



Ingroup vigilance in collectivistic cultures

Shi S. Liu^{a,1}, Michael W. Morris^a, Thomas Talhelm^b, and Qian Yang^c

^aManagement Division, Columbia Business School, New York, NY 10027; ^bDepartment of Behavioral Science, University of Chicago Booth School of Business, Chicago, IL 60637; and ^cSchool of Medicine, Zhejiang University, Hangzhou 310058, China

Edited by Steven J. Heine, University of British Columbia, Vancouver, BC, Canada, and accepted by Editorial Board Member Mary C. Waters June 5, 2019 (received for review October 15, 2018)

Collectivistic cultures have been characterized as having harmonious, cooperative ingroup relationships. However, we find evidence that people in collectivistic cultures are more vigilant toward ingroup members, mindful of their possible unethical intentions. Study 1 found that Chinese participants were more vigilant than Americans in within-group competitions, anticipating more unethical behaviors from their peers. Study 2 replicated this finding by comparing areas within China, finding that people from China's collectivistic rice-farming regions exhibit greater ingroup vigilance than people from the less collectivistic wheat-farming regions. The rice/wheat difference was mediated by greater perceived within-group competition. Study 3 found that Chinese participants were more likely than Americans to interpret a peer's friendly behavior as sabotage in disguise. We also manipulated within-group competition and found that it increased ingroup vigilance in both cultures. Finally, study 3 identified two boundary conditions where cultural differences in ingroup vigilance decrease: an unambiguously competitive win-lose situation where Americans also exhibit vigilance, and an unambiguously cooperative win-win situation where Chinese participants relax their vigilance. This research contributes to a more balanced view of collectivism, revealing its interpersonal tensions in the forms of within-group competition and ingroup vigilance.

culture | collectivism | social cognition | competition | interpersonal relationships

Harmony is a consistent theme in descriptions of East Asian culture. It is emphasized as a virtue in ancient classics of Confucianism and Daoism; it is used in modern travel guides to set visitors' expectations (1); it has featured prominently in ethnographic descriptions of China and Japan over the last century (2, 3). In cultural psychology, harmony is a common feature in the central concepts, such as collectivism (4) and interdependent self (5).

While harmony is no doubt a crucial component of the tight-knit social fabric in East Asian cultures, we propose that it is an incomplete depiction. Anthropologists have cautioned that surface harmony can coexist with underlying interpersonal tensions: "Harmony may be observed where there is, in fact, deep-seated antagonism. The emotional, verbal, and behavioral cues for signaling conflict are so different between cultures that outside observers may easily misjudge the intensity and character of conflict" (6).

Cultural psychologists have also acknowledged that collectivism does not mean a social utopia. In his book *Individualism & Collectivism*, Triandis argued that collectivism is not about being nice to everyone, but rather, distinguishing between ingroup and outgroup members (7). Markus and Kitayama also noted that interdependent relationships need "not imply harmony or affection" (8). In his research on Ghana, Adams found that Ghanaians were more likely than Americans to think of even some of their close friends as potential enemies (9).

However, the vision of harmony still pervades psychology. In theories of collectivistic culture, researchers have described collectivism as emphasizing cooperation (i.e., "great readiness to cooperate with ingroup members") (10) and positive intentions toward each other (i.e., "promote other's goals") (5). In scales measuring collectivism and interdependence, ingroup harmony remains a staple theme. For example, people in collectivistic cultures are supposed to agree more to items such as "It's im-

portant to maintain harmony within my group" (11, 12) and "The well-being of my coworkers is important to me" (13). This expectation can be seen even in recent studies. For example, when researchers found that people in collectivistic cultures were more likely to believe in zero-sum competition than people in individualistic cultures, they called it their "most surprising result" (14).

Our research tests the counter-intuitive hypothesis that people in collectivistic cultures are actually more likely to be vigilant against ingroup members. Furthermore, we propose that ingroup vigilance arises from a common byproduct of collectivism: perceived within-group competition. The interpersonal tension of within-group competition and ingroup vigilance departs from the vision of harmony.

Interpersonal Tension

The interdependent self theory holds that, for people in collectivistic cultures, ingroup members are construed as part of the self and people are more aware of the "fundamental relatedness of individuals to each other" (5). The theory describes this "relatedness" in a positive way, proposing that people's orientation in ingroup interactions is "attending to others, fitting in, and harmonious interdependence with them" (5).

Our understanding of collectivism comes from a socioecological perspective (9, 15–17). It starts from the idea that collectivism arises in ecologies with tight social relationships. Tight social relationships need not to be positive. We propose that people in collectivistic cultures are keenly aware of the downsides of "relatedness"; they

Significance

Decades of research have described East Asian cultures as collectivistic, often characterized by ingroup relationships that are harmonious and cooperative. We find evidence that people in collectivistic cultures can also be more vigilant, mindful of ingroup members' bad intentions. Participants imagined what coworkers and classmates would do in competition. Compared with individualistic Americans, people in China expected more unethical competition. Is this a "China phenomenon" or a phenomenon of collectivistic culture? We next compared regional cultures within China to rule out between-country alternative explanations. We found that people from China's collectivistic rice-farming regions were more vigilant than people from the individualistic wheat-farming regions. This research suggests a more balanced view of collectivism, revealing tensions that can co-occur with harmony.

Author contributions: S.S.L., M.W.M., and T.T. designed research; S.S.L., T.T., and Q.Y. performed research; S.S.L. and T.T. analyzed data; and S.S.L., M.W.M., and T.T. wrote the paper.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission. S.J.H. is a guest editor invited by the Editorial Board.

Published under the PNAS license.

Data deposition: The data reported in this paper have been deposited in the open science framework, <https://osf.io/fzad9/>.

¹To whom correspondence may be addressed. Email: sliu19@gsb.columbia.edu.

This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1817588116/-DCSupplemental.

Published online June 28, 2019.

recognize that others in the group might constrain them and impinge upon their interests.

This sort of tension in tight relationships shows up in descriptions of traditional village environments. For example, anthropologists observing rice-farming villages in Japan found that villagers competed intensely with their neighbors over water (18). This observation highlights the paradox that a collectivistic community can have more cooperation (sharing labor or building irrigation systems) (19) and more competition (disputes over water). A recent cross-cultural study found that cooperation and competition can appear together in the workplace. Compared with Americans, participants in China were more likely to view coworker relationships as both cooperative and competitive (20).

Researchers have measured the tendency to construe social situations as competitive using the concept “zero-sum belief.” Zero-sum belief is the belief that “one person’s gain is possible only at the expense of other persons” (14). Różycka-Tran et al. (14) measured zero-sum belief in 37 nations and found that it correlates highly with various measures of collectivism (r_s 0.47 to 0.71). This finding is consistent with the proposal that collectivism attunes people to both positive and negative relatedness. That negative relatedness includes how the other members of one’s group sometimes constrain one’s goals.

Zero-sum belief often leads to competition and conflict (21). However, for people in collectivistic cultures, the demand for cooperation and harmony may make them suppress open confrontation in ingroup relationships. The competition and conflict is thus channeled underground. For example, anthropologist Lebra suggests that the “closure and tight network of cooperation” in Japanese farming villages means that “intense competitiveness, jealousy, and hatred may indeed predominate, though such conflict emotions usually may not surface” (22).

