Cultural differences are not always reducible to individual differences

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We show that differences in social orientation and in cognition that exist between cultures and social classes do not necessarily have counterparts in individual differences within those groups. Evidence comes from a large-scale study conducted with 10 measures of *independent* vs. *interdependent* social orientation and 10 measures of *analytic* vs. *holistic* cognitive style. The social measures successfully distinguish between interdependence (viewing oneself as embedded in relations with others) and independence (viewing oneself as disconnected from others) at the group level. However, the correlations among the measures were negligible. Similar results were obtained for the cognitive measures, for which there are no coherent individual differences despite the validity of the construct at the group level. We conclude that behavioral constructs that distinguish among groups need not be valid as measures of individual differences.

culture | personality trait | cognitive style | social orientation

> "...it is just possible that the psychological variables that will one day describe differences among cultural communities are not the same as those that will describe differences among individuals within any or all cultural communities, and vice versa." (1)

Social scientists differ widely on the question of how to conceptualize culture in relation to individual traits. On the one hand, researchers such as Robert McCrae assume that cultural differences can be reduced to individual differences (2). On the other hand, researchers such as Richard Shweder hold that culture is conceptually distinguishable from the traits of the individuals who comprise those cultures (1). In the present study we examine whether cultural constructs can be conceptualized as psychological traits at the individual level. We show that the dimensions of social orientation and cognitive style capture statistically significant group differences and yet their coherence is weak when used to describe individual differences within each group. This conclusion has important implications for theories of culture and psychological processes.

A revival of cultural psychology has occurred in the last two decades (3). During this period, a heavy emphasis has been placed on two constructs: social orientation and cognitive style. Some cultures, such as the United States, are characterized by a social orientation valuing *independence*: emphasizing uniqueness, having relatively low sensitivity to social cues, and encouraging behaviors that affirm autonomy. In contrast, other cultures including China, Japan, and Korea tend to value *interdependence*: emphasizing harmonious relations with others, promoting sensitivity to social cues, and encouraging behaviors that affirm relatedness to others (4). Similarly, cultures have been shown to vary along the analytic–holistic dimension in cognitive style. Some cultures are *analytic*: detaching a focal object from the perceptual field, categorizing objects taxonomically, and ascribing causality to focal actors or objects. Other cultures are *holistic*: paying attention to the entire perceptual field, especially relations among objects and events, categorizing objects on the basis of their thematic relations, and attributing causality to context (5).

The validity of these cultural constructs has been well established. First, previous studies have shown that both dimensions can be used to differentiate a diverse range of cultural groups including East Asians vs. Americans and Eastern vs. Western Europeans (4, 6–8). Second, the constructs of social orientation and cognitive style are coherent as descriptors of group characteristics. If a group is high on one measure of a construct, the group is also likely to be high on other measures of the construct. Moreover, for all cultures examined to date, if the culture is relatively high in interdependent social orientation it tends to be relatively holistic in cognitive style. Theorists propose that this relation occurs because interdependence prompts wide attention to context whereas independence focuses attention on objects (9–11).

It would seem natural to infer that these cultural constructs are equally coherent as descriptors of different individuals. Individuals who are high on one measure of the respective construct might be expected to also be high on other measures of the same construct. Psychologists often do find individual differences that correspond to group differences and vice versa. For instance, the "big five" personality traits (extraversion, neuroticism, etc.) were originally developed to describe individual differences, and yet they are often used to describe group differences (2, 12, 13). For example, Serbians score high on extraversion and Japanese score high on neuroticism (14). Thus differences in personality (an individual-level variable) and in national character (a group-level variable) are captured by the same constructs (i.e., the big five personality traits). Likewise, IQ is an individual-difference variable but it can also differentiate groups (15). Thus, correspondence between group-level and individual-level constructs is sometimes observed. Relying on these observations, cultural psychologists often assume that cultural differences in social orientation and cognitive style are reducible to individual differences (16–18).

Although simple and straightforward, the foregoing reasoning is flawed. First, there exist coherent sets of attributes that can differentiate groups and yet, their correlations at the individual level would not necessarily be expected. Being thrifty, working hard, and avoiding a show of wealth, can distinguish ascetic protestantism from other denominations (19). However, there is no particular reason to expect that the thriftier members of an ascetic protestant group would also be the harder workers. Likewise, there are coherent group differences between democratic and autocratic societies. A democratic society ensures the decentralization of power, the rights of minorities, and economic liberty more than does an autocratic society. Although devotion to human rights is the common denominator, we would probably not expect that the stronger supporters of economic liberty would also be the stronger supporters of minority rights.

