Cross-cultural invariances in the architecture of shame

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PSYCHOLOGICAL AND COGNITIVE SCIENCES

EVOLUTION

Human foragers are obligately group-living, and their high dependence on mutual aid is believed to have characterized our species' social evolution. It was therefore a central adaptive problem for our ancestors to avoid damaging the willingness of other group members to render them assistance. Cognitively, this requires a predictive map of the degree to which others would devalue the individual based on each of various possible acts. With such a map, an individual can avoid socially costly behaviors by anticipating how much audience devaluation a potential action (e.g., stealing) would cause and weigh this against the action's direct payoff (e.g., acquiring). The shame system manifests all of the functional properties required to solve this adaptive problem, with the aversive intensity of shame encoding the social cost. Previous data from three Western(ized) societies indicated that the shame evoked when the individual anticipates committing various acts closely tracks the magnitude of devaluation expressed by audiences in response to those acts. Here we report data supporting the broader claim that shame is a basic part of human biology. We conducted an experiment among 899 participants in 15 small-scale communities scattered around the world. Despite widely varying languages, cultures, and subsistence modes, shame in each community closely tracked the devaluation of local audiences (mean $r = +0.84$). The fact that the same pattern is encountered in such mutually remote communities suggests that shame's match to audience devaluation is a design feature crafted by selection and not a product of cultural contact or convergent cultural evolution.

emotion | cognition | culture | cooperation | evolutionary psychology

Evidence from behavioral ecology, hunter-gatherer archaeology, and contemporary forager societies suggests that our hominin ancestors evolved in an ecology characterized by high rates of mortality (1) and scarcity (2), high variance in food acquisition (2, 3), high incidence of disease and injury (4), and attacks by predators and conspecifics (5). To a zoologically unusual degree, humans in all foraging societies rely on the other members of their groups for the assistance necessary for survival and reproduction (6). Indeed, mutual aid has been such a universal and basic feature of forager subsistence that it is believed to be central to the evolutionary biology of our species (6–9). Among the strongest selection pressures shaping human sociality would have been the need to maintain sufficient incentives so that mates, cooperative partners, and fellow group members would be inclined to render assistance in times of hunger, incapacitation, and interpersonal conflict (4). Under these conditions, the extent to which other members of one's social group valued, helped, and refrained from exploiting an

individual would have sensitively impacted whether that individual reproduced successfully, struggled, or died early (10).

In humans, decisions whether to help others are computed by an array of specialized choice architectures that implement welfare trade-off decisions given the information available to the actor about an interaction partner (11, 12). When new information is detected that reveals an individual to be less valuable or less able to enforce her interests, less weight will be placed on her welfare by the people with whom she interacts; she will have been devalued. (By "devaluation" we mean devaluation of the target individual by one or more others; we do not mean devaluation of a relationship, although that may happen as a consequence.) As a result, such an individual will be helped less and harmed more, thereby incurring fitness costs. Preventing social devaluation—and minimizing its costs if it occurs—is a major adaptive problem in this social ecology.

Here we test predictions derived from the information threat theory of shame, according to which the emotion of shame is the expression of a neurocognitive system that evolved to defend against social devaluation (13, 14; see also refs. 15–19). A system

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Significance

This set of experiments shows that in 15 traditional small-scale societies there is an extraordinarily close correspondence between (*i*) the intensity of shame felt if one exhibited specific acts or traits and (*ii*) the magnitude of devaluation expressed in response to those acts or traits by local audiences, and even foreign audiences. Three important and widely acknowledged sources of cultural variation between communities—geographic proximity, linguistic similarity, and religious similarity—all failed to account for the strength of between-community correlations in the shame–devaluation link. This supplies a parallel line of evidence that shame is a universal system, part of our species' cooperative biology, rather than a product of cultural evolution.

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designed for this function should activate in response to cues indicating the prospect or actuality of devaluation, and orchestrate a suite of cognitive mechanisms that: (*i*) deters the individual from taking courses of action that would cost more in terms of social devaluation than the personal payoffs the action would otherwise yield; (*ii*) limits the extent to which others learn about and spread potentially damaging information; (*iii*) limits the degree and costs of any ensuing social devaluation; and, if devaluation occurs, (*iv*) mobilizes the individual to respond adaptively to the new social landscape.

Existing findings on shame are strongly consistent with this theory of its functional architecture. When facing the prospect or actuality of being devalued, people feel pain (20, 21), avoid taking acts that could cause or exacerbate devaluation (22, 23), and conceal damaging information (24, 25). When others discover reputation-damaging information, the individual withdraws (26), appeases (27), and produces a phylogenetically ancient stereotyped nonverbal display (16, 17, 28) that signals subordination: that is, that less weight on their welfare is acceptable (29). When the discrediting information becomes common knowledge (30), people behave in a more cooperative fashion (22, 31), a predicted response for a system designed to restore one's reputation as a good cooperative partner (32). [If cooperative overtures are not successful or cost-effective, the system can switch to aggression (33, 34) as its remaining negotiating tool; one reason why people are proud of aggressive formidability, and ashamed of weakness.] While some discrediting acts or traits can elicit devaluation among specific other individuals [e.g., an individual's refusal to help an opposite sex stranger may cause devaluation in the latter but not in the individual's mate or friends (35, 36)], others (e.g., incompetence, stinginess) can have negative affordances for, and thus have adverse reputational consequences among, broader audiences. A well-designed shame system should therefore be sensitive to partner-choice effects (37–39) and aim to minimize the total costs of devaluation arising from the actor's social world. Although data on shame and partner choice are scarce, there is some evidence consistent with those expectations (40–42). Moreover, recent cross-cultural evidence supports the hypothesis that the complementary emotion of pride is an adaptation that evolved to motivate the pursuit of courses of action where the prospective benefits of increased valuation exceed the costs, to advertise positive information about the self, and to profit from the benefits of increased valuation by others (43–45). By hypothesis, shame serves analogous functions with respect to negative information that threatens to diminish others' valuation of the individual.

