

To test the cross-cultural generality of relational-models theory, four studies examined the social errors of Bengali, Korean, Chinese, and Vai (from Liberia and Sierra Leone) subjects resident in the United States. Few of the subjects understood or spoke English well or participated substantially in American culture. Subjects reported errors in which they called someone they knew by the wrong name, misremembered with whom they had done something, or mistakenly directed an action at an inappropriate person. As predicted in all four cultures, people making these errors tend to substitute someone with whom they have the same basic kind of relationship. This effect of the four relational models is strongest in the least acculturated subjects. This effect is generally independent of tendencies to confuse people of the same age, gender, or ethnicity, or the tendency to confuse people whom subjects encounter in similar situations or refer to by the same role or kin term. These findings support the hypothesis that four universal relational categories underlie everyday social cognition across cultures.

SOCIAL ERRORS IN FOUR CULTURES: EVIDENCE ABOUT UNIVERSAL FORMS OF SOCIAL RELATIONS

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Think of telephoning someone when you intended to telephone someone else. What does it mean? Suppose you purchase a gift for someone, and accidentally give it to someone else, or imagine that you address a friend by another person's name. What are the cognitive processes that determine who you substitute for whom? Consider asking someone to do a task and later asking another person whether she has completed it—what does such an error

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imply about your social schemata? Imagine discussing a movie or social event with someone only to realize that you actually went to it with another person—what does that confusion reveal about your relationships with the two people?¹ This article explores the cognitive factors that structure such confusions, and asks whether the fundamental social schemata that organize social substitution errors vary across cultures or are universal. Social relationships in different societies are markedly different, but do people in each culture use different cognitive models to construct these diverse relationships or do people use a limited set of elementary models to generate the unique forms of interaction that are distinctive of each culture? Social errors provide an important clue to this question.

Research on human errors (Dell & Reich, 1980; Fromkin, 1980; Reason, 1990; Taylor, Fiske, Etcoff, & Ruderman, 1978) shows that people tend to confuse things that they regard as members of the same category. People also make errors in which they reveal cognitive use of social structures that they do not explicitly acknowledge. For example, when Mayans in Zinacantan make errors about the ritual offices that fellow villagers hold, their mistakes reveal a linear hierarchy of such offices (Cancian, 1963); informants attribute to people ritual offices whose prestige corresponds approximately to their actual status ranking in the community.

Studies of naturally occurring social errors in the United States (Fiske, Haslam, & Fiske, 1991) show that error substitutions display a consistent pattern: Americans confuse people with whom they have the same type of relationship. More specifically, error substitutions are governed by the four basic relational models described in A. P. Fiske's (1991a) theory. This theory was developed from fieldwork among the Moose of Burkina Faso, ethnographic sources, a synthesis of important social theories, and empirical social psychological research in North America and Europe. However, the theory has not yet been tested outside of U.S. culture.

The relational-models theory (Fiske 1990, 1991a, 1992a) posits that people use just four elementary cognitive models to generate, understand, coordinate, and evaluate most social interaction. *Communal sharing* (CS) is a relationship based on participants' feeling that all the members of some group or category are the same and that the group transcends its individual members. People in a CS relationship (e.g., lovers) feel a sense of solidarity and corporate identity. *Authority ranking* (AR) is a relationship based on transitive asymmetrical differentiation in a linear hierarchy. Subordinates in an AR relationship owe respect and often obedience, whereas superiors have prerogatives as well as pastoral responsibilities (e.g., military officers). *Equality matching* (EM) is a relationship based on a standard of balance and a concern about the additive magnitude of deviations from that standard.

Typical manifestations of EM are turn-taking, balanced exchange, tit-for-tat reciprocity, eye-for-an-eye vengeance, contributions or distributions in which shares are equated one for one, and in-kind compensation to even things out. Car pools and rotating credit associations are good examples. *Market pricing* (MP) is a relationship based on a sense of proportion, in which people calculate social values as ratios. Common forms of MP are prices, wages, rents, interest, proportional taxes, tithes, proportional rationing, various kinds of social rates and cost-benefit ratio calculations. For example, street vendors and their customers typically relate according to MP.

People use these models to organize exchange, distribution, work, and decision making; to give meaning to time, land, and many material objects; to make moral judgments and formulate legitimating ideologies, to punish and redress transgressions; and to interpret misfortune (Fiske, 1991a, 1992a). The same models are the basis for social influence, as well as for organizing groups and constituting social identities. Conversely, any of the four models can generate conflict, and people often organize aggression according to one or another of them. People find it intrinsically rewarding to seek out, construct, and sustain each of these four basic kinds of social relationships; each of them involves a basic social motive (Fiske, 1991b).

There is a variety of empirical evidence showing that the four relational models are basic components of social categorization, social comparisons, social memory, social action, and speech. When American student and nonstudent subjects are asked to simply remember everyone with whom they interact in any way, they tend to list people in clusters of acquaintances with whom they have the same basic type of relationship (Fiske, 1992b). That is, there are runs in the stream of recall that suggest that the relational models taxonomy is an important organizing factor in people's memory for acquaintances. These relational-model effects are stronger than the effects of age, race, or gender, and independent of the effects of all other factors, including role term ("friend," "Mom") and the situation in which they usually interact.

When Americans are given the task of freely sorting everyone with whom they interact according to how they relate to them, their groupings are correlated with the relational models taxonomy (Haslam & Fiske, 1992). When American students and nonstudents make pairwise similarity judgments about their relationships with their acquaintances, the clusters that emerge are also correlated with the relational models taxonomy (Haslam & Fiske, 1992). None of the other four theoretical taxonomies tested in this study do better in predicting the clusters or free sorts; two theories that did as well as the relational models theory are a taxonomy we derived from the pattern variables of Parsons and Shils (1951) and the resource typology of Foa and Foa (1974, 1980). Two taxonomies did substantially worse than the

other theories: Mills and Clark's (1984, 1986) distinction between communal and exchange relationships, and MacCrimmon and Messick's (1976) game-theoretic typology of altruistic, selfish, and competitive motives.

Unlike many dimensional approaches, including the pattern variables of Parsons and Shils (1951), the relational-models theory posits that people think in terms of discrete, qualitatively distinct categories of social relationships. This contention is supported by results from Haslam and Fiske's (1992) studies and results from three studies using other methods (Haslam, 1992). When subjects judge the prototypicality of hypothetical relationships in two different ways, they use distinct categories that correspond to the relational models. When subjects rate the features of their own, real-life relationships with their personal acquaintances, they also use implicit categories predicted by the relational-models theory; Foa and Foa's (1974, 1980) resource typology generally does not predict the specific categories that subjects use as well as the relational models theory does. In short, none of our studies are consistent with the common assumption that people think about their relationships in terms of a space defined by continuously variable dimensions.

Recall, categorizing, and rating the similarity, prototypicality, and features of relationships all involve conscious reflection, hence these tasks may be affected by experimental demand, ideology, and ethnosociology. But there is another naturally occurring source of evidence about people's implicit taxonomy of social relations, one that does not involve experimental manipulations. In the course of daily life, most people make occasional social errors in which they confuse one person with another. People sometimes call a familiar person by the wrong name, misremember with whom they interacted on some occasion, or mistakenly direct an action at an inappropriate person. Seven studies showed that when Americans make these errors, they apparently lose track of the identity of the individual they are interacting with, but typically continue to interact in the same manner (Fiske et al., 1991). That is, in these errors people have a very strong tendency to substitute another person with whom they relate in the same basic mode.² This tendency to hold the type of relational mode constant is independent of all other factors that affect substitutions, including gender and situation, and stronger than the effects of age, race, role terms, interaction situations, recency of interaction, and similarity of names. Two other theoretical taxonomies of relationships (Foa & Foa, 1974, 1980; Mills & Clark, 1984, 1986) failed to obtain strong or consistent support in the error data.