Ingroup Vigilance

The underlying interpersonal tension in collectivistic culture, although hard to observe, can reveal itself in the form of social vigilance. Vigilance is a core concept in ethology (the study of animal behavior in their natural habitat). Ethologists define vigilance as a tendency to perceive threat. Different animals monitor different kinds of threats. Birds and herd animals are vigilant against predators. Among primates, however, a large proportion of vigilance is directed toward conspecifics in the same social group, who can be an important source of competition and aggression (23, 24). Primatologists refer to within-species vigilance as “social vigilance” (25).

We define ingroup vigilance as social vigilance directed toward peers in one’s groups, such as classmates and coworkers. Ingroup vigilance is a social cognitive tendency to anticipate threat from ingroup members. We argue that people in collectivistic cultures tend to perceive more competition in their social relationships. Because of this, we propose that they more readily impute negative intentions to ingroup members.

It’s important to clarify why we use the term “vigilance” instead of terms like “distrust,” “suspicion,” “hostile attribution bias” (26), or “paranoid social cognition” (27). We avoid these terms because they are negative evaluations, which is particularly important to avoid when describing human cultures. We choose the term “vigilance” so as not to prejudge this tendency as a failing and to highlight its potential adaptiveness.

In fact, an argument could be made that vigilance is a part of a set of adaptive behaviors in collectivistic cultures. For example, Yamagishi et al. argue that collectivistic cultures more often use sanctioning systems to punish selfish choices and thereby enforce prosocial norms (28–30). Sanctions and vigilance both point to people’s need to protect themselves against ingroup threats. However, they are different in that sanctions are reactions after people catch defection. In contrast, vigilance is proactive, coming into play before threat happens. By being vigilant, people pre-

pare themselves to detect threat and can therefore take actions to block it.

In sum, we propose 2 hypotheses: (i) people in collectivistic cultures are more vigilant against ingroup members than people in individualistic cultures; and (ii) perceived competition (zero-sum belief) within groups explains cultural differences in ingroup vigilance.

We ran 3 studies to test these hypotheses. All studies were approved by the Columbia University Institutional Review Board and all participants provided informed consent. Data and materials related to this paper are available at <https://osf.io/fzad9/>.

Study 1

Methods. Study 1 tests whether there are cultural differences (the first hypothesis) by comparing working adults in the United States and China. We chose these 2 countries because a meta-analysis study showed that people in China were more collectivistic than Americans and that the country difference was particularly large in their emphasis on social harmony (31). One caveat is that collectivism is a complex concept and there is heterogeneity within countries (31). A limitation of study 1 is that we did not measure participants’ collectivism and instead used country as a proxy for culture.

Participants. Because we were studying a phenomenon without much prior research and were uncertain about effect size, we followed the suggestion of recruiting at least 50 participants in each culture (32). Given the study design, our sample was large enough to detect a small effect (Cramer’s $V = 0.11$) at 80% power. We recruited 52 American participants from MTurk (<https://www.mturk.com>) and 66 Chinese participants from a Chinese crowdsourcing market similar to MTurk (<https://www.zbj.com>) to participate in “a study of daily life.”

Although these platforms do not provide nationally representative samples, studies have found that MTurk participants are more diverse and closer to being a reflection of the cross-section of society than college student samples (33). Previous research has used samples from these two platforms to study cultural differences and found that the Chinese and American samples are similar in terms of education levels and socioeconomic status (SES) in their society (34). The American participants were 27 males and 25 females (mean [M]_{age} = 35.4 y, $SD = 11.1$; 47 Whites, 3 African Americans, 1 Asian, and 1 Hispanic). Chinese participants were 35 males and 31 females (M _{age} = 26.8 y, $SD = 5.5$). The *SI Appendix* reports similar results in analyses accounting for age and gender.

Materials. Participants read 4 scenarios of within-group competition and indicated what people around them will do in the situation. Participants were asked to imagine 2 or 3 possible behaviors for each competition scenario, such as actresses competing for a lead role, company employees competing for a bonus, students competing for scholarships, and officials competing for promotions. We created 2 versions featuring male protagonists and female protagonists. Participants were randomly assigned to these 2 versions. Gender of the protagonists did not significantly influence ingroup vigilance and the *SI Appendix* reports similar results in analyses accounting for it (*SI Appendix, Table S1, model 3*). All vignettes and instructions were generated through the standard back-translation practice in cultural psychology. Here is the actress scenario:

Mary [Chinese version: Wang Li] is an actress in a drama troupe. There is a new play in preparation. Mary wants to become the leading actress but there are other actresses who also want the position. In order to become the leading actress, what are some things that Mary might do?

Coding ingroup vigilance. Two bilingual research assistants (native Chinese speakers, fluent in English, having lived in the United

States for more than a year) coded participants' responses. They coded the responses in the participants' original language without translation. To minimize possible demand characteristics, we recruited new research assistants on the basis that they had not taken cultural psychology classes and had not participated in our laboratory meetings. In addition, they were told that the purpose of the coding was to explore possible cultural differences, but no hypothesis was mentioned.

Research assistants categorized the behaviors into the following categories: (i) ethical (e.g., "do research on the role"); (ii) unethical (e.g., "poison other actresses' food," "have sex with the producer"); or (iii) gray area, which is not clearly ethical or unethical (e.g., "become buddy-buddy with the director"). Ten behaviors (0.9% of total behaviors, China: 7, United States: 3) were so unclear that they could not be coded and were excluded from analysis. The categorizations of the two coders demonstrated high interrater reliability, ICC = 0.943 (95% CI: 0.936, 0.949); disagreements were solved by discussion. Because unethical and gray-area behaviors by ingroup members are more threatening than ethical behaviors, unethical and gray-area behaviors indicate vigilance, whereas ethical behaviors indicate no vigilance.

To validate research assistants' coding, we also had participants themselves rate their generated behaviors (item: "Mary's behavior is moral"; response scale: $-3 = \text{strongly disagree}$ to $3 = \text{strongly agree}$). Participants' ratings were highly correlated with research assistants' coding ($-1 = \text{unethical}$, $0 = \text{gray}$, $1 = \text{ethical}$), suggesting the latter's validity ($r = 0.74$, $P < 0.001$). The results on ingroup vigilance were similar when we used participants' ratings in the analysis (SI Appendix).

Results.

Ingroup vigilance. As shown in Fig. 1, when expecting ingroup competition, Chinese participants imagined fewer ethical behaviors (China 62% vs. United States 84%) and more unethical (20% vs. 11%) and gray area behaviors (18% vs. 5%). A 2-way Culture (2: China vs. United States) \times Ethicality (3: unethical vs. gray area vs. ethical) Pearson's χ^2 test of independence showed a significant cultural difference, $\chi^2(2, n = 1,150) = 71.80$, $P < 0.001$, Cramer's $V = 0.25$.