Some aspects of the adaptive problem of being socially devalued are highly general and abstract while others are particular and context-dependent. The shame architecture is thus expected to incorporate both structural invariances and open parameters, which can account for differences in shame across situations, individuals, and populations (40). For example, individuals with many socially valued characteristics can both impose more costs on others before being devalued and more effectively limit the cost of devaluation when it occurs; as expected, those individuals are less prone to shame (40). There are individual differences in people's internal estimates of the cost of being socially devalued (46, 47), and a range of clinical conditions—such as psychopathy (48), social anxiety disorder (49), depression (50), and borderline personality disorder (51)—appear to be characterized, for a variety of causes, by perceptions of extreme costs (low and high) to being socially devalued. As expected, the intensity of shame covaries lawfully with those conditions (52–55).

For a member of a social group, the net benefit of taking an action (e.g., stealing) will be the sum of its direct payoff (e.g., acquiring something of value) minus the costs of the lowered welfare trade-offs others in the social world would subsequently direct toward the actor, because the act led them to devalue her. Hence, a central feature of the shame architecture should be that

the aversive intensity of anticipated shame generated when considering a potential disgraceful act tracks the magnitude of devaluation that local community members would express in response to that act. This calibration is necessary if the intensity of the internal signal (aversive shame) is used prospectively to decide whether the cost of devaluation outweighs the benefit of engaging in a given act. An internal shame signal that is too strong compared with the prevalent magnitude of audience devaluation will prevent the individual from taking actions that would provide a net benefit. A shame signal that is too weak will fail to deter actions that cost more in social devaluation than the benefits they provide. To avoid these errors, the shame system should estimate the degree to which a given act would cause local audiences to devalue the individual, and calibrate the intensity of its internal signal in proportion to those estimates (scaled by the probability of observation or informational leakage). This internal signal is expected to be equally well calibrated for conditions (e.g., sickness) and traits (e.g., lack of physical attractiveness), in order for the individual to know how much to motivate precaution, prevention, repair, or cultivation of compensating virtues. Importantly, because the internal shame signal is used by the systems that decide how to act, the intensity of felt shame should track the magnitude of audience devaluation even when there is no communication between audiences and the individual who is evaluating alternative courses of action. That is, the internal signal is useful in preventing devaluation by choosing certain acts, precautions, or countermeasures over others, so the system would be severely handicapped if it needed to observe devaluation to know its magnitude, instead of computing these magnitudes in advance.

These predictions were tested experimentally in three Western(ized) countries: the United States, India, and Israel (13). Subjects were given a set of scenarios that tapped situations likely to vary in how much devaluation the actions or traits they described might elicit. One group of subjects rated how negatively they would evaluate the person described in each scenario. A second, independent group of subjects rated how much shame they would feel if they were the person the situation describes. As predicted, the intensity of anticipated shame for a given act or trait closely tracked the corresponding magnitude of audience devaluation. This result replicated in each of the three countries. Moreover, shame in each country tracked the magnitude of devaluation in the other two countries, suggesting that a common, human universal grammar of social valuation informs shame and audience devaluation in tandem. Importantly, devaluation was tracked specifically by shame. Sadness and anxiety, two other negatively valenced emotions that coactivate with shame, failed to track devaluation.

Although this three-nation experiment is suggestive, it does not rule out cultural contact or convergent cultural evolution as an explanation for the cross-cultural similarities: the number of populations was small, they are mass societies, in close media contact, and WEIRD: Western(ized), industrialized, educated, rich, and democratic (56). Consequently, the goal here is twofold: (*i*) the claim being evaluated is that the shame system is a fundamental part of human biology, and so the signature of its operation should be detectable in all human societies, no matter how widely distributed and mutually unfamiliar they are; and (*ii*) by hypothesis, the shame system evolved in small-scale face-to-face social groups where people knew each other, and so it is important to assess the evidence for its operation in small coresidential social ecologies.

Is the tracking of audience devaluation by shame limited to industrial mass societies? Or does this tracking occur throughout the range of human societies, potentially reflecting the operation of a pan-human shame system? To answer this question, we conducted an experiment with 899 participants from 15 small-scale communities living in widely different physical ecologies and featuring very different languages, cultures, and modes of subsistence: (*i*) Cotopaxi, Ecuador; (*ii*) Morona-Santiago, Ecuador;

(*iii*) Coquimbo, Chile; (*iv*) Drâa-Tafilalet, Morocco; (*v*) Enugu, Nigeria; (*vi*) Chalkidiki, Greece; (*vii*) Ikland, Uganda; (*viii*) Le Morne, Mauritius; (*ix*) La Gaulette, Mauritius; (*x*) Dhading, Nepal; (*xi*) Tuva, Russia; (*xii*) Khövsgöl, Mongolia; (*xiii*) Shaanxi, China; (*xiv*) farming communities, Japan; and (*xv*) fishing communities, Japan. We created, based on ethnographic references (e.g., refs. 2 and 57–59), 12 scenarios in which someone's acts, traits, or circumstances might lead them to be viewed negatively. The scenarios were designed to elicit reactions in a variety of evolutionarily relevant domains, such as mating, generosity, social exchange, dominance contests, skills, and health. They were expressed at a level of abstraction that was not culturally particular (e.g., "He is lazy" rather than "He fishes only once a week"). The experimental design was adapted from Sznycer et al. (13). Participants were randomly assigned to either an audience condition or a shame condition. Participants in the audience condition were asked to provide their reactions to 12 scenarios involving a third-party: a same-sex individual other than themselves (e.g., "He steals from members of his community"; "He is ugly"). These participants were asked, for each scenario, to "indicate how you would view this person if this person was in those situations"; they indicated their reactions using scales ranging from 1 (I wouldn't view them negatively at all) to 4 (I'd view them very negatively). These ratings provide situation-specific measures of the degree to which members of a given population would negatively evaluate the individual described in the scenarios. Baseline evaluations of the target individual were not collected, as they were not deemed particularly meaningful or informative given the properties of the experimental paradigm. Thus, the audience condition measure does not index reductions in social valuation. However, for the purpose of using a simple descriptor, and because negativity of social evaluations should strongly correlate with reductions in social valuations, we will refer to this measure as a measure of devaluation.