The seven-errors studies, the free-recall studies, the free-sort studies, the similarity-judgment studies, the two-prototype studies, and the study of feature ratings of acquaintances all support the relational-models theory. But all of these experiments and diary studies used American subjects, whose

social relations, social ideology, and ethnosociology are by no means typical of the world as a whole. It is conceivable that the findings of these studies are produced by the operation of an implicit, culture-specific ethnopsychology that only Americans use to think about social relationships. Also, a combination of American ideology and experimental demand effects might conceivably have contributed to the findings.

The relational-models theory was inductively derived from West African fieldwork (Fiske, 1985) combined with extensive comparison of ethnographic materials from around the world (Fiske, 1990, 1991a). But there is no *experimental* evidence that the relational-models theory encompasses social relations in cultures outside North America. The kinds of social relations that are emphasized in Asian societies differ from the dominant social relations in African societies, and many patterns of interaction in both Asian and African societies contrast with the forms of relationships that predominate in Euro-American society and ideology (cf., e.g., Brown, 1951; Bulatao, 1964; Coquery-Vidrovitch, 1969; K. Doi, 1982; L. Doi, 1962; Fortes, 1963/1970, 1983; Ho, 1982; Ho & Lee, 1974; Kopytoff, 1988; Markus & Kitayama, 1991; Marshall, 1961; Mead, 1937/1961; Triandis, 1987; Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Patterns of social relations also differ markedly across the thousands of cultures within Asia and Africa. These manifest differences in social values and indigenous conceptions of social relations would appear to pose a problematic challenge to the universality of the relational-models theory.

The relational-models theory postulates that the marked differences in social relations among cultures are largely the product of differences in the cultural implementation rules for the utilization of the same four elementary modes of relationship (Fiske, 1990, 1991b). Cultures differ in the relative prevalence of the four modes and in their evaluation and explicit acknowledgement of them. Cultural implementation rules also define the categories and parameter settings that need to be specified before each of the elementary models can be realized in any concrete interaction. Moreover, people cannot implement any of the models without cultural rules that determine the domains in which they operate and that assign persons to positions in each kind of relationship. Cultures use very different criteria for this: for example, people may belong to a primary CS group by virtue of kinship (defined differently in each culture), blood-brotherhood, initiation into a sorority, or induction into a military unit. The same model may be realized quite differently as a function of how its parameters are set in the particular culture: for example, if retaliatory vengeance in an EM mode calls for killing a person of the opposing group to avenge a death, there must be culture-specific definitions of who are legitimate victims (e.g., children, idiots?), and what

kinds of death are construed as matching the original killing (cf. Schieffelin, 1976). In short, the same four models may be organized in innumerable combinations, may emerge in diverse contexts, and are realized in unique manifestations.

To determine if the same four models underlie the diversity of manifest social forms in different cultures, we studied the pattern of social-substitution errors in Chinese, Korean, Bengali, and Vai cultures. These cultures represent nations with a combined population of over 2 billion. For reasons of economy and efficiency, we elected to study populations resident in the Philadelphia, New York, and Washington, DC, areas, sampling people with little or no knowledge of the English language and with minimal contact with American culture. In short, we located Chinese, Bengalis, Koreans, and Vais whose social relationships—so far as we could judge—were overwhelmingly governed by their culture of origin.

The prediction was that in each culture, people making social errors would tend to substitute someone with whom they typically related in the same mode: errors would occur within basic types more than across them. For example, when people engaged in a CS relationship make an error, they should substitute another person with whom they also have a CS relationship. We should observe relatively few errors involving, say, confusion of someone in a CS relationship with someone in an EM relationship.

METHOD

In each case, with the help of native speakers of the target language and academic experts, we arranged for a culturally adapted, free translation of the original English error questionnaire. We had this independently back-translated into English by another skilled translator, then discussed its connotations with the back-translator, checked it for theoretical validity, and revised the translation as appropriate. We did not do word-for-word translations: our objective was to generate instructions and a questionnaire that represented the expected manifestations of the relational-models theory in each particular culture.³

Experimenters, working in the relevant language, contacted subjects in various ways, obtaining an opportunity sample by using networks of acquaintances and neighbors (see details of each study below). Subjects responded to an acculturation questionnaire to assess knowledge of the English language and the extent of contact with American culture and social assimilation. This questionnaire included questions about the subject's ability to use public transport, ability to get directions on the street, frequency of listening to English language radio or watching English language television,

frequency and type of social and occupational contact with English speakers, and the use of first names for addressing older people. Experimenters also assessed knowledge of English and level of acculturation by reputation and direct observation.

After contacting, screening, and obtaining permission from subjects, the experimenters met the subjects in their homes or any other setting preferred by the subject, explained the study, obtained verbal permission, and explained what we meant by social errors. Experimenters asked each subject if they could recall having made any social errors in the past and recorded every such retrospective error. Subjects who were literate in their native language were provided with simple diary forms for recording subsequent errors, and it was explained to them how to record date and time of the error, the names of the people confused, and the nature of the incident. Experimenters arranged for a follow-up interview, and generally contacted each subject by phone at least once to answer questions and confirm the follow-up appointment. In some cases, the experimenters initially explained the study and gave general instructions to a group, but most of the follow-up interviews were conducted individually.

After approximately 1 to 3 weeks, the experimenters met with each of the subjects and asked him or her to describe any errors they had made since the first meeting. The experimenters then explained the relational models taxonomy, using culturally appropriate descriptions and examples. Then each subject reported the age and gender of each person who was the object of their confusion, the role or kin term that the subject used to describe or refer to that person, and which one of the four relational models—if any—best described the predominant form of their relationship with this person. After this, they provided corresponding information about the person with whom they had confused this person. Subjects also provided other culturally relevant religious, caste, ethnic, or region-of-origin information about the two people whom they had confused with each other. The experimenter then asked subjects for their inferences about the purpose of the research, debriefed them, and paid them for their participation.

We had subjects code their own relationships because we thought that the participants themselves could make the necessary qualitative judgments better than we, from outside their culture, could. Indeed, the theory specifies that the relational models that we wanted to assess are modes of perception and subjective normative standards. Thus we wanted to know how subjects *perceived* their own relationships and what standards *they* applied to them. Our method for teaching the taxonomy was straightforward, although it took a long time to develop the appropriate materials for each culture.

To develop the materials, we began with lengthy discussions of the theory and the probable manifestations of it in each culture. Working with informants from each of the cultures, the experimenters selected names for each model and wrote short paragraphs describing the kinds of relationships. The names and the few simple sentences describing the qualities of the relationship were not direct translations of the American materials, but were adapted to each culture. We had another native speaker (blind to our theory) back-translate these paragraphs into English, and we all discussed them. The experimenters then revised their vernacular descriptions and tested them with informants from their own culture, re-revising and retesting them until they seemed clear and easy to use.

When each subject returned for the second interview, the experimenter read the paragraphs to the subject (or gave them to the subject to read, if the subject preferred). The experimenter asked the subject if they had any questions, and then gave the subject, one-by-one, four role terms to classify. These role terms had been chosen as clear, prototypical, culturally-defined examples of each relational model. The experimenter asked each subject to explain *why* each role fit the relational model in question, to make sure that subjects were using the relevant features. Few subjects had any trouble with this training task, but if they did, the experimenter discussed the taxonomy until it was clear to each subject. In our previous studies (Fiske et al., 1991), American subjects proved to be reliable coders of their own relationships (Cohen's kappa = .63) and showed no signs of bias in coding. Our Bengali, Vai, Korean, and Chinese subjects generally seemed to have little difficulty learning the relational-models taxonomy or classifying the people they had confused. Of course, to the extent that subjects made *random* errors in their classification, this would tend to reduce or eliminate the effects we predicted.