Is it just bribery? One alternative account is that this difference is just a cultural difference in one particular type of unethical behavior, bribery. Studies have found that there is more bribery in collectivistic societies (35). If bribery is more common in China,

perhaps the difference in imagined unethicality is solely a reflection of expected bribery. To test this question, another two bilingual research assistants coded if the decision maker was involved in the behaviors, because bribery involves the decision maker (e.g., "have sex with the producer"; 90% agreement; disagreements solved by discussion). Cultural differences remained strong after excluding all behaviors that involved the decision maker, $\chi^2(2, n = 979) = 68.45$, $P < 0.001$, Cramer's $V = 0.26$. This suggests that ingroup vigilance in collectivistic culture is not just an expectation about bribery.

Is it just guanxi? Another alternative account is that the result reflects Chinese focus on *guanxi*: expecting to seek success through personal connections (36). *Guanxi* and bribery are similar in that they both work through the decision maker. However, the cultural difference in ingroup vigilance remained strong after excluding all behaviors involving the decision maker. Hence, ingroup vigilance in collectivistic culture is also not just expectation about *guanxi*.

Maybe coworkers and classmates are not ingroups in China? Finally, a skeptic might argue that people in China have a more focused ingroup, which doesn't include classmates and coworkers. If so, the result might merely reflect their distrust of outgroup members (28). To test this possibility, we sampled 117 Chinese and 109 American participants from the same platforms. We asked how much they perceive coworkers and classmates as ingroups, using two items for each relationship: "The company [school] often emphasizes that the company [school] is like a big family"; "I have a shared identity with my coworkers [classmates]" ($1 = \text{strongly disagree}$, $5 = \text{strongly agree}$).

Chinese participants judged coworkers to be ingroups ($M = 4.06$, $SD = 0.70$) more strongly than Americans ($M = 3.61$, $SD = 0.81$), $t(214.2) = 4.47$, $P < 0.001$, $d = 0.60$. They also saw classmates as ingroup members ($M = 4.12$, $SD = 0.67$) more strongly than Americans ($M = 3.11$, $SD = 1.07$), $t(186.2) = 8.73$, $P < 0.001$, $d = 1.16$. Because people tend to trust ingroups more than outgroups (29), the difference in ingroup boundaries might make this a more conservative test of the collectivism ingroup-vigilance hypothesis.

Discussion. Study 1 found that people from a collectivistic culture (China) have greater ingroup vigilance than people from an individualistic culture (United States). Study 1 also ruled out alternative explanations of ingroup vigilance, such as cultural differences in bribery, *guanxi*, and ingroup boundary.

However, there are many differences between the United States and China besides collectivism: history, language, religion, and political system, to name a few. For example, greater ingroup vigilance in China may be a legacy of the Cultural Revolution, which put neighbors on guard against each other (37). To address this concern, we conducted study 2, comparing cultures within China.

Study 2: Ingroup Vigilance in China's Rice vs. Wheat Regions

While China has a strong national identity, it is not culturally monolithic. Different ecologies in the north and south have historically given rise to different patterns of social life. Research has shown that people in the traditionally rice-farming regions of southern China are more collectivistic than those in the wheat-farming regions of northern China (19). If ingroup vigilance is more common in collectivistic cultures, then there would be more ingroup vigilance in China's rice regions than its wheat regions. Because the regions are within the same country, this test can rule out between-country alternative explanations.

China's collectivistic rice provinces are also wealthier on average than the wheat provinces (19). In the United States/China comparison, one could easily argue that people are more wary of others in China because China is much poorer than the United States, and poverty makes people compete over resources. The

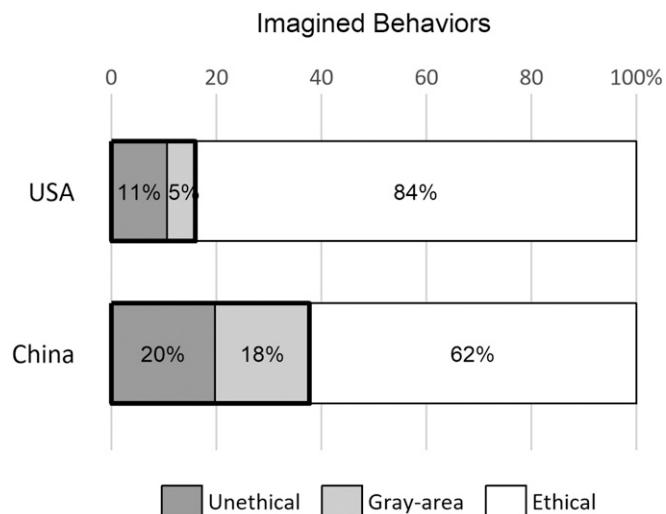


Fig. 1. Ingroup vigilance by culture (study 1).

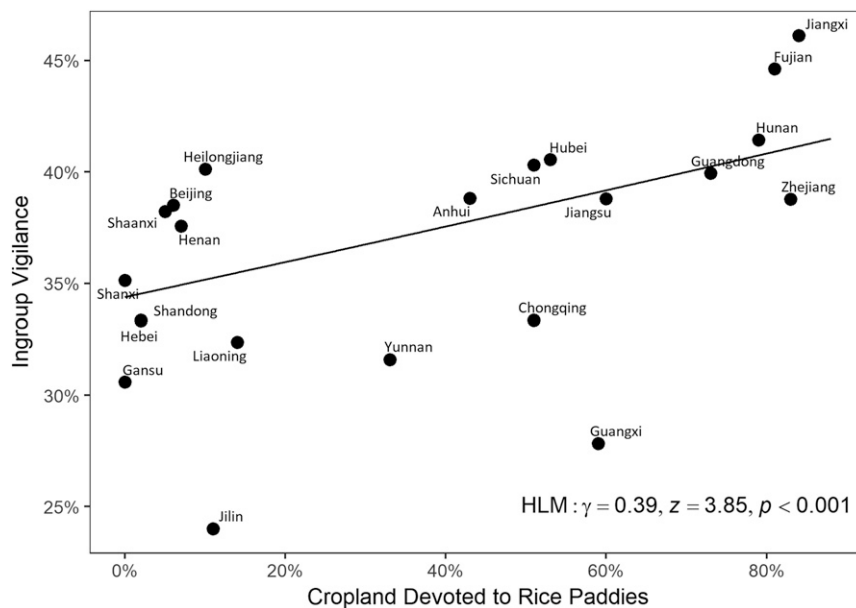


Fig. 2. Ingroup vigilance by rice cultivation (study 2). The regression line and HLM analysis control for SES (Table 1, model 2).

rice/wheat comparison provides a test case where collectivism is not confounded with economic scarcity.

Another goal of study 2 was to test the mediating role of perceived competition in explaining ingroup vigilance. We predicted that people from the rice region would perceive more competition within their social groups than people from the wheat region, which could explain why people in the rice area have more ingroup vigilance. This test is counter-intuitive because rice regions are more collectivistic. Traditional rice farmers had to share labor and work together on irrigation systems (19). Thus, it would be intuitive to predict that China's rice region should be less wary of ingroup members. We predict that, nonetheless, there should be more ingroup vigilance in rice than wheat regions.

Methods.