Participants in the shame condition were asked to "indicate how much shame you would feel if you were in those situations" (that is, in each of the 12 scenarios; e.g., "You steal from members of your community"; "You are ugly"), with scales ranging from 1 (no shame at all) to 4 (a lot of shame). The prompts of the shame measure featured local translations of the term "shame"; these prompts did not contain any reference to how other people might view the participant. Thus, any conceptual connection between feelings of shame and others' negative evaluations of the target individual would be generated endogenously (as predicted by the theory), without facilitation by the prompts. Four-point Likert scales were employed because their psychometric properties tend to be adequate (60, 61) and, critically, many researchers believed that scales with finer divisions would be beyond the discrimination abilities of participants, many of whom are nonliterate (the one

exception was Drâa-Tafilalet, Morocco, where seven-point Likert scales were used). The stimuli in the audience condition and the shame condition were identical on a scenario-by-scenario basis, the only difference being the perspective from which the events are described.

Results

Within-Community Results. First, we report the devaluation and shame results for each community (Fig. 1, Table 1, and *SI Appendix, Supplementary Note 3* and Tables S1–S2o). There was widespread agreement in each community on how discrediting these situations are relative to one another: mean intraclass correlation (ICC) for the 15 communities: ICC $(2,n)$ = 0.83 (*SI Appendix,* Table S3). In other words, participants in each community agreed about the extent to which they would negatively view the individual described in these scenarios. Participants agreed also about the extent to which they would feel shame in each of these specific situations within a given community: mean ICC $(2,n)$ = 0.83 (*SI Appendix,* Table S3).

The main functional prediction is that shame for each act should closely track the devaluation of local audiences, because shame intensities are hypothesized to be the product of the cognitive map of the devaluation cost of each act in the minds of the members of the local community. To test this key prediction, we calculated, for each scenario, the mean shame ratings provided by participants in the shame condition and the mean devaluation ratings provided by participants in the audience condition. As predicted by the hypothesis that shame is calibrated to track the devaluation of local audiences, the mean shame ratings were highly correlated with the mean devaluation ratings within each of the 15 communities, with a mean r = 0.84 (SD = 0.08; minimum r = 0.69; maximum r = 0.94; n rs = 15); Ps = 10^{-5} to 0.013 (Fig. 2 and *SI Appendix,* Table S4, diagonal values). All of these 15 correlations remain significant after applying a false-discovery rate (FDR) correction (62) of P < 0.05. Recall that the shame ratings and the devaluation ratings originate from different participants. Consequently, these high correlations cannot be attributed to individual participants matching their shame and devaluation ratings.

Between-Community Results. The shame system evolved for making decisions in—and tracking the values of—one's local group (13; see also ref. 63), and so cultures could potentially differ from each other to an arbitrarily large degree in what is shameful and devalued. Indeed, some actions, traits, and situations elicit devaluation in some cultures but not others (13, 64). Furthermore, a rich literature in anthropology and cultural psychology exists on cultural differences in emotion, although this work seldom addresses cross-cultural similarities or questions of functional

Fig. 1. Map of the 15 field sites.

Table 1. Demographic information (samples A–O)

Community	Economy	Religion	Language	n	Age, y (SD)
Cotopaxi, Ecuador	Subsistence agriculture, pastoralism	Evangelism	Quechua	40	38 (18)
Morona-Santiago, Ecuador	Foraging, horticulture, hunting, fishing	Catholic–Indigenous syncretism	Shuar	41	37 (16)
Coquimbo, Chile	Artisanal fishing, wage labor	Christian and nonreligious	Spanish	44	45 (15)
Drâa-Tafilalet, Morocco	Subsistence agriculture	Sunni Islam	Amazigh	75	32 (13)
Enugu, Nigeria	Subsistence agriculture	Catholicism	Igbo	80	33 (8)
Chalkidiki, Greece	Fishing, farming, mining, service sector	Orthodox Christianity	Greek	60	47 (15)
Ikland, Uganda	Horticulture, hunting	Animism, Christianity	Icé-tód	96	31 (12)
Le Morne, Mauritius	Fishing, farming, wage labor	Catholicism	Mauritian Creole	80	35 (15)
La Gaulette, Mauritius	Fishing, farming, service sector	Hinduism	Marathi	80	37 (15)
Dhading, Nepal	Farming, trade	Hinduism, Buddhism	Nepali	42	31 (10)
Tuva, Russia	Seminomadic pastoralism	Shamanism, Buddhism	Tuvanian	53	38 (16)
Khövsgöl, Mongolia	Nomadic pastoralism, foraging, fishing	Shamanism, Buddhism	Mongolian	40	41 (13)
Shaanxi, China	Farming	Mostly nonreligious	Northern Mandarin	65	N/A
Farming communities, Japan*	Farming, wage labor	Buddhism, Shintoism	Japanese	60	65 (13)
Fishing communities, Japan†	Fishing, farming, wage labor	Buddhism, Shintoism	Japanese	43	68 (11)

Means (SDs in parentheses). Age was not registered in Shaanxi, China.
*Participants sampled from 12 communities in 3 prefectures where at least 25% of the residents are farmers.
†Participants sampled from nine communities in three prefectures where at least 25% of the residents are fishers. See Fig. 1 for a map of the communities.

design (65–67; but see refs. 16 and 68). However, if there is a human universal system of social valuation, then scenarios that tap this system may elicit agreement across cultures about what is shameful and devaluing, and shame in a given culture may track devaluation in another culture, despite a lack of contact. Are there situations that provoke devaluation and elicit shame across cultures? To explore the existence of between-community agreement in devaluation, in shame, and in the shame–devaluation link, we computed the extent to which the mean devaluation ratings and the mean shame ratings were correlated across communities.