To avoid any possible priming effects that might lead subjects to assign the second person involved in the error to the same type of basic relationship as the first, we used distracter questions between the questions about the two people who had been confused with each other. Therefore, after asking all of the questions about the first person, the experimenters asked subjects to think of someone with whom they had a *different* kind of relationship, asked them to name which of the four models best described the mode of relationship, and then asked them if they had ever made the same sort of error with this person. Thus, when coding their relationship with the second person involved in the error, each subject had recently been thinking about a kind of relationship that differed from their relationship with the first person. Also intervening between the relationship coding of the two people confused with each other were questions about their gender, age, and any other social categories especially salient in the particular culture. Finally, subjects were asked why

they thought they had made the error, and what they thought the purpose of the study was. No subject guessed the hypothesis.

Experimenters translated the results back into English for analysis. We used the *del* statistic (Hildebrand, Laing, & Rosenthal, 1977) to test the prediction that slips would occur within mode of relationship. The *del* statistic represents the proportional reduction in error that a prediction rule achieves against a baseline of expected cell frequencies calculated from the marginal totals. *Del* is somewhat like a correlation coefficient for categorical variables. It is a more stringent test than chi-square because it tests a specific prediction of association of the categorical variables: In this case, the prediction is that errors will occur along the diagonal of the table (in the CS/CS, AR/AR, EM/EM, MP/MP cells, to which we accordingly gave zero values in the prediction rule). All other cases were treated as inconsistent with the prediction rule (i.e., given the value 1). Note that *del* values derived from different prediction rules or from tables with different numbers of cells or different marginal totals cannot be strictly compared, because the *precisions* of the predictions differ. However, if the precision of the predictions are comparable, a higher *del* means a better prediction.

BENGALI STUDY

SUBJECTS AND METHOD

The experimenter was a Bengali-American undergraduate whose parents speak Bengali at home, and who was studying Bengali in college. She was assisted with the interviews by her parents. Subjects were residents of the New York City metropolitan area who were referred by relatives, friends, and acquaintances. The experimenter contacted subjects only if the person who provided the referral described them as monolingual in Bengali. For the few subjects who had jobs, the experimenter interviewed them and only used those who said they were unable to carry on a conversation using only the English language. The experimenter interviewed subjects in her home or theirs, at their convenience. All subjects were literate in Bengali script; they read the instructions that the experimenter then discussed. The experimenter then explained the errors questionnaire, and subjects filled out one questionnaire for each error that occurred between the two interviews. A few weeks after the second interview, subjects were paid \$10 plus \$2 per reported error. Three subjects reported no errors after three weeks, and were dropped from the study; 2 others could not be re-located.

The remaining 19 subjects had a mean age of 31 (ranging from 12 to 70), and they included 8 males and 11 females. Five subjects were from India and 14 from Bangladesh; 5 were Muslim and 14 Hindu (including 10 of the Kayastha caste, 1 Barujibi, and 3 who declined to give their caste). They had been in the United States for periods between 6 months and 6 years. They reported 43 errors that occurred between the first and second session. They made 29 misnaming errors, including a woman who was telling an acquaintance the news about her husband's sister's son's new job, but used the name of another son of her husband's sister. The nine misactions included a girl telephoning her father when she meant to phone her mother and a woman who intended to visit her friend, but went to her sister-in-law's house. In a mistake that was typical of the five person-memory confusions, a young man went to a movie with his elder brother, but later asked his friend what he thought about the movie, thinking that his friend had seen it with him. Some of the errors involved more than one kind of confusion, like an instance in which a man wanted to wake up his brother's wife's sister's son, Narayan, but accidentally went to the bed of another brother's wife's sister's son, Arabindu, and woke him, addressing him as Narayan. A grandmother who usually sleeps in the same bed with her 11-year-old granddaughter asked her 8-year-old granddaughter whether it bothered her to share the bed. We rather arbitrarily categorized these multifaceted confusions as memory errors, misnaming, or misaction, according to whatever seemed like the principal component of the confusion.

RESULTS

Table 1 shows the pattern of error substitutions by relational mode for the 19 Bengali speaking subjects. The columns (Appropriate Recipient) indicate the subject's relationship with the person whom the subject intended to address, the person who was the intended recipient of the action, or the person with whom the subject had actually done something. The rows (Actual Person) indicate the relationship with the person whose name the subject mistakenly used, the person to whom the subject mistakenly directed the action, or the person with whom the subject mistakenly remembered doing something. Inspection of the table shows that there is a strong tendency for the subject to have the same type of relationship with both the appropriate person and the actual person. Statistical analysis bears this out: $del = .62$, $p < .00005$ ($precision = .68$), indicating that there is a very strong tendency for Bengali speakers to confuse people to whom they relate in the same mode. This effect is not the result of any one mode alone: if we compare each mode against the other three modes combined, the results are highly significant in

TABLE 1
Bengali Errors

Relationship With Actual Person	Relationship With Appropriate Recipient				Total
	Communal Sharing	Authority Ranking	Equality Matching	Market Pricing	
Communal sharing	8	1	1	0	10
Authority ranking	0	3	2	0	5
Equality matching	1	2	16	1	20
Market pricing	0	1	2	5	8
Total	9	7	21	6	43

$del = .62$; $p < .00005$.

each case (for CS vs. AR + EM + MP, $del = .80$, $p < .00005$; for AR vs. CS + EM + MP, $del = .42$, $p = .016$; for EM vs. CS + AR + MP, $del = .58$, $p < .00005$; for MP vs. CS + AR + EM, $del = .66$, $p < .00005$). This is good evidence that each of the four elementary models is salient in the social cognition of Bengali speakers. Furthermore, the effects of the relational models are not restricted to just one kind of error. If we look at misnamings alone, $del = .70$, $p < .00005$, whereas for misactions and person-memory errors combined, $del = .42$, $p = .025$.

Strictly speaking, one might not choose to consider the errors made by any 1 subject as statistically independent cases; hence we selected one error at random from each subject and repeated the analysis. Using these 19 independent errors, $del = .68$, $p < .00005$. However, there is another possible artifact in the data. Suppose that some subjects interacted with everyone in a CS mode, or only made mistakes while relating in this way. Suppose that other subjects interacted or made errors only in AR mode, and other subjects' interactions or errors were limited to EM and still others were restricted to MP. The errors of each subject would necessarily involve substitutions within one single mode. But when their respective errors were combined with the errors of other subjects—each interacting in only a single, different mode—the aggregated data would show substitutions within mode resembling the pattern that we observe along the diagonal in Table 1. Even if individual subjects used more than one model, if they differed substantially in the base rate of their use of the four models, this individual difference effect could conceivably produce the observed results. Although this would provide some support for an individual difference theory of selective *social interaction* according to the relational models, it would not provide meaningful support for the *cognitive* theory that error substitutions per se are governed by the four models.⁴ We tested this individual-difference hypothesis. For each of the

13 subjects who had made two or more errors, we selected one person at random from one of their errors and a second person at random from another error. Thus, for each of these subjects we had a pair of people who had not been confused with each other. The individual-difference hypothesis predicts that the *del* for these errors should be approximately as high as the *del* for the pairs of people actually confused. Instead, for these pairs of people involved in different errors made by the same subject, *del* = .22, *n.s.*; *precision* = .69. This indicates that the results are probably due to the cognitive processes involved in errors, not to differences among individual Bengali speakers in base rates of interaction in each mode. However, because only 13 subjects provided more than one error, this control for individual differences is not very reliable statistically.

