract entities that can then function as theoretical explanations. Plato actually thought that these abstractions had a greater real-

ity than the properties of objects in the physical world. This degree of theorizing about abstractions was never characteristic of Chinese philosophy.

East Asian languages are highly "contextual." Words (or phonemes) typically have multiple meanings, so to be understood they require the context of sentences. English words are relatively distinctive and English speakers in addition are concerned to make sure that words and utterances require as little context as possible. The linguistic anthropologist Shirley Brice Heath has shown that middle-class American parents quite deliberately attempt to decontextualize language as much as possible for their children. They try to make words understandable independent of verbal context and to make utterances understandable independent of situational context. When reading to a child about a dog, the parent might ask the child what the animal is ("A doggie, that's right") and who has a dog ("Yes, Heather has a dog"). The word is detached from its naturally occurring context and linked to other contexts where the word has a similar meaning.

Western languages force a preoccupation with focal objects as opposed to context. English is a "subject-prominent" language. There must be a subject even in the sentence "It is raining." Japanese, Chinese, and Korean, in contrast, are "topic-prominent" languages. Sentences have a position, typically the first position, that should be filled by the current topic: "This place, skiing is good." This fact places an alternative interpretation on our finding that, after viewing underwater scenes, Americans start with describing an object ("There was a big fish, maybe a trout,

moving off to the left") whereas Japanese start by establishing the context ("It looked like a pond"). While not obligatory from a grammatical standpoint, an idiomatic Japanese sentence starts with context and topic rather than jumping immediately to a subject as is frequently the case in English.

For Westerners, it is the self who does the acting; for Easterners, action is something that is undertaken in concert with others or that is the consequence of the self operating in a field of forces. Languages capture this different sort of agency. Recall that there are many different words for "I" in Japanese and (formerly, at any rate) in Chinese, reflecting the relationship between self and other. So there is "I" in relation to my colleague, "I" in relation to my spouse, etc. It is difficult for Japanese to think of properties that apply to "me." It is much easier for them to think of properties that apply to themselves in certain settings and in relation to particular people. Grammar also reflects a different sense of how action comes about. Most Western languages are "agentic" in the sense that the language conveys that the self has operated on the world: "He dropped it." (An exception is Spanish.) Eastern languages are in general relatively nonagentic: "It fell from him," or just "fell."

A difference in language practice that startles both Chinese speakers and English speakers when they hear how the other group handles it concerns the proper way to ask someone whether they would like more tea to drink. In Chinese one asks "Drink more?" In English, one asks "More tea?" To Chinese speakers, it's perfectly obvious that it's tea that one is talking about drinking more of, so

to mention tea would be redundant. To English speakers, it's perfectly obvious that one is talking about drinking the tea, as opposed to any other activity that might be carried out with it, so it would be rather bizarre for the question to refer to drinking.

According to linguistic anthropologists Edward Sapir and Benjamin Whorf, the differences in linguistic structure between languages are reflected in people's habitual thinking processes. This hypothesis has moved in and out of favor among linguists and psychologists over the decades, but it is currently undergoing one of its periods of greater acceptance. Some of our evidence about language and reasoning speaks directly to the Sapir-Whorf hypothesis.

Recall that Li-jun Ji, Zhiyong Zhang, and I examined whether language per se affects the way people categorize objects. We gave word triplets (for example, panda, monkey, banana) to Chinese and American college students and asked them to indicate which two of the three were most closely related. The Chinese students were either living in the U.S. or in China and they were tested either in English or in Chinese.

If the Sapir-Whorf hypothesis is correct, then it ought to make a difference which language the bilingual Chinese are tested in. They should be more likely to prefer relationships (monkey, banana) as the basis for grouping when tested in Chinese and more likely to prefer taxonomic category (panda, monkey) when tested in English. But there are different ways of being bilingual. Psycholinguists make a distinction between what they call "coordinate" bilin-

guals and "compound" bilinguals. Coordinate bilinguals are people who learn a second language relatively late in life and for whom its use is confined to a limited number of contexts. Mental representations of the world supposedly can be different in one language than in the other for such people. Compound bilinguals are people for whom the second language is learned early and is used in many contexts. Mental representations for such people should be fused, since the languages are not used for different functions or used exclusively in different settings. We tested both types of bilinguals. People from China and Taiwan could be expected to be coordinate bilinguals because they typically learn English relatively late and its use is confined mostly to formal school contexts. People from Hong Kong and Singapore would be more likely to be compound bilinguals because they learn English relatively early and use it in more contexts. In addition, these societies, especially Hong Kong, are highly Westernized.

If language makes a difference to understanding of the world because different languages underlie different mental representations, we would expect to find the Sapir-Whorf hypothesis supported: The coordinate bilinguals, at least, should group words differently when tested in Chinese than when tested in English. If language makes a difference because structural features of the language compel different thinking processes, then we might expect even the compound bilinguals to group words differently when tested in Chinese than when tested in English. And, of course, if language is not important to cognitive tasks such as our grouping one, then we would expect no effect of language for either group.

The results could not have been more unequivocal. First, there were marked differences between European Americans tested in English and coordinate Chinese speakers tested in Chinese, whether in China or in the U.S. Americans were twice as likely to group on the basis of taxonomic category as on the basis of relationships. Mainland and Taiwanese Chinese tested in their native language were twice as likely to group on the basis of relationships as on the basis of taxonomic category and this was true whether they were tested in their home countries or in the U.S. Second, the language of testing did make a big difference for the mainland and Taiwanese Chinese. When tested in English, they were much less likely to group on the basis of relationships. It thus appears that English subserves a different way of representing the world than Chinese for these participants.

But matters were quite different for compound bilinguals from Hong Kong and Singapore. First, their groupings were shifted in a substantially Western direction: They were still based on relationships more than on taxonomic category, but the preference was much weaker for them than for the coordinate Chinese and Taiwanese speakers. More importantly, it made precisely no difference for the compound speakers whether they were tested in Chinese or in English.

The results are clear in their implications. There is an effect of culture on thought independent of language. We know this because both the coordinate Chinese speakers and the compound Chinese speakers group words differently from Americans regardless of language of testing. The differences between coordinate and compound speak-

ers also indicate a culture difference independent of language. The compound speakers from Westernized regions are shifted in a Western direction—and to the same extent regardless of language of testing. There is also clearly an effect of language independent of culture—but only for the coordinate speakers from China and Taiwan. They respond very differently depending on whether they are tested in Chinese or in English.

A tentative answer to the Sapir-Whorf question as it relates to our work—and it must be very tentative because we have just been discussing a couple of studies dealing with a single kind of mental process—is that language does indeed influence thought so long as different languages are plausibly associated with different systems of representation.

So there is good evidence that for East Asians the world is seen much more in terms of relationships than it is for Westerners, who are more inclined to see the world in terms of static objects that can be grouped into categories. Child-rearing practices undoubtedly play a role in producing these very different visions. East Asian children have their attention directed toward relationships and Western children toward objects and the categories to which they belong. Language probably plays a role, at least in helping to focus attention, but probably also in stabilizing the different orientations throughout life. There appears to be nothing about the structure of language, though, that actually forces description in terms of categories versus relationships.

As we will see next, the very different approaches to

understanding the world don't stop with the organization of knowledge. The decontextualization and object emphasis favored by Westerners, and the integration and focus on relationships by Easterners, result in very different ways of making inferences.