There was a high degree of between-community agreement on the extent to which a given situation would elicit devaluation: mean $r = 0.72$ (SD = 0.16; minimum $r = 0.36$; maximum $r = 0.99$; n rs = 105); Ps = 10^{-8} to 0.26; 76 of these 105 correlations (72% of them) remain significant at FDR $P < 0.05$ (*SI Appendix*, Table S5). There was also high between-community agreement on the extent to which a given situation would elicit shame: mean $r = 0.69$ (SD = 0.17; minimum $r = 0.15$; maximum $r = 0.95$; n rs = 105); Ps = 10^{-5} to 0.64; 83 of these 105 correlations (79% of them) remain significant at FDR $P < 0.05$ (*SI Appendix*, Table S6). Furthermore, the shame elicited in each of the 15 communities was positively correlated with the devaluation from the other 14 communities: mean $r = 0.69$ (SD = 0.15; minimum $r = 0.21$; maximum $r = 0.95$; n rs = 210); Ps = 10^{-5} to 0.52; 166 of these 210 correlations (79% of them) remain significant at FDR $P < 0.05$ (*SI Appendix*, Table S4, off-diagonal values). In other words, the shame elicited by these scenarios in one community (e.g., Shuar forager-horticulturalists of the Ecuadorian Amazon) tracked how negatively people viewed these scenarios in each of the other 14 communities (e.g., pastoralists from Tuva, Amazigh farmers from Morocco, farmers from Nepal).

By hypothesis, the intensity of the shame signal reflects estimates of devaluation by local audiences. Accordingly, the correlations between shame and devaluation were descriptively higher for local than foreign audiences in 81% of cases (170 of 210; zs = 0.006 to 7.17; 95 of these 170 pairwise comparisons remain significant at FDR $P < 0.05$). In the remaining 19% of cases, shame-devaluation correlations were descriptively higher for foreign than local audiences (zs = −0.005 to −2.30), but only one of these 40 comparisons was significant at FDR $P < 0.05$. The proportion of variance in shame accounted for by the devaluation of local audiences (mean: 71%) was higher than that accounted for by the devaluation of foreign audiences (mean: 48%) (*SI Appendix, Supplementary Note 1* and Tables S7a and S7b).

There were, of course, some cross-society differences in the rank order of scenarios for devaluation, which can lower shame-devaluation correlations for foreign compared with local audiences. (For local audiences, 100% of shame-devaluation correlations were equal to or greater than $r = 0.69$, with mean $r = 0.84$.) Even so, the mean correlation between shame and foreign audiences was high ($r = 0.69$) and the SD indicates that 84% of values were greater than $r = 0.54$. These high correlations make sense for scenarios (like ours) designed to tap a universal system of social valuation. (Obviously, correlations with foreign audiences would be lower for culturally idiosyncratic scenarios, as shown in ref. 13.)
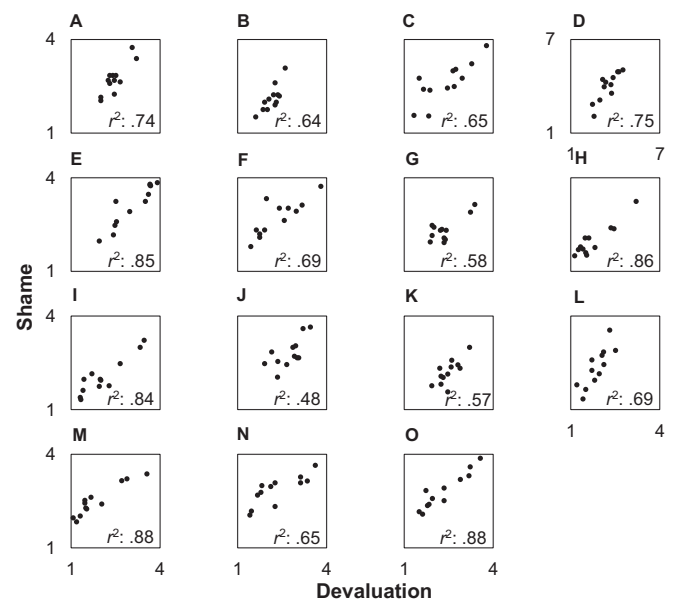
Fig. 2. Scatter plots: Shame as a function of devaluation (samples A–O). Each point represents the mean shame rating and mean devaluation rating of one scenario. Shame ratings and devaluation ratings were given by different participants. Number of scenarios = 12. Effect size: r^2 linear. (A) Cotopaxi, Ecuador; (B) Morona-Santiago, Ecuador; (C) Coquimbo, Chile; (D) Drâa-Tafilalet, Morocco; (E) Enugu, Nigeria; (F) Chalkidiki, Greece; (G) Ikland, Uganda; (H) Le Morne, Mauritius; (I) La Gaulette, Mauritius; (J) Dhading, Nepal; (K) Tuva, Russia; (L) Khövsgöl, Mongolia; (M) Shaanxi, China; (N) farming communities, Japan; (O) fishing communities, Japan.

Importantly, three major and widely acknowledged sources of cultural variation between communities—geographic proximity, linguistic similarity, and religious similarity (69)—all failed to account for the strength of between-community correlations in shame, devaluation, and the shame–devaluation link (*SI Appendix*, *Supplementary Note 2* and Table S8). This indicates that the 15 communities in our sample represent largely independent cultural contexts with respect to shame and devaluation. Therefore, it is unlikely that the strong correlations we observe result from cultural contact creating shared social norms.

Discussion

A cross-culturally replicable, close quantitative correspondence between anticipated shame and the devaluation of local audiences is what one expects of a computational system that is well-designed for countering the threat of being devalued. Features causing this close calibration assist the individual in balancing the competing demands of effectiveness and economy by steering between oversensitivity to devaluation (which would, for example, deter one from taking actions that produce benefits exceeding the probable costs of devaluation) and a weak shame signal that would insufficiently deter discrediting acts, leading one to be devalued to an injurious degree: reckless disregard of devaluation. These data show that the same evolutionarily functional relationship between devaluation and shame intensity found in three Western(ized) mass societies is also found in every one of the 15 additional small-scale populations tested. These populations were selected to be from widely different cultures, subsistence modes, institutions, and languages. This supports the hypothesis that this functional relationship originates in a human universal adaptation designed by natural selection, and is unlikely to have been produced by inheritance from a common cultural ancestor or by convergent cultural evolution arising from similarity in ecologies, subsistence modes, exposure to markets, religions, or ideologies (70, 71). Moreover, the shame system is hypothesized to have evolved in the mutual-aid context of ancestral small-scale forager communities, so it is instructive to see that the same relationships are obtained in small-scale societies as in mass societies.