Second, from a statistical standpoint, correlations at one level pose no constraint on correlations at another level (1, 20). As shown in Fig. 1A, two hypothetical variables, A and B, are positively correlated across three cultures. However, the individual-level correlations within each culture can be (a) positive, (b) zero, and (c) even negative. This illustrates that the group-level coherence of variables is independent of their individual-level coherence.

Finally, some small-scale studies have suggested that even when aspects of social orientation or cognitive style coherently differentiate two cultures, they show little coherence at the individual level. For example, Caudill and Schooler found that Japanese children as a group showed more interdependent behaviors than a similar group of American children, but the correlations among individual behaviors were no greater than would be expected by chance (21). Also, Kitayama and colleagues found similarly low correlations among college students using a small number of measures of interdependence and a small number of measures of cognitive style (22). However, both sets of data are inconclusive because they are based on a limited number of measures and restricted samples with respect to age, social class, and other demographic characteristics.

Thus it is an empirical question whether social orientation and cognitive style are also meaningful individual-difference constructs. In the present study we examine the coherence of social orientation and cognitive style at the individual level.

Results

We selected 10 measures of social orientation and 10 measures of cognitive style on the basis of their success in detecting group differences at the cultural level. For example, overall effect sizes between East Asians and Westerners on both concepts are moderate to large (mean Cohen's $d = 0.54$ for social orientation and 0.62 for cognitive style when calculated from published studies that used the same measures).[*] Thus, there is no question about their validity as cultural constructs. Table 1 includes a short description of each measure.

To test whether social orientation can be conceptualized as an individual-level construct, we calculated correlations among 10 measures of social orientation. If there is a meaningful psychological construct of social orientation at the individual level, we should find at least reasonable correlations among the measures. For example, a strong individual-difference variable like IQ (in the case of WAIS-IV) is characterized by significant correlations among its subcomponents. The mean correlation of subtests is 0.48 and also, each subtest is strongly correlated with full-scale IQ (mean $r = 0.65$). Likewise, subfacets of the five personality traits (in the NEO-PI-R) load well onto the respective personality trait (mean factor loading = 0.64).

We found both mean and median correlations among social orientation measures to be negligible (mean $r = 0.008$ and median $r = 0.008$).[†] Only a handful of correlations (i.e., 2 out of 45) were statistically significant and positive (Table S1). When we conducted an exploratory factor analysis, the first factor was driven almost solely by one measure (Table S2) and explained very little of the variance (12.26%). Note that each measure would explain 10% of the variance if social orientation measures are orthogonal to each other. Thus we failed to find any hint of coherence among 10 social orientation measures.

Such negative results by no means indicate that these measures of social orientation are unreliable or invalid. There is reasonable reliability for most individual measures for which it can be calculated (Table S3). More importantly, previous studies have repeatedly found significant cultural differences with these measures. Fur-
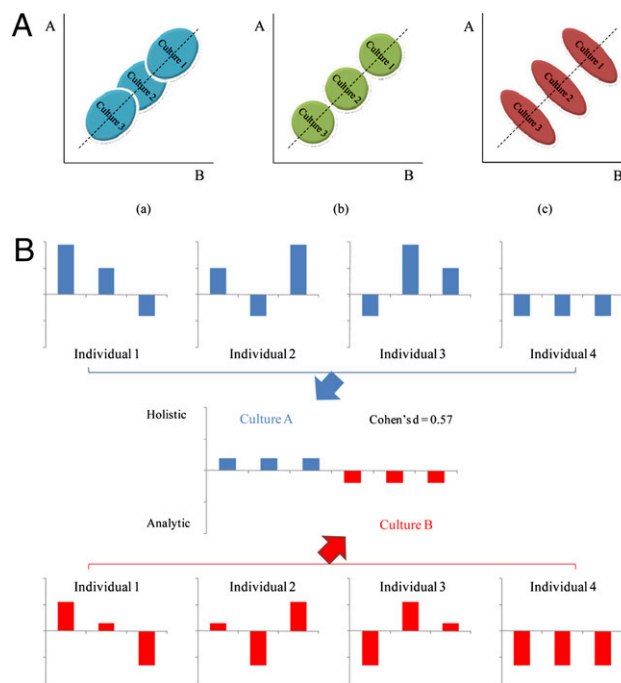
Fig. 1. Illustrations of independence between individual and cultural differences. (A) When correlations are positive at the group level they can be positive, nil, or negative at the individual level (adapted from refs. 1 and 56). (B) Even when two groups differ on all measures of a given construct there may be no tendency for an individual in a given group whose score is relatively high on one measure to have scores that are relatively high on other measures. Three bars indicate three different attributes of cognitive style and higher scores on the y axis reflect more holistic cognitive style.