People also showed a strong tendency to confuse people of the same gender (*del* = .61, $p < .00005$; *precision* = .41). This effect was not due to individual differences in base rates of interaction with males and females, because random pairs of people taken from different errors by each subject did not show any effect of gender (*del* = .03, *n.s.*). There was also a tendency to confuse people of approximately the same age: if we classify the age of people by decade (e.g., 11-20, 21-30, *del* = .41, $p < .00005$; *precision* = .71). The substitutions did not involve very precise age correspondence, however: if we divide the people confused with each other into 5-year age classes, *del* = .18, $p = .009$. This effect of age is also not due to individual differences in base rates of interaction, because pairs of people taken from different errors made by each of the same subjects do not yield significant concordance (by age decade, *del* = .23, $p = .08$; by 5-year age classes, *del* = .06, *n.s.*).

Bengali speakers often confuse people whom they typically encounter in the same social setting or situation (*del* = .67, $p < .00005$, and *precision* = .64; for random pairs of people not confused with each other, *del* = .21, $p = .099$; *precision* = .59). They also tend to confuse people whom they call by the same role or kin term (*del* = .47, $p < .00005$, and *precision* = .88; for random pairs of people not confused with each other, *del* = .15, $p = .08$; *precision* = .59). These random pair controls suggest that most of the effect of situation and role term is cognitive, not due to individual differences in base rates of reported interactions.

There is a very strong tendency for Bengali speakers to make substitutions within the same caste, nationality, and religion, but controls indicate that these predictable effects are probably entirely due to individual differences in base rates of interaction with people of different castes, nationalities, and religions. For error substitutions by caste, *del* = .73, $p < .00005$; *precision* = .52, but pairs of people taken from different errors reported by each subject yield an even higher concordance of caste: *del* = .86, $p < .00005$; *precision* =

.54. Similarly, for error substitutions by nationality, *del* = .90, $p < .00005$ (*precision* = .48), but the nationality results for pairs of people taken from different errors reported by each subject are *del* = .84, $p < .00005$ (*precision* = .48). Again, error substitutions by religion give *del* = .88, $p < .00005$ (*precision* = .56), but pairs of people taken from different errors reported by each subject produce a religion effect that is nearly as strong: *del* = .71, $p < .00005$ (*precision* = .54). What this apparently means is that Bengali speakers interact assortatively by caste, nationality, and religion, but their error substitutions as such do not show any direct cognitive effect of these factors beyond the strong tendency toward behavioral social segregation.

Bengali speakers tend to confuse people with whom they interact in the same mode, but they also make substitutions by gender and age, and confuse people whom they describe by the same role term and people whom they encounter in the same situation. Thus the effects of relationship mode might be an artifact of some of these other tendencies. When Bengali speakers make an error in which they substitute a person in the same relationship mode, are they more likely to make a substitution of a person of the same gender, age, role term, situation, caste, nationality, or religion? We sorted the errors according to whether the relationship mode of the two people confused with each other was the same or different, and whether each of these other factors was the same or different, creating seven 2×2 tables (mode vs. gender, mode vs. age, etc.). None of the Pearson chi-squares was significant.⁵ This indicates that the subjects' tendency to substitute another person with whom they have a similar relationship is independent of their tendency to make substitutions by any of these other factors.

Does the relational-models theory reflect some kind of implicit American cultural schemata of social relations? Although these subjects come from Bangladesh and from the state of Bengal in India, speak Bengali almost all of the time, and interact mostly with other Bengali speakers, they do reside in New York. Perhaps even their limited exposure to the English language and American culture has resulted in their acquisition of an American ethnosociology that somehow produces these reported patterns of error substitutions. If so, the relatively more acculturated Bengali speakers, who tend to speak and understand a little more English, should show a stronger tendency to make error substitutions in which relationship mode is the same. After hearing about the subjects from their friends and relatives, and after two interviews and a considerable amount of informal social interaction with the subjects, the experimenter had a fairly clear idea of their knowledge of English. She rated subjects either as speaking little or no English or as able to convey simple messages and engage in some sort of minimal conversation in English. For the 25 errors by the 12 subjects with a modest knowledge of

English, relationship mode, $del = .53, p = .0001$; $precision = .68$. But the 18 errors by the 7 subjects who spoke virtually no English showed an even stronger effect: $del = .72, p < .00005$; $precision = .60$. So the subjects' minimal knowledge of English apparently cannot account for these results, nor is their exposure to American culture likely to be the explanation for the similarity of the Bengali speakers' error substitutions to the substitutions of Americans reported by Fiske, Haslam, and Fiske (1991).

DISCUSSION

When Bengali speakers in New York call someone by the wrong name, they tend to substitute the name of a person with whom they have the same kind of relationship. They make the same kind of substitutions when they misremember with whom they did something or misdirect a social action. In other words, when Bengali speakers lose track of the *identity* of the individual with whom they are interacting, they usually do not lose track of the *way* they are interacting. Taking into account the *precision* of the predictions (which is a function of the marginal totals in the relevant tables), we find that this effect is stronger than their tendency to substitute people according to their gender, age, or social situation. This suggests that kinds of relationships are at least as salient in Bengali social cognition as categorical attributes of individuals. Furthermore, the results strongly support the specific typology of the relational-models theory.

However, Bengali is an Indo-European language remotely related to English, and there is a long history of mutual diffusion between the Bengali and Anglo cultures: for example, *bungalows* and *pajamas* both came to Anglo-American culture from that part of the world, not to mention many foods and spices. There have been many Western influences on Bengali culture as well. Moreover, similarity between two cultures does not make a universal. So we went on to study other, unrelated cultures.

CHINESE STUDY

SUBJECTS AND METHODS

The experimenter was an American of European origin whose college major had been Chinese, and who was fluent in Mandarin Chinese, the language spoken in much of northern China, including the region around Beijing. Subjects were recruited by advertisements in a Philadelphia edition of a Chinese-language newspaper and by referrals from other subjects, who

were paid \$5 for each referral. Each subject received \$5 per interview plus \$1 per error reported. The experimenter contacted five people who declined to participate and dropped five others from the study because they were too acculturated. Of those who began the study, 11 subjects were dropped because they reported no relevant errors, 1 declined to continue, and 2 could not be located for the second interview. The remaining 29 subjects (11 males, 18 females) had a mean age of 36, with a range of 25 to 65.

They reported 26 errors at the initial interview, and 42 more that occurred between the first and second interviews. The 68 errors included 22 misactions; for example, while one subject was at his daughter's house he intended to telephone his son, but dialed the daughter's number instead. There were 34 misnamings; a typical example was a woman who addressed her 5-year-old son by his playmate's name. And there were 12 person-memory errors; for example, a subject lent money to a fellow student, and later asked another fellow student for repayment of the loan.

RESULTS

Table 2 shows the pattern of error substitutions by relational mode for the 29 Mandarin Chinese-speaking subjects. For mode of relationship, $del = .36, p < .00005$ ($precision = .69$), indicating that there is a tendency for Chinese to substitute people to whom they relate in the same mode. If we assure true statistical independence by taking only one randomly chosen error from each subject, relationship mode still has a significant effect in this smaller sample ($del = .41, p = .0009$). This effect of relationship mode is observable in the errors that subjects recalled at the first interview ($del = .48, p = .0003$) and in the errors that occurred between the two interviews ($del = .29, p = .004$). Each of the four basic modes has a distinct effect: if we test CS versus AR + EM + MP combined, $del = .43, p < .00005$; for AR versus the other three modes, $del = .36, p = .036$; for EM versus the other three, $del = .24, p = .028$; for MP versus the other three modes, $del = .41, p = .003$. Relationship mode has a strong effect on the substitutions that occur in misactions ($del = .52, p = .0002$) and in misnaming ($del = .44, p = .0001$). However, in the small sample of 12 person-memory errors, mode has no significant effect ($del = -.165$).