Finally, the agreement across cultures, and not just within them, on shame, devaluation, and their interrelationship is noteworthy. According to some accounts, different cultures are in all their dimensions richly and arbitrarily different from each other (72), subserved by only a minimal common psychological architecture of cultural learning. If this were true, then what cultures devalue and what makes members of different cultures ashamed should be radically different. An alternative view is that the evolved architecture of human emotional and motivational systems is richly structured, so that humans in all cultures are similar, with differences arising when emotional, motivational, and cognitive systems have open parameters that are set by the local environment (73). So, although substantial cultural differences in various aspects of shame exist, it remains possible that these are adaptively patterned (13), rather than arbitrary. This view also suggests that there will

be strong commonalities across cultures in what is valued, devalued, and shameful. Indeed, this is just what we find: Local within-community correlations between shame and devaluation are very high, because the shame system is designed to track the devaluative dispositions of local audiences. However, there are surprisingly high correlations in devaluation and shame across far distant, never-encountered communities. This is just what one would expect if there is a cross-culturally universal psychology of human valuation. These data contribute to a growing body of findings indicating that theories of adaptive function are a powerful tool for identifying regularities in the structure and content of human emotion.

Methods

The study procedures were approved by the Institutional Review Boards at the University of California, Santa Barbara, University of Oregon, Rutgers University, East China Normal University, University of Nigeria, Nsukka, and Universidad San Francisco de Quito, and the Research Ethics Committee of the Institute of Psychology, Russian Academy of Sciences. All of the participants gave informed consent. The data and study materials are included in Dataset S1 and *SI Appendix*, respectively.

Participants. We collected data from 899 participants from Cotopaxi, Ecuador (sample A), Morona-Santiago, Ecuador (sample B), Coquimbo, Chile (sample C), Drâa-Tafilalet, Morocco (sample D), Enugu, Nigeria (sample E), Chalkidiki, Greece (sample F), Ikland, Uganda (sample G), Le Morne, Mauritius (sample H), La Gaulette, Mauritius (sample I), Dhading, Nepal (sample J), Tuva, Russia (sample K), Khövsgöl, Mongolia (sample L), Shaanxi, China (sample M), farming communities, Japan (sample N), and fishing communities, Japan (sample O). The numbers of participants are: 40 (sample A), 41 (sample B), 44 (sample C), 75 (sample D), 80 (sample E), 60 (sample F), 96 (sample G), 80 (sample H), 80 (sample I), 42 (sample J), 53 (sample K), 40 (sample L), 65 (sample M), 60 (sample N), and 43 (sample O). For demographic information, see Table 1; for descriptions of the communities, see *SI Appendix, Supplementary Note 3*.

Procedure. The 12 scenarios are shown in *SI Appendix*, Tables S2a–S2o. Participants were randomly assigned to either the audience condition or the shame condition. The language in the scenarios was gendered according to the participant's sex, except for the two Japan sites. In both Japan sites, data collection was through self-administered questionnaires sent by mail; here we used gender-neutral pronouns and instructed respondents in the audience condition to imagine the target individual was someone of their same sex and age. Sample size, order in which the scenarios were administered, method of stimuli administration, language of stimuli, method of stimuli translation, and geographic location are listed in *SI Appendix*, Table S1.

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Supplementary Information

Cross-cultural invariances in the architecture of shame

1

Table S1

Sample size, order in which the scenarios were administered, method of stimuli administration, language of stimuli, and geographic location (Samples A-O)

Sample	Community	N	Order of scenarios	Method of stimuli administration			Language of stimuli	Method of stimuli translation	Geographic Location	
				Verbal (by researcher)	Written (self-administered)	Not recorded			Latitude	Longitude
A	Cotopaxi, Ecuador	40	A	40	0	0	Spanish	K	−0.87	−78.83
B	Morona-Santiago, Ecuador	41	A	41	0	0	Spanish	J	−1.90	−78.00
C	Coquimbo, Chile	44	A	0	44	0	Spanish	K	−30.25	−71.50
D	Drâa-Tafilalet, Morocco	75	A	75	0	0	Moroccan Arabic	L	31.52	−5.53
E	Enugu, Nigeria	80	A	68	12	0	Igbo	J	6.70	7.30
F	Chalkidiki, Greece	60	A	3	57	0	Greek	L	40.24	23.53
G	Ikland, Uganda	96	A	96	0	0	Icé-tód	J	3.65	34.28
H	Le Morne, Mauritius	80	A	75	2	3	Mauritian Creole	M	−20.47	57.34
I	La Gaulette, Mauritius	80	A	25	54	1	Mauritian Creole	M	−20.42	57.35
J	Dhading, Nepal	42	A	4	38	0	Nepali	J	27.70	85.20
K	Tuva, Russia	53	A	0	53	0	Tuvanian	J	50.59	97.52
L	Khövsgöl, Mongolia	40	A	0	40	0	Mongolian	J	51.14	100.51
M	Shaanxi, China	65	B	0	65	0	Northern Mandarin	J	34.17	107.15
N	Farming Communities, Japan	60	A	0	60	0	Japanese	J	33.56	132.82
O	Fishing Communities, Japan	43	A	0	43	0	Japanese	J	35.57	135.46

A: The 12 scenarios were randomly presented in 1 of 2 orders; from first to last: {2, 11, 3, 4, 7, 12, 6, 1, 8, 5, 9, 10}, or {3, 8, 2, 9, 12, 5, 11, 6, 1, 7, 10, 4}.

B: The 12 scenarios were presented in a single, fixed order; from first to last: {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}.

J: Translated and back-translated by different individuals.

K: Translated by one individual, revised by at least one other individual (native speaker(s) of local language).

L: Translated by one individual (native speaker of local language).