thermore, in our data we found differences in social orientation between two subcultural groups defined by social class.[‡] The working-class group was more interdependent in 7 out of 10 social orientation measures than the middle-class group. Of these differences, 4 were statistically significant whereas only 1 difference was significant in the opposite direction (Table S4). In addition, there was a significant difference between the two groups in the aggregate index of social orientation measures, $t(188) = 2.81 \, P < 0.01$.[§] In other words, we found coherent group-level differences without finding corresponding coherence at the individual level.

We computed similar correlations and factor analysis for 10 cognitive style measures. The measures of cognitive style were very weakly correlated (mean $r = 0.038$ and median $r = 0.040$) (Table S5). Again, an exploratory factor analysis showed that the variance explained by the first factor was only trivially different from the standard criterion of variance explained for 1 measure out of 10 (10.69% vs. 10%). In addition, the first factor was largely driven by 1 measure (Table S2). As was the case with social orientation, the lack of correlation could not be explained by poor reliability of individual measures (Table S3). Also, even if relatively unreliable measures are excluded (e.g., $\alpha < 0.60$), the correlations between measures are still very slight (mean and median r's = 0.031 and 0.072, respectively).

Finally, we found significant group differences between working-class and middle-class participants. The working-class group was more holistic than the middle-class group on 7 out of 10

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[*]Cohen's d is the standardized difference between the two group means.

[†]All of the mean correlations reported here were weighted by N.

[‡]Social class was defined by their level of education (i.e., some college or less vs. completed college or more). When we used other indicators of social class (e.g., occupational prestige), the group differences were largely replicated.

[§]The aggregate index was the mean (weighted by N) of standardized scores of measures. Participants who completed at least six measures were included.

Table 1. Description of measures

	Measure	Description
Social orientation	Inclusion of other in the self scale (IOS)	Pictorial measure of felt closeness to others
	Twenty statement task (TST)	Interdependence (emphasizing relations with others) or independence (emphasizing attributes of the self) of self-description
	Proportion of close relations	Proportion of others in their social network to whom they feel close
	Network quality	Degree to which their social relations with others are positive
	Centrality of self	Centrality of self in their social network (scored negatively)
	Self-inflation	Symbolic self-enhancement: size of symbol drawn for self vs. others (scored negatively)
	Self-construal scale	Agreement with statements expressing high or low independence
	Predictor of happiness	Association between happiness and interdependence vs. independence
	Intensity of engaged emotions	Intensity of socially engaging emotions (friendly feelings) vs. socially disengaging emotions (pride)
	Vocal Stroop	Sensitivity to socioemotional cues when they are pitted against semantic cues
Cognitive style	Inclusion	Perceived casual relevance of various items of information
	Proverb	Preferences for dialectical proverbs (containing contradictions) vs. nondialectical proverbs (containing no contradictions)
	Change	Perceived likelihood of change in some process
	Triad	Thematic vs. taxonomic categorization
	Attribution	Situational vs. dispositional attribution
	Outside in	Third person vs. first person perspective in personal memory
	Framed line task (FLT)	Field dependence vs. field independence
	Change sensitivity	Detecting changes in background environmental objects vs. focal objects
	Underwater animation	Memory for background environmental objects vs. focal objects in a series of underwater animations
	Narrative	Focus on other characters relative to a main character in narratives

measures and 5 of these differences were statistically significant (one marginally) whereas only 1 measure was significant in the opposite direction (Table S6). Further, the difference between the social classes in the aggregate index of cognitive measures was significant, $t(213) = 3.51$, $P < 0.001$.