We again controlled for individual differences in base rates by taking one person from one error and another person from a different error by the same subject (for each of the 20 subjects who reported at least two errors involving different people). For these pairs of acquaintances of each subject who were not confused with each other, $del = .19, n.s.$, ($precision = .68$) This figure suggests that the relational mode effect is primarily a result of cognitive confusions between people.

TABLE 2
Chinese Errors

Relationship With Actual Person	Relationship With Appropriate Recipient				Null	Total
	Communal Sharing	Authority Ranking	Equality Matching	Market Pricing		
Communal sharing	19	1	6	0	0	26
Authority ranking	2	2	2	1	0	7
Equality matching	7	0	11	3	1	22
Market pricing	2	0	4	5	0	11
Null	1	0	0	0	1	2
Total	31	3	23	9	2	68

$del = .36; p < .0005.$

The Chinese subjects also tended to make error substitutions by gender ($del = .67, p < .00005; precision = .48$), place of origin ($del = .43, p < .00005; precision = .92$), and according to the role term they used to refer to people ($del = .44, p < .00005; precision = .87$). They also showed a tendency to confuse people of the same absolute age (by decade over age 19, $del = .57, p < .00005; precision = .72$) and the same age relative to the self—younger, same, older ($del = .38, p < .00005; precision = .58$). However, the effects of gender and place of origin may be largely a result of differences among subjects' rates of interaction with the two genders and with people from different regions: the gender del for the random pairs of acquaintances is .30 ($p = .08, precision = .50$), and the origin del for random pairs is .31, $p = .003; precision = .91$.

The effect of mode on error substitutions—whether through cognition or interactional preferences—is independent of all of the effects of age, gender, race, origin, or role term. We calculated the Pearson chi-square for errors in which the person relates in the same versus different modes and for same versus different ages, and found no significant association. Nor were the effects of any of the other factors associated with the effect of mode; none of the chi-squares approached significance.

Because these Chinese speakers live in Philadelphia, we looked to see if knowledge of English or involvement in American culture affected the results. Again, the experimenter rated each subject's ability to use English in conversation. For the 56 errors of the subjects who spoke a little English, relationship mode had an effect ($del = .30, p = .0009; precision = .71$). For the 12 errors of the subjects who spoke virtually no English, the effect of mode on substitutions was much stronger ($del = .59, p = .0095; precision = .40$). In the first interview, subjects also answered a set of questions that

assessed their knowledge of English and their participation in American culture. The 14 more acculturated subjects who answered yes on four or more questions show a significant tendency to make substitutions by mode ($del = .30, p = .014; precision = .75$), whereas the effect of mode is comparable and more significant in the 15 unacculturated subjects who answered yes on three or fewer questions ($del = .38, p = .0003; precision = .64$). Thus these assessments of both knowledge of American culture and of the English language show that the effects of relationship mode are more statistically significant and at least as clear for subjects who have been less affected by their residence in the United States.

DISCUSSION

The Chinese subjects have a tendency to report error substitutions in which they relate in the same mode to the two people whom they confuse with each other. This confirms that this pattern is not limited to subjects who speak English or Indo-European languages. Indeed, in both the Bengali and Chinese studies, the subjects who were least involved in American culture showed the most statistically significant tendency to make substitutions confusing people with whom they typically relate in the same mode. Chinese error substitutions are also affected by the gender, age, place of origin, and role term that subjects use to describe their interaction partners. But the effect of mode is independent of these other factors. Once again, the comparison with random pairs of acquaintances (whom the subjects had *not* confused with each other) suggests that the effect of mode among Mandarin Chinese is not due to a tendency for different individuals to report participation in different kinds of relationships.

The existence of the relational models in three cultures does not make them universal. A third sample from another Asian culture area will provide further evidence about the universality of the relational models.

KOREAN STUDY

SUBJECTS AND METHOD

Korean culture is extremely hierarchical, and social interaction is marked by an elaborate set of titles and terms of address that people use with great care. Gender is also highly significant in a very ceremonial social life. Many kin terms mark relative age, gender, gender of speaker, and gender of the

intermediate person through whom the kinship link exists. Thus, among relationship modes we would expect errors to show a particularly strong effect of AR. Among personal characteristics, errors should reflect the cultural salience of gender. Teknonymy (e.g., addressing people as "mother of X" or "grandfather of Y") is also widespread. Children, and even grandchildren, may be given names with the same first (or second) syllable. These features might make Koreans prone to misnaming errors. Bowing, hand-holding, hugging, and many other gestures are frequent and important in social life, which could make misactions common.

The experimenter was a Korean-American undergraduate who was reasonably fluent in Korean. Most of the subjects were elderly residents of two apartment buildings in Philadelphia who were recruited at meetings in one building and by neighbors' referrals in the other building. Each subject received \$5 per hour of participation. One person who was contacted declined to participate, 2 moved away after the first interview, 2 became too ill to continue participating, and 7 could not be contacted for a second interview. The mean age of the 17 remaining subjects (12 females, 5 males) was 76 (ranging from 66 to 86). Although others' names can be a sensitive matter for Koreans to discuss, the great age of these subjects mitigated this factor so that it was not a problem. Subjects had been in the United States for a mean of 12 years (range, 5 to 25). Most of the subjects were illiterate, and none of the subjects could speak or understand any English or had any appreciable involvement in U.S. culture. Many of them turn on the television to watch baseball (a popular sport in Korea), but only 3 ever go out to English-speaking restaurants or use public transportation to go to new places. None had been to an English-language movie or play in the previous 6 months or ever had English-speaking Americans in their home or been in the home of an English-speaking American. Indeed, the Korean researchers judged that these elderly subjects were more isolated from Western influences and more traditional than most Koreans in contemporary Korea.

They reported 34 errors, of which 26 occurred between the first and second interviews. Of the total, 26 were misactions, the most common of which were telephoning the wrong relative. One man intended to telephone a fellow church member to ask him to help in his store, but dialed the number of another acquaintance by mistake. A woman was helping a friend by working in her garden while the friend was incapacitated, but accidentally gave a cabbage from the invalid woman's garden to another woman. Another woman had a present for her daughter, but mistakenly gave it to her own friend. There were also eight misnamings; for example, a man called one grandson by another grandson's name. The Koreans reported no person-memory errors.

RESULTS

Table 3 shows the pattern of error substitutions by relational mode for the 17 Korean-speaking subjects. For mode of relationship, $del = .80, p < .00005$ ($precision = .60$), showing an extremely strong tendency for Koreans to confuse people to whom they relate in the same mode. To assure complete independence among the errors, we analyzed one randomly chosen error per subject, which yielded a del of .89 ($p < .00005$). Each of the four modes had a distinct effect on the error substitutions: comparing CS with AR + EM + MP yields $del = 1.00, p < .00005$; AR versus CS + EM + MP gives $del = .76, p < .00005$; EM versus the other three gives $del = .78, p < .00005$; and the result for MP versus the three other modes is $del = .65, p = .022$. In both misactions and misnamings, Koreans tended to confuse people with whom they had the same relationship (for misactions, $del = .77, p < .00005$; for misnamings, $del = 1.00, p < .00005$).

Examining random pairs of acquaintances involved in different errors shows that this concordance of people whom the Korean subjects confused with each other is not the result of individual differences in proportions of reported interactions in different modes; for these random pairs of people whom each subject had not confused with each other, $del = -.39, n.s.$; $precision = .65$. This indicates that the effect of mode results purely from a cognitive process specific to errors per se.