M: Independent translations by different individuals, which were then contrasted and reconciled.

Table S2a

Ratings of devaluation and shame, by scenario: Cotopaxi, Ecuador (Sample A)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.20 (0.95)	3.40 (1.10)
5	You have sex with many women. / He has sex with many women.	3.05 (0.94)	3.75 (0.72)
9	You don't have many skills. / He doesn't have many skills.	2.65 (0.99)	2.65 (0.88)
6	You are sickly. / He is sickly.	2.50 (1.15)	2.85 (0.99)
3	You are lazy. / He is lazy.	2.45 (0.94)	2.25 (1.07)
8	You don't keep your promises. / He doesn't keep his promises.	2.45 (1.05)	2.70 (0.92)
10	You are a bad storyteller. / He is a bad storyteller.	2.40 (1.05)	2.85 (1.14)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.30 (0.98)	2.60 (0.99)
7	You are not intelligent. / He is not intelligent.	2.30 (1.03)	2.85 (1.04)
1	You are stingy. / He is stingy.	2.25 (0.91)	2.70 (0.98)
2	You are ugly. / He is ugly.	2.00 (0.97)	2.15 (1.04)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.00 (1.03)	2.05 (0.89)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 20; shame: 20. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2b

Ratings of devaluation and shame, by scenario: Morona-Santiago, Ecuador (Sample B)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	2.60 (1.14)	3.10 (1.26)
7	You are not intelligent. / He is not intelligent.	2.40 (1.05)	2.19 (1.03)
5	You have sex with many women. / He has sex with many women.	2.35 (1.31)	2.24 (1.22)
10	You are a bad storyteller. / He is a bad storyteller.	2.30 (1.13)	2.00 (1.05)
8	You don't keep your promises. / He doesn't keep his promises.	2.25 (1.12)	2.62 (0.97)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.25 (1.12)	1.90 (1.09)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.20 (1.01)	2.24 (1.00)
1	You are stingy. / He is stingy.	2.05 (1.15)	2.10 (1.14)
3	You are lazy. / He is lazy.	2.00 (0.94)	1.76 (1.09)
9	You don't have many skills. / He doesn't have many skills.	1.90 (0.79)	2.00 (1.14)
6	You are sickly. / He is sickly.	1.85 (0.75)	1.76 (0.94)
2	You are ugly. / He is ugly.	1.60 (0.75)	1.52 (0.81)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 19–20; shame: 21. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2c

Ratings of devaluation and shame, by scenario: Coquimbo, Chile (Sample C)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.77 (0.53)	3.81 (0.68)
8	You don't keep your promises. / He doesn't keep his promises.	3.27 (0.98)	3.23 (0.97)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.95 (1.05)	2.77 (1.07)
3	You are lazy. / He is lazy.	2.73 (1.03)	3.05 (1.07)
1	You are stingy. / He is stingy.	2.68 (0.95)	2.50 (1.30)
5	You have sex with many women. / He has sex with many women.	2.64 (1.26)	3.00 (1.23)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.45 (1.14)	2.45 (1.10)
9	You don't have many skills. / He doesn't have many skills.	1.86 (0.94)	2.38 (1.12)
6	You are sickly. / He is sickly.	1.82 (1.10)	1.55 (0.80)
10	You are a bad storyteller. / He is a bad storyteller.	1.64 (0.66)	2.41 (1.14)
7	You are not intelligent. / He is not intelligent.	1.50 (0.80)	2.77 (1.23)
2	You are ugly. / He is ugly.	1.32 (0.72)	1.57 (0.93)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 22; shame: 21–22. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2d

Ratings of devaluation and shame, by scenario: Drâa-Tafilalet, Morocco (Sample D)

#	Scenario	Devaluation	Shame
8	You don't keep your promises. / He doesn't keep his promises.	4.50 (2.41)	5.05 (1.99)
12	You steal from members of your community. / He steals from members of his community.	4.24 (2.80)	4.95 (2.38)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	4.16 (2.25)	4.95 (2.22)
5	You have sex with many women. / He has sex with many women.	3.84 (2.73)	4.57 (2.30)
1	You are stingy. / He is stingy.	3.74 (2.41)	3.57 (1.86)
3	You are lazy. / He is lazy.	3.68 (1.85)	4.11 (2.12)
9	You don't have many skills. / He doesn't have many skills.	3.34 (1.58)	4.27 (2.06)
7	You are not intelligent. / He is not intelligent.	3.24 (2.19)	3.97 (2.07)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	3.14 (2.21)	4.46 (2.08)
10	You are a bad storyteller. / He is a bad storyteller.	2.95 (2.20)	3.14 (1.84)
6	You are sickly. / He is sickly.	2.55 (1.94)	2.08 (1.50)
2	You are ugly. / He is ugly.	2.45 (1.97)	2.86 (1.69)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 38; shame: 36–37. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–7.

Table S2e

Ratings of devaluation and shame, by scenario: Enugu, Nigeria (Sample E)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.90 (0.30)	3.85 (0.43)
1	You are stingy. / He is stingy.	3.68 (0.47)	3.75 (0.44)
5	You have sex with many women. / He has sex with many women.	3.65 (0.48)	3.80 (0.41)
8	You don't keep your promises. / He doesn't keep his promises.	3.65 (0.53)	3.78 (0.42)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	3.60 (0.59)	3.48 (0.78)
3	You are lazy. / He is lazy.	3.50 (0.64)	3.25 (0.95)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.98 (0.97)	2.93 (0.83)
9	You don't have many skills. / He doesn't have many skills.	2.53 (0.78)	2.60 (0.59)
7	You are not intelligent. / He is not intelligent.	2.50 (0.78)	3.25 (0.81)
6	You are sickly. / He is sickly.	2.48 (0.91)	2.48 (0.91)
10	You are a bad storyteller. / He is a bad storyteller.	2.43 (0.81)	2.18 (0.78)
2	You are ugly. / He is ugly.	1.95 (1.01)	1.98 (0.97)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 40; shame: 40. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2f