Participants. A total of 450 college students from 3 universities in China participated in the study. Following previous research (19), we excluded non-Han Chinese students ($n = 34$) and Han students from the historically herding provinces of Tibet, Inner Mongolia, and Xinjiang ($n = 16$). Two participants typed nonsensical answers and were further excluded, leaving a total of 398 participants ($M_{\text{age}} = 20.3$ y, $SD = 2.7$; 231 female).

Materials. We used the same within-group competition scenarios as in study 1 and asked participants to imagine 2 or 3 possible behaviors for each scenario. As in the previous study, participants were randomly assigned to read about male or female protagonists. Gender of the protagonists did not significantly influence ingroup vigilance (*SI Appendix, Table S3, model 5*).

Dependent variable: Ingroup vigilance. After listing the behaviors, participants coded them as unethical, gray-area, or ethical. Using participants' own coding is appropriate because vigilance is essentially a subjective experience. Furthermore, it rules out the possibility that greater vigilance in collectivistic culture was only in the eyes of the outside observers. Participants also indicated if the decision maker was involved in the behavior. This allows us to test the alternative explanations from bribery and *guanxi*.

Independent variable: Rice vs. wheat. Participants indicated where they primarily grew up. Following previous research (19), rice provinces are defined as $>50\%$ farmland devoted to rice paddies and wheat provinces as $<50\%$. In addition to the categorical

variable, our main hierarchical linear model (HLM) analyses use continuous rice percentage.

Mediator: Perceived zero-sum competition within groups. We took items from the Perceived Competition Scale (38) and adapted them to measure students' perceived competition with their classmates. The items measure to which extent the students see their classmates as constraints to personal success and items were: "The more resources a classmate gets from my school, the less I will get"; "My situation would turn worse if another classmate's turns better"; and "Another classmate might take away things that my school gives me right now" (1 = *strongly disagree*, 7 = *strongly agree*; Cronbach's $\alpha = 0.75$).

Control variable: SES. Previous research has found that SES is a significant predictor of perceived competition. People with higher social status will perceive less competition (14). Given the importance of SES, we asked participants to report their status using the social ladder task from 1 (bottom) to 10 (top) (39) and used it as a control variable in the HLM analysis. One limitation of study 1 is that we didn't measure SES, although previous research has shown that the Chinese and American samples recruited from the same platforms are similar in terms of SES in their society (34).

Preregistration. Because it is common to see collectivistic cultures as harmonious, our main predictions may be counterintuitive. Thus, we preregistered our hypotheses (<https://aspredicted.org/ff9z9.pdf>), indicating that for ethicality: rice < wheat, and that for perceived competition (zero-sum belief): rice > wheat. We collected variables for other projects, but all variables on ingroup vigilance are reported here.

Results.

Replicating study 1. We used an analysis parallel to study 1, replacing the China vs. United States comparison with the rice vs. wheat comparison. For overall vigilance, a 2 Culture (rice vs. wheat) \times 3 Ethicality (unethical vs. gray area vs. ethical) χ^2 test was significant, $\chi^2(2, n = 3,668) = 8.88, P = 0.012$, Cramer's $V = 0.05$. The effect size was small according to Cohen's definition (40). Compared with the wheat region, people from the rice region came up with a lower percentage of ethical behaviors (59.8% vs. 64.5%) and slightly more unethical (17.7% vs. 16.3%) and gray-area behaviors (22.5% vs. 19.2%). This suggests that people in the rice region exhibit higher ingroup vigilance. Like in study 1, to rule out the possibility that

Table 1. Rice farming predicts ingroup vigilance (study 2)

		<i>B</i> / γ	<i>SE</i>	<i>z</i>	<i>P</i>
Model 1	Percent rice	0.34	0.13	2.58	0.010
Model 2	Percent rice	0.39	0.10	3.85	<0.001
	Subjective SES	−0.06	0.02	−2.98	0.003
Model 3	Percent rice	0.37	0.11	3.39	<0.001
	Subjective SES	−0.06	0.02	−2.97	0.003
Modernization	Province GDP per capita	0.07	0.16	0.47	0.640
Model 4	Percent rice	0.38	0.11	3.34	<0.001
	Subjective SES	−0.06	0.02	−2.33	0.020
Pathogen	Province pathogen prevalence	0.02	0.07	0.36	0.720
Model 5	Percent rice	0.40	0.10	3.87	<0.001
	Subjective SES	−0.07	0.02	−3.27	0.001
Population density	Province population density	3.34	1.80	1.86	0.063
Model 6	Percent rice	0.37	0.12	3.02	0.003
	Subjective SES	−0.06	0.02	−2.90	0.004
Political institution	Government efficiency	−0.00	0.17	−0.01	0.995
Political institution	Government anticorruption effort	−0.02	0.06	−0.41	0.681

Participants are grouped at the province level. We used generalized linear mixed models with a binomial distribution in R with the lme4 package (41). GDP per capita and population density data are from the 1996 Statistical Yearbook, same as the rice data, consistent with the original rice paper (19). Political institution variables are from a 2009 study (42). Pathogen data come from a 1975 study (43) and several provincial statistical yearbooks used in the original rice theory paper (19). All models include the full dataset except for model 4, which includes 333 participants in 21 provinces where the province pathogen data are available.

what we observed is just a cultural difference in bribery and *guanxi*, we excluded all behaviors that involve the decision maker and did the same analysis. The results were similar, $\chi^2(2, n = 2,518) = 13.79$, $P = 0.001$, Cramer's $V = 0.07$.

HLM rice analysis. We next did HLM analyses to account for that participants (level 1) are nested within provinces (level 2) using the same methods as in the original rice theory paper (19). To focus on the difference between vigilance and lack thereof, we coded imagined ethical behaviors as 0 (no vigilance) and imagined gray-area and unethical behaviors as 1 (vigilance). Results were similar when we used cumulative link mixed models to further account for the difference between unethical and gray-area behaviors (*SI Appendix, Table S2*).

The results in Table 1 show that rice farming predicts ingroup vigilance (model 1) (Fig. 2). The effect became stronger after we accounted for SES (model 2). We report additional analyses in the *SI Appendix*, accounting for rice–wheat border crossers and other major demographic variables (*SI Appendix, Table S3*).

We also tested other possible sources of ingroup vigilance. We included gross domestic product (GDP) per capita as a measure modernization (model 3) and pathogen prevalence (model 4) measures to test alternative theories. The modernization theory argues that as societies become wealthier and more developed, they become less collectivistic (44). The pathogen prevalence theory argues that in areas with high prevalence of communicable diseases, it is dangerous to deal with strangers; therefore, those areas become more insular and collectivistic (45). The original rice paper finds that in China, rice farming is a better predictor of regional differences in collectivism than modernization or pathogen prevalence (19). We found a similar pattern here: rice farming explained regional differences in ingroup vigilance, whereas the other two did not.

Model 5 tested the effect of population density, because densely populated places could be more competitive (46). Density was marginally significant in the “right” direction, $\gamma = 3.34$, $SE = 1.80$, $P = 0.063$. Importantly, after accounting for population density, the effect of rice was still significant, $\gamma = 0.40$, $SE = 0.10$, $P < 0.001$. This suggests that regional differences in ingroup vigilance cannot be fully attributed to population density. Finally, model 6 tested measures of government efficiency and anticorruption. These measures tested whether regional

differences in bribery and corruption could explain ingroup vigilance. Results showed that neither of these measures did, $P_s > 0.68$.