In sum, the present results indicate that social orientation and cognitive style are not coherent individual-level constructs in spite of their coherence at the cultural level. Compared with other well-established individual-difference variables such as IQ and the big five personality traits, correlations and factor structure for both constructs were too weak to qualify social orientation and cognitive style as individual level constructs. These negative results were not driven by low reliability. Most importantly, we found group differences without any evidence of coherence at the individual level. Thus we conclude that cultural differences in cognition and social orientation are not reducible to corresponding individual differences. This conclusion cannot be attributed to demographic restriction of our sample. Although all of our participants were Americans, (*i*) they included representatives of diverse subcultural groups including social class for which we found reliable group differences, and (*ii*) Kitayama and his colleagues recently found that a subset of our measures differentiated Westerners and Japanese and yet they didn't correlate among themselves (22). Such a lack of coherence at the individual level might seem puzzling at first glance. It might even seem impossible that a given variable is meaningful at one level but not so at another level.

However, there can be coherent group differences when there are no correlations among the measures that differentiate groups. Fig. 1*B* includes individual profiles of cognitive styles in two hypothetical cultures. Individual 1 in culture A is the most holistic in the first domain but not in other domains. Thus, subdomains of cognitive style are not correlated within each culture (the mean $r = -0.037$). However, if the individual profiles are averaged, culture A is more holistic than culture B in all respects. Furthermore, the average correlation between domains is still close to zero for the two cultures combined ($r = 0.040$). More generally, we show both through

derivation and simulation that variables can exhibit group-level effects yet show very small correlations between them when the two samples are combined. For example, when the correlation within a culture is zero and the between-culture effects for two different variables have the same size Cohen's d, the correlation for the combined data will be $\dfrac{d^2}{d^2 + 4 - \frac{8}{N}}$, where N is the total sample size. This means that two variables each exhibiting a group-level effect of $d = 0.4$ will produce a correlation of 0.039 when the samples of, say, 100 participants are combined (as sample size increases to infinity, the group-level correlation approaches 0.038). Group-level effects need to be very large to observe sizeable correlations between the two variables in the combined sample when there are no within-culture correlations (e.g., $d = 1$ approaches a correlation of 0.2 as long as sample sizes are greater than 20). This result cannot be attributed to measurement error. We also conducted a simulation with two groups ($n = 100$) having group-level effects ($d = 0.4$) on 10 variables and the correlation among the 10 variables was set to be zero within each culture. The two groups were then combined and the mean correlation among variables was calculated. The average mean correlation across 10,000 repetitions was 0.038 (see *SI Text* and Fig. S1 for details).

Our results do not imply that there is no stable structure at the individual level. Instead, individual profiles of both cognitive and social measures may be stable. That is, if a person is relatively holistic in making causal attributions, the person would make situational attributions more often than other individuals, although we cannot assume that the person is also holistic by virtue of, say, being inclined to reason dialectically. If this is true, we should find temporal stability for each measure. We tested this hypothesis with one construct that we measured at two different sessions, the exclusion task. Most of our participants completed the task twice, separated by periods ranging between 1 and 4 weeks. The test–retest correlation was highly significant, ($r = 0.51$, $P < 0.001$).
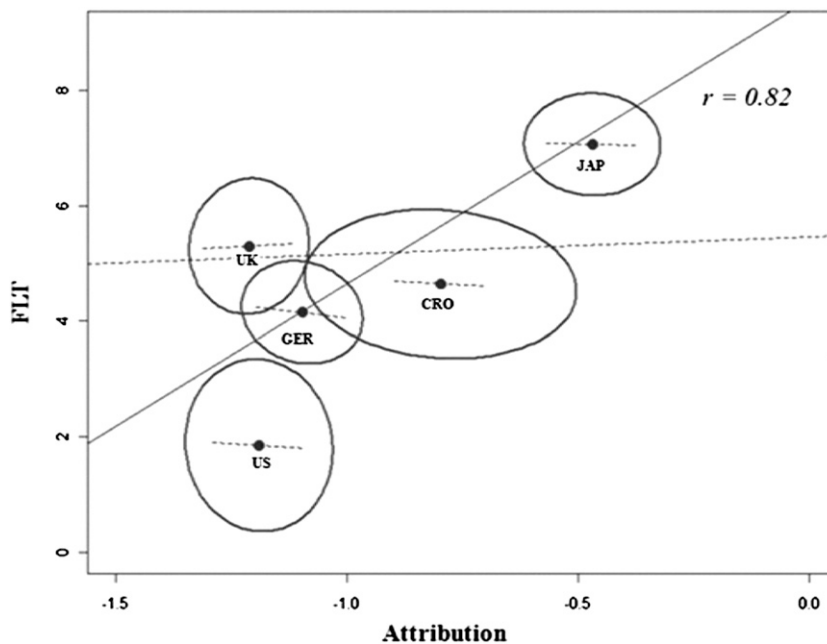
Fig. 2. A multilevel analysis on FLT and attribution across five cultures. The dotted lines indicate the association between them at the individual level both within each culture and with all cultures collapsed, whereas the solid line indicates the association at the cultural level. The ellipses represent a ±SE around a group mean on each variable and the within-culture correlation influences its orientation.