Ratings of devaluation and shame, by scenario: Chalkidiki, Greece (Sample F)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.80 (0.61)	3.73 (0.69)
8	You don't keep your promises. / He doesn't keep his promises.	3.17 (0.99)	3.13 (1.01)
1	You are stingy. / He is stingy.	2.97 (0.96)	2.93 (0.94)
3	You are lazy. / He is lazy.	2.70 (0.99)	3.03 (1.16)
5	You have sex with many women. / He has sex with many women.	2.57 (1.28)	2.63 (1.43)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.40 (0.93)	3.03 (1.07)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.97 (0.89)	3.33 (0.8)
9	You don't have many skills. / He doesn't have many skills.	1.90 (0.88)	2.33 (0.92)
6	You are sickly. / He is sickly.	1.73 (1.14)	2.10 (1.12)
10	You are a bad storyteller. / He is a bad storyteller.	1.73 (0.87)	2.20 (0.81)
7	You are not intelligent. / He is not intelligent.	1.62 (0.62)	2.33 (1.06)
2	You are ugly. / He is ugly.	1.43 (0.57)	1.80 (0.96)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 30; shame: 30. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2g

Ratings of devaluation and shame, by scenario: Ikland, Uganda (Sample G)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.38 (1.07)	3.15 (1.17)
5	You have sex with many women. / He has sex with many women.	3.23 (1.13)	2.90 (1.19)
7	You are not intelligent. / He is not intelligent.	2.41 (1.22)	2.33 (1.05)
3	You are lazy. / He is lazy.	2.38 (1.07)	2.03 (0.97)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.34 (1.18)	1.93 (0.97)
6	You are sickly. / He is sickly.	2.34 (1.20)	2.08 (1.12)
10	You are a bad storyteller. / He is a bad storyteller.	2.27 (1.18)	2.35 (1.08)
9	You don't have many skills. / He doesn't have many skills.	2.21 (1.16)	2.33 (1.05)
8	You don't keep your promises. / He doesn't keep his promises.	2.00 (1.06)	2.43 (1.17)
1	You are stingy. / He is stingy.	1.93 (1.16)	2.48 (1.01)
2	You are ugly. / He is ugly.	1.93 (0.95)	2.15 (0.98)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.88 (1.18)	1.95 (1.08)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 56; shame: 40. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

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Table S2h

Ratings of devaluation and shame, by scenario: Le Morne, Mauritius (Sample H)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.20 (1.11)	3.25 (1.13)
8	You don't keep your promises. / He doesn't keep his promises.	2.45 (1.06)	2.38 (0.98)
5	You have sex with many women. / He has sex with many women.	2.35 (1.17)	2.40 (1.17)
3	You are lazy. / He is lazy.	1.81 (1.02)	1.78 (0.95)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.60 (0.90)	2.08 (1.16)
1	You are stingy. / He is stingy.	1.53 (0.91)	1.53 (0.91)
9	You don't have many skills. / He doesn't have many skills.	1.50 (0.88)	1.60 (0.87)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	1.48 (0.82)	2.08 (1.12)
2	You are ugly. / He is ugly.	1.40 (0.78)	1.73 (0.96)
7	You are not intelligent. / He is not intelligent.	1.33 (0.66)	1.79 (1.00)
10	You are a bad storyteller. / He is a bad storyteller.	1.25 (0.54)	1.70 (0.91)
6	You are sickly. / He is sickly.	1.13 (0.46)	1.50 (0.82)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 40; shame: 39–40. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2i

Ratings of devaluation and shame, by scenario: La Gaulette, Mauritius (Sample I)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.46 (0.79)	3.23 (1.00)
5	You have sex with many women. / He has sex with many women.	3.33 (0.97)	3.00 (1.30)
8	You don't keep your promises. / He doesn't keep his promises.	2.65 (0.86)	2.48 (1.06)
3	You are lazy. / He is lazy.	2.28 (1.01)	1.78 (1.03)
10	You are a bad storyteller. / He is a bad storyteller.	2.00 (1.09)	1.95 (0.97)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	1.98 (1.14)	1.98 (1.03)
1	You are stingy. / He is stingy.	1.95 (1.01)	1.75 (1.06)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.70 (0.94)	2.15 (1.10)
7	You are not intelligent. / He is not intelligent.	1.43 (0.81)	1.98 (1.03)
9	You don't have many skills. / He doesn't have many skills.	1.40 (0.81)	1.63 (0.84)
2	You are ugly. / He is ugly.	1.33 (0.66)	1.33 (0.76)
6	You are sickly. / He is sickly.	1.31 (0.77)	1.40 (0.84)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 39–40; shame: 39–40. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2j

Ratings of devaluation and shame, by scenario: Dhading, Nepal (Sample J)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.45 (1.00)	3.65 (0.81)
5	You have sex with many women. / He has sex with many women.	3.20 (1.20)	3.60 (0.82)
7	You are not intelligent. / He is not intelligent.	3.05 (1.07)	2.67 (1.02)
10	You are a bad storyteller. / He is a bad storyteller.	3.00 (1.14)	2.67 (1.32)
8	You don't keep your promises. / He doesn't keep his promises.	2.95 (1.00)	3.05 (0.97)
3	You are lazy. / He is lazy.	2.90 (1.04)	2.71 (1.19)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.86 (1.06)	3.00 (1.18)
1	You are stingy. / He is stingy.	2.65 (0.99)	2.45 (1.10)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.35 (1.14)	2.55 (1.36)
2	You are ugly. / He is ugly.	2.33 (1.24)	2.05 (1.07)
9	You don't have many skills. / He doesn't have many skills.	2.14 (0.85)	2.86 (1.06)
6	You are sickly. / He is sickly.	1.90 (0.91)	2.48 (1.03)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 20–21; shame: 20–21. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2k