The mediating role of perceived competition. We used HLM with participants grouped at the province level. First, consistent with past findings, we found that people with higher SES perceived less competition: $B = -0.13$, $SE = 0.04$, $t(394.7) = -3.32$, $P < 0.001$. Next, we put rice (1 = rice, 0 = wheat) and SES into the model. Results showed significant effects of SES [$B = -0.14$, $SE = 0.04$, $t(394.0) = -3.54$, $P < 0.001$] and rice [$B = 0.39$, $SE = 0.17$, $t(14.3) = 2.23$, $P = 0.043$] on perceived competition. Students from rice-cultivating provinces perceived more competition with their classmates than students from wheat provinces: $M_{\text{rice}} = 3.35$, $SE_{\text{rice}} = 0.13$, $M_{\text{wheat}} = 2.97$, $SE_{\text{wheat}} = 0.12$, $t(14.3) = 2.23$, $P = 0.043$, 95% CI for the mean difference (0.015, 0.756).

We next tested whether perceived competition mediated the relationship between rice and ingroup vigilance (Fig. 3). We nested participants within provinces and controlled for SES using the *mediation* package in R (47). Results showed that perceived competition predicted ingroup vigilance, $b = 0.16$, $se = 0.04$, $z = 4.69$, $P < 0.001$, and that there was a significant indirect effect in the proposed path of Rice \rightarrow Perceived Competition \rightarrow Ingroup Vigilance, 95% CI (0.0013, 0.0236) (simulation = 5,000).

Discussion. Study 2 replicated the patterns of ingroup vigilance within China. It also extended study 1 by finding that perceived competition within groups mediates the link between collectivistic culture and ingroup vigilance. By testing within the same country, study 2 rules out between-country alternative explanations for the United States–China differences in study 1.

The result also suggests that ingroup vigilance may come from collectivism itself and not just from economic scarcity. China's collectivistic rice provinces are wealthier than the wheat provinces on average (19). However, we still observe more ingroup vigilance in rice regions. When we directly tested collectivism (rice farming) against measures of economic resources (GDP), only rice farming explained ingroup vigilance. The results suggest that East Asia's history of rice farming is one possible source of its ingroup vigilance.

Study 3

Study 3 sought to advance the understanding of ingroup vigilance in three ways: locate causality, test alternative interpretations, and identify boundary conditions. Although it is useful to test the mediation effect of perceived competition between collectivism and ingroup vigilance, we recognize that the mediation analysis doesn't prove causality (48). Therefore, we manipulated perceived competition and tested whether it increased ingroup vigilance.

Alternative Interpretations About Ingroup Relationships. To test alternative interpretations about ingroup relationships in collectivistic culture, we identified that the key difference between our view of collectivism and the standard view is the role of within-group competition. The standard view emphasizes that collectivistic culture features cooperation and good intentions among ingroup members. Our hypothesis posits that people in collectivistic cultures can also perceive more competition within groups than people in individualistic cultures, whereas the more traditional view of collectivism does not make that argument (5). In fact, some theories and scales classify competition as a defining feature of individualism, rather than collectivism (10, 13).

In this study, we designed everyday vignettes about a friendly behavior by a peer at work or school, such as offering to help proofread important documents. Critically, we designed the friendly behaviors so that they could also be sabotage in disguise. For example, a malicious peer could tamper with the document to undermine the colleague. If collectivistic cultures primarily foster cooperation and good intentions among ingroup members, then the friendly behavior from the peer should be accepted at face value. Therefore, people from collectivistic cultures would not be more likely to imagine sabotage.

But if collectivism tends to come with more perceived competition, then people from collectivistic cultures would be more vigilant against possible sabotage, even though the peer appears friendly. This contrasts with other explanations of cultural differences. Researchers studying cultural differences in helping have argued that people in collectivistic cultures sometimes decline help because they are afraid of burdening others (49) or because they are worried about having to return the favor (50). These explanations are compatible with the standard view of collectivism, and neither of them assumes that the helper has negative intentions. However, vigilance of sabotage is different in that it involves imputing negative intentions to ingroup peers, which is incompatible with the standard view and is better explained by perceived competition.

Boundary Conditions. Study 3 also tested boundary conditions. Previous research has found that differences in social cognition tend to be larger in ambiguous situations where people have to draw inferences to guide their interpretations and actions (51). Therefore, when the objective level of competition (i.e., the precise payoff structure with the peer) is ambiguous, people from

collectivistic cultures will make their habitual inference of competition, and larger cultural differences in ingroup vigilance would ensue.

However, when the objective level of competition is spelled out explicitly, there is less room for projection and cultural differences in vigilance would be smaller. Thus, when competition is objectively high (a win-lose payoff with the peer, see *Materials*, below), both groups would expect competition and exhibit vigilance; when competition is objectively low (a win-win payoff with the peer, see *Materials*, below), both groups would expect low competition and therefore be less vigilant. We tested these conditions in study 3, which features a 2 Culture (China vs. United States) \times 3 Competition (win-lose, ambiguous, win-win) between-subjects design.

Methods.

Participants. We recruited 239 American participants (127 females) from MTurk and 219 Chinese participants (110 females) from <https://www.zbj.com> for a study that they were told would require them to "read short stories and tell what is going to happen next." We collected at least 70 participants per culture for each condition. With 80% power, the sample size allowed us to use χ^2 tests to detect small effect sizes for testing the cultural differences in each condition (Cramer's $V = 0.14$) and for testing the causal effect of competition in both cultures (Cramer's $V = 0.12$). American participants were 28.4 y old on average ($SD = 4.8$; 182 Whites, 17 African Americans, 20 Asians, and 20 others). Chinese participants were 27.1 y old on average ($SD = 4.7$). One limitation of this study (and study 1) is that they were conducted before study 2, so we did not measure which region of China participants were from.

Materials. Participants read the beginnings of three stories and then completed the stories. The stories were about an accountant, a car salesman, and a student. All protagonists in the stories were male. Depending on which situation condition participants were in, they read one of the following versions of the stories. For example, the three versions of the accountant story were:

Adam works for an accounting company.

[Ambiguous condition] He and a friend in the workplace have worked together on some projects in the past and their collaboration has been smooth. (No mention of the payoff structure).

[Win-lose condition] Recently, there is a chance for promotion in his department. Promotion is based on his boss's rating of performance. Adam's rating was stellar last year and one of his coworker friends' was similar. Either of them has a good chance of being promoted. Adam and the friend worked together on some projects in the past and their collaboration has been smooth.

[Win-win condition] Recently, there is a chance that his team will be promoted—all members of the best performing team will be promoted, based on his boss's rating of performance. Adam and a friend who is on his team worked together on some projects in the past and their collaboration has been smooth.

Last week, Adam started to work on a complex and important project. His friend offered to informally check over some technical parts that Adam was not sure if he designed correctly.