The Korean subjects also tended to substitute someone of approximately the same age: $del = .38, p = .0005$; $precision = .74$. Controlling for individual differences in base rates shows that this effect of age is specific to the errors; taking one random pair of acquaintances from each subject, del for age = $-.20, n.s.$ There is an apparent effect of gender ($del = .47, p = .001$; $precision = .50$), but this seems to result largely from individual differences in association with males and females; for the random pairs of acquaintances whom subjects had not confused with each other, $del = .35, p = .044$; $precision = .56$. The Korean role or kin term that subjects used to describe people also affected error substitutions ($del = .21, p = .001$; $precision = .94$), whereas for the random pairs, $del = -.11, n.s.$ Koreans also tended to confuse people of the same ethnicity (for Korean vs. American ethnicity, $del = .78, p = .0001$; $precision = .14$) and people of the same religion (for Christians vs. other religions, $del = .53, p = .0026$; $precision = .31$). For race and religion it was not possible to calculate an individual difference control del , because the random pairs of acquaintances included no non-Koreans or non-Christians.

When Koreans make an error, they tend to replace the correct person not only with someone to whom they relate in the same mode, but also someone of the same gender, ethnicity, and religion; someone whom they call by the same role term; and someone of similar age. To determine whether the mode

TABLE 3
Korean Errors

Relationship With Actual Person	Relationship With Appropriate Recipient				Total
	Communal Sharing	Authority Ranking	Equality Matching	Market Pricing	
Communal sharing	4	0	0	0	4
Authority ranking	0	17	2	1	20
Equality matching	0	1	8	0	9
Market pricing	0	0	0	1	1
Total	4	18	10	2	34

$del = .80; p < .00005.$

effect was associated with these other effects, we again calculated Pearson chi-squares, constructing 2×2 tables according to whether the errors were confusions between people related to in the same or different modes, and—for example—were of the same or different gender. None of these chi-squares approached significance, indicating that mode confusions were independent of the other factors that affected error substitutions.

DISCUSSION

The Korean social errors provide very striking support for the relational-models theory. Once again, each of the four modes of relationship had a separate effect on Korean error substitutions, and mode affected both misnamings and misactions. Taking the precision of the predictions into account, this mode effect was much stronger than subjects' tendencies to confuse people of the same gender or similar age, people of the same ethnicity or religion, or people described by the same term; it was also independent of all of these factors. Once again, among the Koreans, subjects' tendency to substitute people to whom they related in the same way evidently resulted from a cognitive process involving confusability of similar patterns of interaction. It is interesting that these 66- to 86-year-old subjects make the same kinds of errors, influenced by the same cognitive factors, as much younger subjects.

As expected, the ratings of the subjects show that most of their interactions are governed by AR. Yet the errors provide cognitive evidence for the operation of each of the other three relational models. Because gender is also prominent in Korean culture, it is predictable that there appears to be a tendency for different subjects to have different frequencies of interaction

with men and with women, but it is surprising that there is no evidence of an additional cognitive effect of gender in the errors per se.

In the American and Bengali studies, errors tended to involve substitutions of people with whom the subjects interacted in the same situation, although the effect of mode was independent of this tendency. We did not collect information about situation in the other studies, but it is probably not an important factor in the Korean errors, because these elderly subjects spend most of their time in their apartment building where 31 of the 34 errors occurred.

Bengali, Chinese, and Korean cultures are very different from each other and very widely dispersed, and the languages are not closely related. But they are all Asian cultures, and most of these subjects have resided in the United States for several years. It would be worth examining evidence from a totally unrelated culture and language, and from subjects who have not resided in the United States for very long. So we did a fourth and final study among Vai-speaking immigrants from Liberia and Sierra Leone.

VAI STUDY

SUBJECTS AND METHOD

The experimenter was a Liberian national: a native speaker of Vai with a doctoral degree in political science. The Vais, who come from Liberia and Sierra Leone, are related to the Mende of Sierra Leone, and speak a Mande (Mandingo) language. They are predominantly Moslem; traditionally farmers, fishers, and craftspeople; centered around men's and women's secret societies; and organized under a political hierarchy of chiefs. Most of our subjects were recent immigrants living in the Washington, D.C., metropolitan area. Each subject was paid \$10 per interview. One person was rejected as too acculturated, 5 subjects were dropped when they failed to produce any relevant errors, and 1 could not be reached after agreeing to participate. Of the 21 remaining subjects, 7 were males and 14 females; 16 were Liberian Vais, whereas 5 were Mende/Vai with roots in Sierra Leone. Their mean age was 37, with a range of 19 to 66. Because of the civil war and political turmoil in Liberia, most of the subjects were fearful of political informers or concerned about immigration issues, making them wary of the experimenter, despite his use of personal networks to contact them. Hence many subjects were reluctant to participate in follow-up interviews, and only 6 were contacted about errors occurring after the initial interview.

They reported a total of 35 errors, 31 of which had occurred before the initial interview—several of them in Liberia before their recent arrival to the United States. They made 16 misactions, including one in which a woman was holding a birthday party for her sister, but embraced and congratulated her aunt. Among the 9 misnamings, one woman accidentally bought Mother's Day flowers and a gift for her mother, but addressed the card to her aunt. The most dramatic misnaming was one that a woman reported making in Liberia, when she was welcoming President Doe to the city and addressed him as "President Tolbert"—the man whom Doe had assassinated. The Vais made 10 person-memory errors, typified by one in which a woman returned home and asked her niece whether she had finished preparing the dinner, only to be reminded that she had asked her other niece to do it. Many of the errors could have been classified as either memory or action errors. For example, a woman sent a ticket to her elder son to come to the United States, but then called her younger son and asked if he had received the ticket. One woman made an appointment to pick up her niece at school and take her to the hairdresser, but went to a different school and picked up another niece. In another case, two customers known to a store clerk were shopping and one of them had paid for her purchases whereas the other had not; the clerk again asked the former to pay. There also were errors that could have been construed as misactions, misnamings, or memory confusions: A man was friends with two brothers, George and Michael; after hearing that George had died, the man called Michael's fiancé to express his condolences at Michael's death.

RESULTS

Table 4 shows the pattern of error substitutions by relational mode for the 21 Vai-speaking subjects. For mode of relationship, $del = .38$, $p = .001$ ($precision = .56$), indicating a tendency for Vais to confuse people to whom they relate in the same mode. If we take one error at random from each of the 21 subjects, $del = .33$, $p = .013$. The Vai subjects showed distinct tendencies to confuse AR relationships with each other (for AR vs. CS + EM, $del = .43$, $p = .0026$) and to make errors that involved substitutions among EM relationships (for EM vs. AR + CS, $del = .53$, $p = .0002$). They reported no errors involving MP relationships and no tendency to make substitutions confusing CS relationships. For 16 misactions, $del = .26$, $p = .081$; for 10 person-memory errors, $del = .41$, $p = .027$. For the 9 misnamings, $del = .34$, $p = .14$ (but if we combine naming and memory errors, $p = .0048$). This suggests that the tendency for substitutions to occur within mode is not limited to any one kind of error. We again controlled for individual differ-

TABLE 4
Vai Errors

Relationship With Actual Person	Relationship With Appropriate Recipient				Total
	Communal Sharing	Authority Ranking	Equality Matching	Market Pricing	
Communal sharing	0	2	1	1	4
Authority ranking	2	12	2	0	16
Equality matching	1	4	10	0	15
Market pricing	0	0	0	0	0
Total	3	18	13	1	35

$del = .38$; $p = .001$.

ences in base rates of reporting different kinds of relationships. For the random pairs of acquaintances involved in separate errors by each subjects, $del = -.01$ (n.s.; $precision = .57$). This control indicates that the mode effect operates at the level of the errors per se, and hence is a result of cognitive confusability.