It might be surmised that the failure to find coherence for the social orientation and cognitive style variables at the individual level calls into question their coherence at the cultural level. As one colleague wrote to us: "I propose a new construct which I'll label "Asianness," which is based on a tolerance for dense crowds, skill using chopsticks, having dark hair color, and a preference for soy products. I imagine that if I investigated this, I would find pronounced cultural differences between East Asia and North America on each of these individual measures, yet there would likely be no correlations between these individual measures. Is Asianness a cultural construct?" Of course it would not be. No one would assume that dark-haired people in general have unusual skill in using chopsticks or marked preference for soy products. The construct is transparently nonsensical. In contrast, the concept that independence vs. interdependence meaningfully distinguishes between cultures has been around in one form or another at least since the introduction in the late 19th century of the concepts of *Gesellschaft* and *Gemeinschaft* (23). The cultural construct of holistic vs. analytic cognitive style as one distinguishing between East Asians and Westerners has been around at least since the mid 20th century (24–28). Abundant historical and anthropological evidence and philosophical analysis attest to the reality of these constructs at the cultural level.

Abundant laboratory evidence for the cultural utility of the constructs also exists. If two cultures (e.g., East Asia vs. the West, Western Europe vs. the U.S., mainland Japanese vs. Hokkaido Japanese) differ in one aspect of social orientation (e.g., emphasis on relationships vs. attributes of the self) they also differ in the same direction in other aspects (e.g., sensitivity to socioemotional cues) (6, 8, 9, 22). The same is true of cognitive style. If two cultures or subcultures (e.g., southern Italians vs. northern Italians, working class vs. middle class, Turkish farming communities vs. Turkish herding communities) differ in one aspect of cognitive style (e.g., attention to environment vs. focal object) they also differ in the same direction in other aspects (e.g., acceptance of apparent contradictions) (5, 8, 29, 30).

In fact, a multicultural comparison involving two cognitive tasks (i.e., FLT and attribution, see Table 1 and also *Methods* for task descriptions) across five cultures (i.e., U.S., U.K., Germany, Croatia, and Japan)[¶] showed that correlations between FLT and attribution at the individual level were quite small both with all five cultures combined ($r = 0.04$) and within each culture (median within-culture correlation $= -0.047$). Even when only two extremes (i.e., U.S. and Japan) were collapsed together, the correlation remained negligible ($r = 0.070$), consistent with the formula presented earlier given the moderate effect sizes. In stark contrast, the corresponding correlation at the cultural level is quite high ($r = 0.73$). A bivariate multilevel analysis also confirmed these results (e.g., the correlation of the second level random effect terms was 0.82; Fig. 2). Most importantly, the hypothesis that social orientation and cognitive style are linked causally has been demonstrated repeatedly (31–33). Cultures that are relatively interdependent are also relatively holistic (11).

Why do the constructs of social orientation and cognitive style have validity only at the level of the group and not at the level of the individual? A more appropriate question might be to ask why any construct would be expected to have consistent differences at both levels. Groups and individuals differ in a host of potentially relevant ways. Groups are not biological entities. They do not have needs and desires. Groups do not have a standard developmental life course. They can endure for a moment or for eons. Systems involving groups of individuals are by definition more complex than any given individual. Thus, why should the attributes that individuals share with other group members, and which they are less likely to share with members of other groups, be the sorts of attributes that would be expected to show substantial individual differences within their own group?