Participants were asked to write at least 10 sentences for each story and another sentence explaining the intention of the friend's behavior.

Coding for ingroup vigilance. Two bilingual research assistants, blind to the purpose and expectations of the study, independently coded all of the stories for narratives of ingroup vigilance of possible sabotage behaviors. Coders were trained to recognize descriptions of behavior by the peer that are intentional, covert, and that harm one's chances of getting the reward. Seventeen stories were so unclear that they were unable to be coded (1.2%

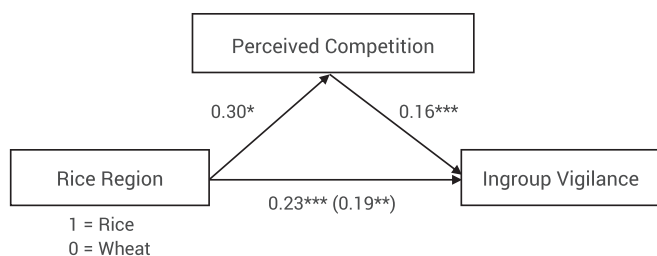


Fig. 3. Study 2 mediation model. Values are standardized regression coefficients. * $P < 0.05$. *** $P < 0.001$.

of total stories, United States: 6, China: 11) and were excluded from analysis. The 2 coders showed high interrater reliability [ICC = 0.931 (95% CI: 0.923, 0.938)]; disagreements were solved by discussion. Here is an example of ingroup vigilance from a participant:

Adam's friend started to look over the project and erased some parts of the design. ... It was small changes, so Adam couldn't notice. He [the friend] also noticed that some parts were designed wrong but did not put any corrections. The friend also "accidentally" threw some of the pages into the trash. ... His friend did not want to see Adam be successful and be promoted.

Results and Discussion. We examined the percentage of ingroup vigilance narratives by culture and competition using Pearson's χ^2 test of independence. The *SI Appendix* reports similar results using mixed-effects logistic regressions to account for the differences between stories, nesting stories within individuals, and controlling for age and gender.

Locating causality. To examine the causal role of competition on ingroup vigilance, we did χ^2 tests on competition (win-lose, ambiguous, win-win) within each culture. Competition led to more ingroup vigilance both in China, $\chi^2(2, n = 646) = 46.54, P < 0.001$, Cramer's $V = 0.27$, and in the United States: $\chi^2(2, n = 711) = 66.83, P < 0.001$, Cramer's $V = 0.31$ (Fig. 4).

Testing alternative interpretations. We tested the two alternative interpretations about ingroup relationships in collectivistic culture by comparing the cultural difference in ingroup vigilance in the ambiguous situation. Would people perceive an overtly friendly peer as sincerely helping, or would they suspect that the friendliness might just be sabotage in disguise? Results showed people in China were more than 5 times (21%) as likely to be vigilant against their peers than Americans (4%), perceiving the friendly gesture as sabotage in disguise, $\chi^2(1, n = 462) = 32.88, P < 0.001$, Cramer's $V = 0.27$. This result cannot be easily explained by the standard view that collectivistic culture primarily fosters cooperation and good intentions among ingroup members. It lends supports to the view that people in collectivistic cultures tend to perceive more competition.

Identifying boundary conditions. Next, we examined situations that we expected would reduce cultural differences in vigilance. In the win-lose condition, people in China were still more vigilant (35%) than Americans (25%), $\chi^2(1, n = 424) = 4.69, P = 0.030$, Cramer's $V = 0.11$. Although the cultural difference was

not fully eliminated in this situation, there was a significant Culture \times Competition (win-lose vs. ambiguous) interaction (Mantel-Haenszel test, $M^2 = 25.58, df = 1, P < 0.001, OR = 2.46, 95\% CI [1.73, 3.49]$). The interaction indicated a substantial reduction of cultural difference from the ambiguous condition, mainly driven by a large increase of vigilance by Americans (from 4 to 25%).

In the win-win condition, Chinese and Americans were similarly vigilant (8% vs. 5%), $\chi^2(1, n = 471) = 0.79, Cramer's V = 0.05$. There was a significant Culture \times Competition (win-win vs. ambiguous) interaction [Mantel-Haenszel test, $M^2 = 26.44, df = 1, P < 0.001, OR = 3.57, 95\% CI (2.16, 5.89)$]. The interaction indicated a substantial reduction of cultural difference from the ambiguous condition, mainly driven by a large decrease of vigilance in China (from 21 to 8%).

Culture as a difference in default assumptions. Analyzing the cultures separately gave a clear picture of each culture's default assumption. For Americans, vigilance in the ambiguous condition was not so different from the win-win situation, $\chi^2(1, n = 495) = 0.62, 0.432, Cramer's V = 0.04$. This suggests that Americans' default assumption within groups are on the cooperative side. It's only when the situation becomes extremely competitive (an explicit win-lose payoff structure with the peer) that Americans develop vigilance against their peers, $\chi^2(1, n = 459) = 43.80, P < 0.001, Cramer's V = 0.31$.

But in China, ingroup vigilance in the ambiguous condition was significantly different from the win-win situation, $\chi^2(1, n = 438) = 15.59, P < 0.001, Cramer's V = 0.19$, and the win-lose condition, $\chi^2(1, n = 427) = 9.9, P = 0.002, Cramer's V = 0.15$. This suggests that Chinese participants' default assumption within groups is more ambivalent, somewhere in between cooperation and competition.

General Discussion

Across 3 studies, we explored the phenomenon, the mechanism, and the boundary conditions of ingroup vigilance in collectivistic culture. Collectivistic cultures harbored more ingroup vigilance than individualistic cultures, both in the between-country comparisons (China vs. the United States) and the within-country comparison (rice vs. wheat regions within China). The results suggested that ingroup vigilance is partially caused by stronger perceived within-group competition in collectivistic cultures. Finally, the cultural difference in ingroup vigilance between the United States and China can be reduced in two situations: an

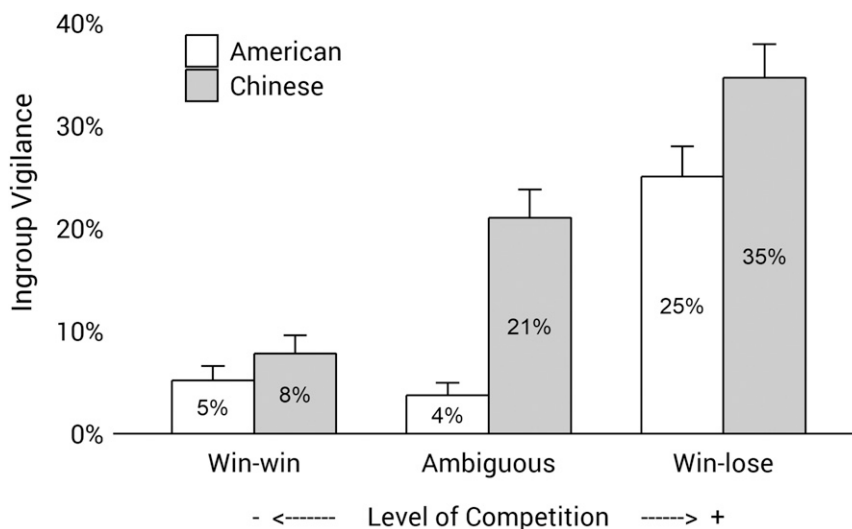


Fig. 4. Ingroup vigilance by culture and competition (study 3). Error bars represent 1 SE.

explicit win–lose situation where Americans develop vigilance or an explicit win–win situation where Chinese relax their vigilance.