English is the official language and the language of instruction in Liberia and Sierra Leone. Because most of the Vai subjects had attended school, almost all understood some English and many could speak English. For the 13 errors of the 8 subjects who were fluent in English, $del = .38$, but, with the small sample size, $p = .077$; $precision = .50$. For the 22 errors of the 13 subjects whom the experimenter judged not to be fluent in English, $del = .36$, $p = .0056$; $precision = .64$. We also used an acculturation questionnaire to measure involvement in U.S. culture and capacity to perform basic cultural tasks like using public transportation. For the 8 moderately acculturated subjects who answered yes to 3 or more of these acculturation items, $del = .19$, $p = .15$; $precision = .67$, although for the less acculturated subjects who answered yes to two or fewer items, $del = .50$, $p = .001$; $precision = .55$. Overall, Vai subjects who have had little exposure to American culture and the English language show the predicted pattern of substitutions even more clearly than those with more exposure. These results confirm once again that the effect of mode on substitutions is not a consequence of knowledge of any specific culture or language.

The Vai subjects showed a strong tendency to make errors that substituted another person of the same gender ($del = 1.00$, $p < .00005$; $precision = .48$), whereas the individual difference control produced a del of $-.17$, indicating that the effect was cognitive. Subjects also tended to confuse people whom they described by the same Vai kin or role term ($del = .60$, $p < .00005$; $precision = .94$), whereas for the individual difference control $del = -.04$

(*precision* = .96). There was also an effect of age (*del* = .52, $p < .00005$; *precision* = .65), but at least some of this appeared to be the product of different subjects' interacting with people of different ages (for the random acquaintances, *del* = .25, $p = .043$; *precision* = .67). Because all of the reported errors involved Africans and most of them were Vai, we were unable to test for the effect of ethnicity.

There was an association between substitutions that involved people described by the same Vai role term and substitutions that involved two people whom the subjects related to in the same mode: $\chi^2 (df = 1) = 5.27, p = .022$. This may have occurred because of the way in which the experimenter taught the relational models taxonomy. It appears that many Vai subjects immediately translated the theoretically defined relational-models concepts into specific Vai role terms. Many subjects may have assimilated CS to the terms *bondo musu* and *bondo kai*, which are used by women and men respectively for people who were initiated with them. They may also have translated AR into *manjah* ("elder") and *mohmessea* ("subordinate"), while they assimilated EM relationships to the Vai *mboeh*, which means a peer of the same gender. If subjects equated each relational category with a particular Vai role term, then when role term differed there would be no remaining effect of mode. That is, subjects categorizing their relationships would not have been conceptualizing relational mode apart from the specific role terms. To test the nature of the association between mode and role term, we looked at the 13 errors in which the subject described the two people by different *role* terms; for this small sample, *del* for mode = $-.09$, n.s. In contrast, for the 13 errors in which subjects confused two people with whom they related in different *modes*, *del* for term = .34, $p < .0057$. This probably reflects the fact that, in addition to the terms that subjects apparently used to translate the relational modes, several other role and kin terms had an effect on substitutions.⁶

The Pearson chi-square did not show an association between mode and age. It was not possible to evaluate the association between mode and either gender or ethnicity, because all of the error substitutions were within gender and within ethnic group.

DISCUSSION

The relational-models theory was developed partly by induction from ethnographic fieldwork in another West African culture, the Moose of Burkina Faso (cf. Fiske, 1985, 1991a). But the Moose and the Vai are separated by about 1,200 kilometers, by major differences in their traditional cultures, and by very different colonial histories and modern cultural influ-

ences. The Vai and Moose languages are not closely related. Furthermore, the Moose ethnographic basis for the theory was the observation of patterns of social interaction and norms, not cognitive processes. Hence the Vai error substitution data represent an entirely independent source of support for the relational-models theory. The Vai data show that the effect of mode is not limited to any particular kind of error or any one mode of relationship. As in the other three cultures, the effect is clearest and most significant for the least acculturated subjects. This shows that people's tendency to confuse acquaintances with whom they interact in the same way is not a result of any influence of U.S. culture. However, the interpretation of this support for the relational-models theory among Vai remains somewhat ambiguous, because the effect is limited to cases in which the subjects use the same Vai role or kin term to describe the two people they have confused with each other.

RELATIVE FREQUENCIES OF THE FOUR TYPES OF RELATIONSHIPS

Combined with the previous studies of errors in the United States, these studies provide some evidence for comparing the relative frequencies of the four basic modes of relationship in five cultures. However, there are several factors that make such comparison problematic. The samples of subjects from the five different cultures differ on many demographic dimensions. Moreover, it is not likely that social-substitution errors would occur randomly in all interactions. They probably underestimate anonymous interactions in which individual identities are unknown and therefore cannot be mistaken: one cannot make manifest errors mixing up the identities of people whose identities are not explicitly distinguished in the first place. For example, in a culture in which people in an EM relationship ordinarily address each other with terms like "buddy" or "brother," fewer EM misnaming errors may be reported than from cultures in which people use personal names in EM relationships. If subordinates are not supposed to speak to or initiate interactions with superiors, misnamings and misactions in AR relationships may be less common than in a culture in which subordinates interact more freely and frequently with superiors.

Error rates may also differ in different relationships as a function of the attention people pay to the interactions and the consequences of making errors. In addition to these biases that affect comparisons between cultures, there may be biases that are common across many cultures. MP relationships, in particular, are probably undersampled in the error reports from most

cultures, because people may deal with many vendors and customers among whom they do not differentiate sufficiently to make or notice confusions. For example, because of the differences in specificity of the behaviors in contemporary American culture, misactions are less likely when shaking someone's hand in a MP relationship than when holding someone's hand in a CS relationship. Error rates in any mode in any culture may also be affected by the degree of differentiation of the implementation rules for different interactions in the same mode: for example, do all CS relationships involve kissing, or do only the most intimate, or does kissing never occur? In addition, it is not entirely clear what kind of unit of interaction is being sampled: what are the events in which errors potentially occur?

Nevertheless, it still may be worth considering the error reports as a tentative means of comparing the relative prevalence of the relational modes in different cultures. Table 5 shows the percentage of relationships of each type that subjects reported in the five cultures, combining data from both people whom subjects confused with each other. Across the six major U.S. error studies reported in Fiske, Haslam, and Fiske (1991), the proportions of the four kinds of relationships that U.S. subjects report for the 604 people involved in their errors are not constant, $\chi^2 (df = 15) = 56.13, p < .00005$. But they are fairly consistent, despite the variety of subjects in the different studies: EM and CS relationships are always more frequent than either AR or MP relationships. In the United States, therefore, the error reports show moderate reliability in proportions of the four modes of relationship.

The last three lines of Table 5 show the proportions of each type of relationship that subjects reported in two other U.S. studies (Haslam & Fiske, 1992) when asked to list everyone they interact with in any way. Do the proportions of each of the modes in these U.S. recall lists differ from the proportions in the U.S. error reports? We calculated the Pearson chi-square of the totals of each kind of relationship reported in the three U.S. recall studies against the total of each kind of relationship reported in the six U.S. error studies. For this 4×2 table, $\chi^2 (df = 3) = 67.96, p < .00005$. This difference in the distributions is to be expected—especially given a sample of 6,000—because individuals interact with different acquaintances at different rates: the proportions of *people* with whom one interacts in each mode will differ from the proportion of *interactions* in each mode, and the rates of errors in each mode presumably are a function of the rates of interactions in each mode. Compared to CS relationships, for example, people probably tend to have MP interactions with many people, but have relatively few interactions with each individual. Except for the lower proportions of MP relationships in the error reports, the proportions of the four kinds of relationships in the error reports and recall lists are rather similar.