We would not expect individuals to be democratic in the same way that institutions or nations are democratic. Democratic individual functioning is at the level of beliefs and preferences. Democratic societal functioning is at the level of types of institutional relations and sanctions.

[¶]We obtained and reanalyzed the data from refs. 8 and 22.

Through socialization agents such as parents and schools, groups press their members toward conformity on matters that are important to group functioning. The group would not necessarily be expected to differentially press conformity on its members. All members of interdependent groups are expected to define themselves in terms of their relations with others. All members of independent groups are expected to define themselves in terms of enduring personal attributes. However, we would not expect individual differences in the various components of social orientation to be socialized to the same degree—as much for self-definition as for sensitivity to socioemotional cues, for example.

In contrast, different groups within a given society do socialize their members differently with respect to intellectual skills. In particular, the social classes differ in the nature of skills they try to instill in their youth (34–36). Even within a class, socialization agents such as families and schools could be expected to be differentially effective. In addition, and this may be crucial, there are substantial individual differences in genetic propensities to learn particular intellectual skills, and perhaps intellectual skills in general. Thus, even though there are coherent group differences in intelligence and coherent individual differences within groups, there is no reason to assume that groups differ for the same reasons that individuals differ.

An example sufficient to make the above point is the fact that IQ in advanced societies has been increasing at a rate of more than half a standard deviation per 30-year generation for the last 90 years (37). And this increase has been a constant across social classes—people at every class level have increased in IQ by about the same amount. People in advanced societies have higher IQs than their grandparents did and they have higher IQs than contemporary people in less advanced societies, but the reasons for these group differences are largely unrelated to the reasons for differences between individuals within a cultural or generational group.

Matters are similar for personality traits. Groups differ in extraversion. Prim mainland Japanese are sometimes astonished at the verve and outgoingness of their Japanese Peruvian cousins. And of course there are individual differences in extraversion among mainland Japanese and among Peruvian Japanese. But there is no reason to believe that the origins or even the typical manifestations of the differences between groups have anything to do with the origins or manifestations of differences within groups.

Thus, rather than regarding the present findings as anomalous, we should probably regard it as a coincidence when differences between groups in a particular construct are accompanied by individual differences within each group in the same construct.

Finally, we note that the implications of the present research are not limited to cultural psychology. Our evidence and analysis make the general point that group-level constructs of any kind may not be reducible to individual-level constructs (1, 20, 38–40).

Methods

We recruited socioeconomically diverse participants from a telephone directory (n = 235; age range, 25–93) (Table S7). They were tested with 10 social orientation and 10 cognitive measures across three sessions (Tables S8 and S9). The diverse nature of the sample was chosen to maximize the likelihood of detecting individual differences in the dimensions. This study was approved by the Institutional Review Board at the University of Michigan (HUM00003207/HUM00005106).

Measures of Independent vs. Interdependent Orientation. *Self-concept (two measures).* An interdependent self-concept includes others as a significant component of the self-representation, whereas an independent self-concept places less emphasis on others. In the 20 statement task (TST) (41), participants were asked to describe themselves in 20 different ways. The statements were coded as either personal (e.g., "I am kind"), relational (e.g., "I like camping"), or collective (e.g., "I am in a sorority"). The score was the number of interdependent statements (i.e., relational + collective) minus the number of independent statements (i.e., personal). In the self-construal scale (17), participants indicated how much they agreed with 10 independent (e.g., "I always try to have my own opinions")