Theoretical Implications. This research reveals a type of interpersonal tension in collectivistic cultures that diverges from some prior research. Theory and research on ingroup interactions in collectivistic cultures have often focused on its harmonious, cooperative side. Here, we highlight a less harmonious side. In particular, we argue that past accounts have a hard time explaining ingroup vigilance, especially expectations of possible sabotage from peers. Explaining vigilance becomes easier with an account of collectivism that attends to the downsides of interdependence as well as the upsides.

These findings contribute to research on culture and social cognition. First, the results are consistent with the enduring effect of traditional ecologies and institutions on current-day social cognition (19, 52). In study 2, participants were college students; most of them grew up in cities. It is safe to say none have ever farmed for a living. However, people from rice areas were more vigilant than people from wheat areas, suggesting the lasting effect of rice legacy despite China's rapid change in recent decades.

Second, the results highlight the idea that ambiguous situations are where culture can fill in the details. In study 3, the largest cultural difference was in the ambiguous condition, where participants had to project their expectations onto the ambiguous situation. Daily life is filled with ambiguity, which means cultural default assumptions can often fill in the details of people's experience. The results suggest that culture is carried by patterns of social cognition rather than the objective structure of people's immediate situation. Hence, our findings support a subjectivist rather than strictly structuralist account of cultural patterns.

Finally, our proposal is compatible with another contrarian argument about collectivism by Yamagishi et al. (53). These authors argued that the finding that East Asian participants conformed more than Americans wasn't actually a preference for conformity, but rather a strategy to avoid sanctions and negative evaluations. They argued that sanctioning plays an important role in maintaining cooperation in East Asian culture.

Our findings connect with the findings of Yamagishi et al. (53) in that ingroup vigilance is another aspect of ingroup regulation that seems to be more common in collectivistic cultures. However, vigilance differs from sanctioning because vigilance applies to a wider range of behaviors. In study 3, Chinese participants were much more likely than Americans to be vigilant against a peer's friendly gesture, fearing that the friendliness might be sabotage in disguise. Friendly behaviors would not get sanctioned because they are not antisocial, but they are still scrutinized proactively as part of ingroup vigilance.

Open Questions. We hope this research adds more nuance to the concept of collectivism. There is still much to be done. For example, because we didn't study people's actual behaviors in competition, one open question is whether ingroup vigilance is an accurate reflection of reality. Are people more vigilant because sabotage and unethical competition are objectively more common, or is this anticipation unfounded? Although the answer to that question is beyond the scope of this study, it would be interesting to know whether people's perceptions of competition align with reality.

A second open question is whether the ingroup vigilance at work and school also occurs at home. There should be less competition within a family because families are tighter ingroups than coworkers and classmates and resources within a family are shared largely according to need. Although family interactions were not our focus for this reason, it would be valuable to investigate vigilance in family settings.

Finally, there is the question of whether the findings can be generalized to other collectivistic cultures. We argue that ingroup vigilance arises from perceived competition, so the answer may depend on people's perceptions of competition. Some early researchers categorized competitiveness as a feature of individualism (13). But a metaanalysis found that Japanese people endorse competition more than Americans, leading the authors to conclude that competitiveness must not be a core part of individualism (31). The data here suggest perceived competition is more common in collectivistic cultures, but we are open to the idea that there are exceptions. For example, perhaps well-functioning football teams achieve collectivism without competition and vigilance among team members. Although more research is needed, our data add to a growing base of evidence for interpersonal tension in collectivistic cultures.

Conclusion

The narrative of collectivistic culture has long been a positive one. The danger of a single narrative, as African novelist Chimamanda Adichie (54) puts it, "is not that they are untrue, but that they are incomplete. They make one story become the only story." We hope this research advances a more balanced view of collectivism, a view that not only emphasizes harmony and cooperation, but also recognizes tension and competition.

ACKNOWLEDGMENTS. We thank Joel Brockner, Jon Jachimowicz, and Shigehiro Oishi for their comments on previous drafts; Minzhao Huang, Aitong Li, Fangyu Qi, Liuqing Wei, James Quay, Siyu Xu, Mengfei Yu, and Haoyue Zhang for their research assistance; and three anonymous reviewers for their guidance.

1. R. Milner, et al., Eds. *Lonely Planet Japan* (Lonely Planet Global, Melbourne, Australia, 2017).
2. R. Benedict, *The Chrysanthemum and the Sword; Patterns of Japanese Culture* (Houghton Mifflin Company, Boston, 1946).
3. F. L. Hsu, *Americans and Chinese: Passages to Differences* (University of Hawaii Press, Honolulu, ed. 3, 1981).
4. H. C. Triandis, R. Bontempo, M. J. Villareal, M. Asai, N. Lucca, Individualism and collectivism: Cross-cultural perspectives on self-ingroup relationships. *J. Pers. Soc. Psychol.* **54**, 323–338 (1988).
5. H. R. Markus, S. Kitayama, Culture and the self: Implications for cognition, emotion, and motivation. *Psychol. Rev.* **98**, 224–253 (1991).
6. E. S. Krauss, T. P. Rohlen, P. G. Steinhoff, "Conflict: An approach to the study of Japan" in *Conflict in Japan*, E. S. Krauss, T. P. Rohlen, P. G. Steinhoff, Eds. (University of Hawaii Press, Honolulu, 1984), pp. 3–15.
7. H. C. Triandis, *Individualism & Collectivism* (Westview Press, Boulder, CO, 1995).
8. H. R. Markus, S. Kitayama, Cultures and selves: A cycle of mutual constitution. *Perspect. Psychol. Sci.* **5**, 420–430 (2010).
9. G. Adams, The cultural grounding of personal relationship: Enemyship in North American and West African worlds. *J. Pers. Soc. Psychol.* **88**, 948–968 (2005).
10. H. C. Triandis, "Collectivism v. individualism: A reconceptualisation of a basic concept in cross-cultural social psychology" in *Cross-Cultural Studies of Personality, Attitudes and Cognition*, C. Bagley, G. K. Verma, Eds. (Palgrave Macmillan, London, 1988), pp. 60–95.
11. V. L. Vignoles et al., Beyond the 'east-west' dichotomy: Global variation in cultural models of selfhood. *J. Exp. Psychol. Gen.* **145**, 966–1000 (2016).
12. T. M. Singelis The measurement of independent and interdependent self-construals. *Pers. Soc. Psychol. Bull.* **20**, 580–591 (1994).
13. H. C. Triandis, M. J. Gelfand, Converging measurement of horizontal and vertical individualism and collectivism. *J. Pers. Soc. Psychol.* **74**, 118–128 (1998).
14. J. Rózycka-Tran, P. Boski, B. Wojciszke, Belief in a zero-sum game as a social axiom: A 37-nation study. *J. Cross Cult. Psychol.* **46**, 525–548 (2015).
15. R. Nisbett, *The Geography of Thought: How Asians and Westerners Think Differently... and Why* (Simon and Schuster, New York, 2004).
16. S. Oishi, Socioecological psychology. *Annu. Rev. Psychol.* **65**, 581–609 (2014).
17. R. Thomson et al., Relational mobility predicts social behaviors in 39 countries and is tied to historical farming and threat. *Proc. Natl. Acad. Sci. U.S.A.* **115**, 7521–7526 (2018).
18. T. Yoshida, "Spirit possession and village conflict" in *Conflict in Japan*, E. Krauss, T. Rohlen, P. Steinhoff, Eds. (University of Hawaii, Honolulu, 1984), pp. 85–104.
19. T. Talhelm et al., Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science* **344**, 603–608 (2014).
20. J. Keller, J. Loewenstein, The cultural category of cooperation: A cultural consensus model analysis for China and the United States. *Organ. Sci.* **22**, 299–319 (2011).
21. N. Sirolo, M. Pitesa, Economic downturns undermine workplace helping by promoting a zero-sum construal of success. *Acad. Manage. J.* **60**, 1339–1359 (2016).