TABLE 5
Percentage of Four Types of Relationships Involved in Errors in Five Cultures and Total Recall in the United States

	Communal Sharing	Authority Ranking	Equality Matching	Market Pricing	Total
Koreans	12	56	28	4	100
Vai	10	49	40	1	100
Bengalis	22	14	48	16	100
Chinese	43	8	34	15	100
United States	37	16	39	8	100
Unweighted mean	24.8	28.6	37.8	8.8	100
U.S. student recall 1	30	11	39	20	100
U.S. student recall 2	25	14	36	25	100
U.S. general recall	26	11	45	19	100

NOTE: U.S. error data are drawn from the major studies presented in Fiske, Haslam, and Fiske (1991). U.S. student 1 recall and U.S. general recall data are from Fiske, 1992. U.S. student recall 2 data are from Haslam and Fiske, 1992.

The moderate stability of the proportions of errors in different modes across the different U.S. studies and the approximately similar proportions of each mode in the U.S. acquaintances and errors suggests that, if used with caution, the error data may be a reasonably good representation of the interactions that people notice and remember. To see whether the variations in proportions of the four modes differ beyond chance across cultures, we analyzed the frequencies in the cells of the five-culture by four-mode table, finding that $\chi^2 (df = 12) = 142.27, p < .00005$. Given a sample of 958, the four- to sevenfold and even higher differences in proportions are more impressive than mere statistical significance. Across the five cultures, CS and EM relationships are the most common overall, and MP relationships are least often reported (perhaps because of their anonymity). MP relationships are virtually absent among the errors reported by Vai subjects and rare among the Korean errors. Koreans and Vai report a great many errors involving AR relationships. Chinese and American subjects report many CS relationships, whereas Vai and Korean subjects seem to have few CS relationships. The rates of EM relationships are relatively constant, with Koreans at the low end of the range.

GENERAL CONCLUSIONS

Social substitution errors in all five cultures were consistent with the hypothesis derived from the relational-models theory. People in every culture

tended to confuse people with whom they interacted in the same mode. The effect of relationship mode was not limited to any one kind of error: it was observed in misnaming, memory confusions, and action slips. In most cases, each of the four relational models had a distinct effect on the pattern of substitutions. Errors that subjects reported in the first interview, which included many errors that subjects had made consistently and frequently, showed the same pattern as errors that subjects recorded using diary forms. There was a definite mode effect among the partially acculturated subjects, but the Koreans (none of whom were acculturated) and the less acculturated subsamples from each of the other three cultures showed an even more distinct tendency to make substitutions by relationship mode. Perhaps this reflects the much greater individualism of American society, in contrast to the importance of social relationships that permeate all four of the other societies. When Americans and somewhat acculturated subjects from other cultures make errors, their substitutions are consistently affected by the relational models. But it appears that, if anything, social relational thinking may be somewhat more pervasive in most other cultures. In any case, these cross-cultural studies confirm the findings of the American studies with *del* coefficients and precision values that are often even stronger than the original results.

The Vai subjects made the predicted substitutions among people with whom they interact in the same mode. But their tendency to make substitutions by relationship mode seems to be a result of their tendency to make substitutions within the same Vai role and kin terms. The Vai subjects probably translated the relational modes into specific Vai role terms, and did not use any other criteria to code their relationships. This failure of ours to communicate the precise conceptual distinctions and subjects' use of their own lexically labeled concepts is not surprising. What is very striking is that in the other studies, American, Bengali, Korean and Chinese subjects quickly learned and were able to use a taxonomy that does not correspond to lexically marked or explicit, culturally formulated surface categories. In studies of these four cultures, subjects' errors were better predicted by the unmarked, implicit categories of the relational models theory than by the culturally salient role and kin terms that subjects use every day to address and refer to people.

In the other three cultures reported here (and in the studies of Americans, Fiske et al., 1991), subjects' tendency to confuse people with whom they related in the same mode was also independent of the other factors affecting errors, including culturally defined role and kin terms, gender, ethnicity, religion, or caste. In all of the cultures the mode effect was independent of any age effect. The mode effect in American and Bengali errors—the two

cultures where situation data were collected—is also independent of the tendency to confuse people with whom subjects interact in the same situation. And 91% of the Korean subjects' errors occurred in one setting. So situation effects cannot account for the cross-cultural tendency to make substitutions within the same relationship mode.

The possibility of experimental demand in these studies cannot be completely discounted, although it seems unlikely that any bias in subjects' coding their relationships could account for the results. Subjects' coding could have been affected if they had guessed our hypothesis. But in eleven experiments with American, Bengali, Chinese, Vai, and Korean subjects, only one American (who was eliminated from the results) ever guessed the hypothesis (Fiske et al., 1991). Subjects typically expressed surprise and were intrigued when the experimenter explained the results. Subjects were asked about several features of the people involved in their errors, and about several other aspects of their relationships with these people, and in every study they gave us discordant information on many of these features, which they would not have done if they were trying to adjust their answers to give us matching information. Note also that between their coding of the two people confused with each other, subjects had to code their relationship with a person with whom they had a different type of relationship. Subjects were confused and distracted by this item, which prevented priming. In one American study we recontacted subjects some weeks later to have them recode their relationships and we found no evidence at all for priming bias (Fiske et al., 1991). In two of the American studies we concealed the coding task in a separate experiment, to remove any possible demand effects, and still obtained the predicted error substitutions.

In these four studies and the seven earlier American samples, we find that relationship mode affects the errors of elderly immigrants, recent refugees, students, blue-collar workers, and professionals. The broadly consistent pattern of results across American, Bengali, Chinese, Korean, and Vai subjects suggests that the four relational models are not ethnosociological folk concepts derived from any particular culture. They are implicit schemata that people use in diverse and widely dispersed cultures—perhaps all cultures. Different cultures use the same models in different domains and implement them according to different parameters (Fiske, 1990, 1991b), but the underlying models are the same. In the five cultures whose errors we have studied, the four relational models appear to differ in their prevalence (or perhaps salience). But in every culture, people use each of the four models, and each model has an independent effect on the substitutions people make in all kinds of social errors.

Wherever they are, when people make a social error they tend to substitute another person with whom they have the same basic type of relationship. Indeed, the striking finding is that in American, Bengali, Chinese, and Korean cultures, this tendency is independent of subjects' tendency to confuse people according to their explicit, culturally formulated, linguistically labeled role or kin concepts. As predictors of error substitutions, the relational modes also rival prominent social features of individuals like gender, age, and ethnicity. In short, the relational-models theory generally predicts error confusions as well as or better than—and usually independent of—these salient surface concepts in several diverse cultures. This suggests that beneath the unique, culturally formulated, explicit folk models and lexical distinctions, and beneath the diversity of surface forms of relationships in diverse cultures, the same four elementary models organize basic processes of social cognition.

NOTES

1. All of these real instances are drawn from the data described below.
2. I use the term *model* to refer to the cognitive schema that people use to structure, plan, coordinate, and evaluate a relationship; *mode* refers to the resultant type of interaction.
3. Copies of the Mandarin, Bengali, Korean, and Vai protocols, instructions, and questionnaires are available from the author.
4. The individual difference effect could result from differences in frequencies of interaction in the four modes, in which case it would indicate an effect of mode on social relationship preferences or opportunities, or it could result from some kind of individual differences in making or reporting errors that involve people with whom the subjects relate in different modes (but do not necessarily confuse with each other beyond chance rates), in which case it would indicate some kind of cognitive bias; for example, different subjects might be valuing or paying attention to different types of relationships.
5. We used chi-square rather than *del* here because we were testing for any kind of association at all: we had no specific hypothesis about the nature of any association that might exist. *Del* can only be used if specific prior predictions are made about the cells that will exhibit frequencies higher and lower than chance.
6. This kind of analysis is probably irrelevant where there is no association between the factors that affect substitutions. However, as an additional check, we did this analysis in the other three cultures—in which there were no such associations—finding no indication that the mode effects were dependent on role term effects.

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