and 10 interdependent statements about the self (e.g., "I am concerned about what people think of me"). The score was the difference between the mean ratings given to interdependent and independent statements.
Social relations (three measures). People from interdependent cultures have closer and more intimate social relations than people from independent cultures. The inclusion of other in the self (IOS) scale is a pictorial measure of closeness (42). In the IOS scale, a series of two circles is provided where the degree of overlap between them progresses linearly, creating a seven-point scale of relational closeness. Participants selected one pair of circles that best represents their relationships with the closest person, the best friend, others in general, and family members. In the social network task (43), there were three concentric circles centered around a small circle labeled "the self." Participants were asked not only to place members of their network in one of three circles depending on emotional closeness, but also to specify network members showing social support and those causing annoyances. Two scores were calculated from this task: the proportion of network members in one's inner circle and the proportion of social support relative to annoyances.
Sensitivity to social cues (one measure). People with an interdependent orientation are more sensitive to relational cues such as emotion in daily communication than people with an independent orientation. In the vocal stroop task (44), words that are either positive (e.g., "wedding") or negative (e.g., "funeral") are pronounced in either an emotionally positive or negative tone. Participants were asked to judge whether each word is positive or negative. The score was the interference effect of vocal tone: reaction times for incongruent trials (e.g., "wedding" in a negative tone) minus the congruent trials (e.g., "wedding" in a positive tone).
Emotional experience (two measures). Socially engaged emotions (e.g., friendly or guilty) play a central role in the emotional life of people in interdependent cultures, whereas socially disengaged emotions (e.g., proud or angry) are central in independent cultures. In the implicit social orientation questionnaire (ISOQ) (45), participants were asked to remember 10 social episodes (e.g., "when I had a positive interaction with friends) and indicate how much they experienced each of 12 emotions. Two scores were calculated: (i) relative effects of socially engaged emotions vs. socially disengaged emotions on happiness (i.e., for each participant, their happiness score was regressed on engaged minus disengaged positive emotions) and (ii) relative intensity of socially engaged vs. disengaged emotions in a given situation (i.e., for each participant, engaged minus disengaged emotions were averaged across 10 social episodes).
Self-enhancement (two tasks). People from interdependent cultures are less motivated to see themselves in positive ways than people from independent cultures. In the sociogram task (46), participants were asked to draw their social network by using circles to represent the self and others. Two scores were calculated: (i) the relative size of the self circle and (ii) the centrality of the self circle.

Measures of Analytic vs. Holistic Mode of Thought. *Attention (five measures).* Analytic attention focuses on a central, salient object, whereas holistic attention is diffused to the entire field. East Asians generally attend more closely to the entire field, Westerners to the most salient objects. The outside-in task (47) measured whether participants took a third person (holistic) or a first person (analytic) perspective when they thought about their past. In the underwater animations task (48), participants saw animated vignettes of fish and similarly in the narrative tasks (49), they watched video clips and read stories about people. Participants reported what they saw (or read). The score for the task was the frequency that context was mentioned minus the frequency that focal objects were mentioned. In the change sensitivity task (50), participants watched several pairs of animated scenes such as a construction site and an airport. Each scene pair consisted of two similar but slightly different vignettes and the participants' job was to detect the difference between them. The score was the frequency of contextual changes noticed minus the frequency of focal object changes noticed. In the framed line test (FLT) (51), participants saw a square with a line drawn inside it and were asked to reproduce the line inside a new square of a different size either by duplicating its absolute length (ignoring the context of the square) or its length relative to the square (by drawing a line with the same proportion as in the original square). The score was the error in millimeters for the absolute judgments minus the error in millimeters for the relative judgments.
Naïve dialecticism (two measures). East Asians tend to see relationships even among contradictory concepts more than do Americans and are more likely to accept the contradictions as being accurate representations of reality. Participants indicated their preferences for both dialectical proverbs ("too humble is half proud") and nondialectical proverbs ("one against all is certain to fall") in the proverb task (52). The score was the relative preference for dialectical proverbs vs. the nondialectical proverbs. The change task measured how much

participants thought that a contradictory event was likely to happen in the future, for example, that people who fought as children might become lovers as adults (53).

Causal inference (two measures). Because Americans pay relatively little attention to contexts, they make more dispositional attributions for events that emphasize intrinsic properties of the person or object, and fewer situational attributions that emphasize the causal role of contextual factors, than do East Asians. In the causal attribution task (6), participants read several vignettes describing either positive or negative behavior of a target and were asked how much the behavior was caused by his or her disposition and how much was caused by the situation. The score was their ratings for situational attributions minus those for dispositional attributions. In the inclusion task (54), a list of informational items was given to participants and they were asked to judge whether each piece of information was causally related to an event. The score was the number of items that they thought were causally relevant to the event.

Categorization (one measure). Holistic East Asians tend to categorize on the basis of thematic relations, whereas analytic Westerners tend to categorize taxonomically. In the triad task (55), participants were given a target object (e.g., cow) and asked to choose which of two alternatives (e.g., chicken vs. grass) was best associated with the target object. One alternative was thematically related to the target (e.g., grass) and the other belonged to the same taxonomic category as the target (e.g., chicken). The score was the number of thematic categorizations.

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