22. T. S. Lebra, "Nonconfrontational strategies for management of interpersonal conflicts" in *Conflict in Japan*, E. S. Krauss, T. P. Rohlen, P. G. Steinhoff, Eds. (University of Hawaii Press, Honolulu, 1984), pp. 99–114.
23. N. G. Caine, S. L. Marra, Vigilance and social organization in two species of primates. *Anim. Behav.* **36**, 897–904 (1988).
24. A. Treves Within-group vigilance in red colobus and redtail monkeys. *Am. J. Primatol.* **48**, 113–126 (1999).
25. R. B. Ebitz, K. K. Watson, M. L. Platt, Oxytocin blunts social vigilance in the rhesus macaque. *Proc. Natl. Acad. Sci. U.S.A.* **110**, 11630–11635 (2013).
26. W. Nasby, B. Hayden, B. M. DePaulo, Attributional bias among aggressive boys to interpret unambiguous social stimuli as displays of hostility. *J. Abnorm. Psychol.* **89**, 459–468 (1980).
27. R. M. Kramer Paranoid cognition in social systems: Thinking and acting in the shadow of doubt. *Pers. Soc. Psychol. Rev.* **2**, 251–275 (1998).
28. T. Yamagishi, The provision of a sanctioning system in the United States and Japan. *Soc. Psychol. Q.* **51**, 265–271 (1988).
29. T. Yamagishi, Exit from the group as an individualistic solution to the free rider problem in the United States and Japan. *J. Exp. Soc. Psychol.* **24**, 530–542 (1988).
30. T. Yamagishi, N. Jin, A. S. Miller, In-group bias and culture of collectivism. *Asian J. Soc. Psychol.* **1**, 315–328 (1998).
31. D. Oyserman, H. M. Coon, M. Kemmelmeier, Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychol. Bull.* **128**, 3–72 (2002).
32. J. P. Simmons, L. D. Nelson, U. Simonsohn, "Life after p-hacking" in *Meeting of the Society for Personality and Social Psychology* (New Orleans, LA, 2013). <https://ssrn.com/abstract=2205186> or <http://dx.doi.org/10.2139/ssrn.2205186>. Accessed 13 June 2019.
33. M. Buhrmester, T. Kwang, S. D. Gosling, Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspect. Psychol. Sci.* **6**, 3–5 (2011).
34. K. Wu, S. M. Garcia, S. Kopelman, Frogs, ponds, and culture: Variations in entry decisions. *Soc. Psychol. Personal. Sci.* **9**, 99–106 (2017).
35. N. Mazar, P. Aggarwal, Greasing the palm: Can collectivism promote bribery? *Psychol. Sci.* **22**, 843–848 (2011).
36. X.-P. Chen, C. C. Chen, On the intricacies of the Chinese guanxi: A process model of guanxi development. *Asia Pac. J. Manage.* **21**, 305–324 (2004).
37. B. M. Frolic, *Mao's People: Sixteen Portraits of Life in Revolutionary China* (Harvard University Press, Cambridge, MA, 1980).
38. S. T. Fiske, A. J. Cuddy, P. Glick, J. Xu, A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *J. Pers. Soc. Psychol.* **82**, 878–902 (2002).
39. N. Adler, E. Epel, G. Castellazzo, J. Ickovics, Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychol.* **19**, 586–592 (2000).
40. J. Cohen, *Statistical Power Analysis for the Behavioral Sciences* (Lawrence Erlbaum Associates, Hillsdale, NJ, ed. 2, 1988).
41. D. Bates, M. Mächler, B. Bolker, S. Walker, Fitting linear mixed-effects models using lme4. *J. Stat. Softw.* **67**, 1–48 (2015).
42. M. A. Cole, R. J. Elliott, J. Zhang, Corruption, governance and FDI location in China: A province-level analysis. *J. Dev. Stud.* **45**, 1494–1512 (2009).
43. J. Chen, T. C. Campbell, L. Junyao, R. Peto, *Diet, Life-Style and Mortality in China: A Study of the Characteristics of 65 Chinese Counties* (Oxford University Press, Oxford, 1990).
44. P. M. Greenfield, Social change, cultural evolution, and human development. *Curr. Opin. Psychol.* **8**, 84–92 (2016).
45. C. L. Fincher, R. Thornhill, D. R. Murray, M. Schaller, Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proc. Biol. Sci.* **275**, 1279–1285 (2008).
46. O. Sng, S. L. Neuberg, M. E. W. Varnum, D. T. Kenrick, The crowded life is a slow life: Population density and life history strategy. *J. Pers. Soc. Psychol.* **112**, 736–754 (2017).
47. D. Tingley, T. Yamamoto, K. Hirose, L. Keele, K. Imai, Mediation: R package for causal mediation analysis. *J. Stat. Softw.* **59**, (2014).
48. S. J. Spencer, M. P. Zanna, G. T. Fong, Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *J. Pers. Soc. Psychol.* **89**, 845–851 (2005).
49. S. E. Taylor et al., Culture and social support: Who seeks it and why? *J. Pers. Soc. Psychol.* **87**, 354–362 (2004).
50. J. G. Miller, H. Akiyama, S. Kapadia, Cultural variation in communal versus exchange norms: Implications for social support. *J. Pers. Soc. Psychol.* **113**, 81–94 (2017).
51. K. A. Dodge, Social cognition and children's aggressive behavior. *Child Dev.* **51**, 162–170 (1980).
52. D. Cohen, Culture, social organization, and patterns of violence. *J. Pers. Soc. Psychol.* **75**, 408–419 (1998).
53. T. Yamagishi, H. Hashimoto, J. Schug, Preferences versus strategies as explanations for culture-specific behavior. *Psychol. Sci.* **19**, 579–584 (2008).
54. C. N. Adichie, "The danger of a single story" (video recording, 2009). https://www.ted.com/talks/chimamanda_adichie_the_danger_of_a_single_story. Accessed 13 June 2019.