Ratings of devaluation and shame, by scenario: Tuva, Russia (Sample K)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.20 (1.22)	3.00 (1.20)
3	You are lazy. / He is lazy.	2.88 (1.17)	2.33 (1.14)
8	You don't keep your promises. / He doesn't keep his promises.	2.81 (1.17)	2.44 (1.22)
5	You have sex with many women. / He has sex with many women.	2.60 (1.26)	2.59 (1.28)
1	You are stingy. / He is stingy.	2.58 (1.24)	2.37 (1.28)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	2.46 (1.07)	1.58 (0.90)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	2.46 (1.21)	2.15 (0.95)
7	You are not intelligent. / He is not intelligent.	2.31 (1.23)	2.04 (1.11)
2	You are ugly. / He is ugly.	2.23 (1.18)	1.81 (0.96)
9	You don't have many skills. / He doesn't have many skills.	2.23 (1.18)	2.07 (1.27)
10	You are a bad storyteller. / He is a bad storyteller.	2.19 (1.27)	2.33 (1.14)
6	You are sickly. / He is sickly.	1.92 (0.95)	1.77 (1.03)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 25–26; shame: 26–27. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2l

Ratings of devaluation and shame, by scenario: Khövsgöl, Mongolia (Sample L)

#	Scenario	Devaluation	Shame
5	You have sex with many women. / He has sex with many women.	2.50 (1.24)	2.90 (1.37)
12	You steal from members of your community. / He steals from members of his community.	2.30 (1.26)	3.55 (1.10)
1	You are stingy. / He is stingy.	2.11 (0.81)	2.45 (1.28)
8	You don't keep your promises. / He doesn't keep his promises.	2.10 (0.97)	2.85 (0.99)
3	You are lazy. / He is lazy.	2.05 (1.00)	2.75 (1.12)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.95 (1.05)	2.15 (0.93)
10	You are a bad storyteller. / He is a bad storyteller.	1.80 (1.06)	1.95 (1.15)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	1.70 (0.8)	2.26 (0.93)
7	You are not intelligent. / He is not intelligent.	1.70 (0.80)	2.60 (1.05)
6	You are sickly. / He is sickly.	1.50 (0.61)	1.65 (1.04)
2	You are ugly. / He is ugly.	1.40 (0.68)	1.35 (0.59)
9	You don't have many skills. / He doesn't have many skills.	1.20 (0.52)	1.80 (0.95)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 19–20; shame: 19–20. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2m

Ratings of devaluation and shame, by scenario: Shaanxi, China (Sample M)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / He steals from members of his community.	3.55 (0.83)	3.38 (0.98)
8	You don't keep your promises. / He doesn't keep his promises.	2.88 (1.11)	3.22 (1.07)
5	You have sex with many women. / He has sex with many women.	2.70 (1.19)	3.16 (1.17)
3	You are lazy. / He is lazy.	2.03 (0.81)	2.41 (1.01)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard he tries, he can't produce enough to keep himself well-fed.	1.67 (0.96)	2.63 (1.18)
1	You are stingy. / He is stingy.	1.52 (0.83)	2.25 (1.05)
10	You are a bad storyteller. / He is a bad storyteller.	1.48 (0.80)	2.28 (0.99)
11	You can't defend yourself very well, so people push you around. / He can't defend himself very well, so people push him around.	1.45 (0.90)	2.44 (1.19)
9	You don't have many skills. / He doesn't have many skills.	1.45 (0.67)	2.53 (0.92)
7	You are not intelligent. / He is not intelligent.	1.30 (0.68)	2.03 (0.82)
2	You are ugly. / He is ugly.	1.18 (0.46)	1.84 (0.99)
6	You are sickly. / He is sickly.	1.06 (0.35)	1.97 (0.97)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 33; shame: 32. The male versions of the shame and devaluation scenarios are presented before and after the slash, respectively. The female versions of scenario # 5 read "men" instead of "women". The female versions of the devaluation scenarios featured a female target, so the personal pronouns were female pronouns. Otherwise, the male and female scenarios were identical. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2n

Ratings of devaluation and shame, by scenario: Farming Communities, Japan (Sample N)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / The person steals from members of his/her community.	3.62 (0.80)	3.66 (0.83)
5	You have sex with many women. / The person has sex with many members of the opposite sex.	3.35 (0.80)	3.15 (0.97)
3	You are lazy. / The person is lazy.	3.11 (0.89)	3.09 (1.09)
8	You don't keep your promises. / The person doesn't keep his/her promises.	3.11 (0.93)	3.27 (1.13)
11	You can't defend yourself very well, so people push you around. / The person can't defend himself/herself very well, so people push him/her around.	2.26 (1.02)	3.09 (1.07)
1	You are stingy. / The person is stingy.	2.26 (0.90)	2.33 (1.11)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard the person tries, he/she can't produce enough to keep himself/herself well-fed.	2.11 (1.19)	2.97 (1.02)
2	You are ugly. / The person is ugly.	1.81 (0.90)	3.00 (0.97)
7	You are not intelligent. / The person is not intelligent.	1.78 (0.89)	2.78 (1.01)
10	You are a bad storyteller. / The person is a bad storyteller.	1.67 (0.83)	2.70 (1.02)
9	You don't have many skills. / The person doesn't have many skills.	1.46 (0.90)	2.18 (0.92)
6	You are sickly. / The person is sickly.	1.41 (0.80)	2.06 (0.86)

Note. Displayed are means, with standard deviations in parentheses. Ns: devaluation: 26–27; shame: 32–33. The shame and devaluation scenarios are presented before and after the slash, respectively. As data collection was through self-administered questionnaires sent by mail, we used gender-neutral pronouns and instructed respondents to imagine someone of their same sex and age. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S2o

Ratings of devaluation and shame, by scenario: Fishing Communities, Japan (Sample O)

#	Scenario	Devaluation	Shame
12	You steal from members of your community. / The person steals from members of his/her community.	3.56 (0.78)	3.88 (0.44)
8	You don't keep your promises. / The person doesn't keep his/her promises.	3.22 (0.94)	3.60 (0.58)
3	You are lazy. / The person is lazy.	3.18 (1.01)	3.32 (0.99)
5	You have sex with many women. / The person has sex with many members of the opposite sex.	2.89 (1.18)	3.20 (0.87)
11	You can't defend yourself very well, so people push you around. / The person can't defend himself/herself very well, so people push him/her around.	2.33 (1.14)	2.92 (1.00)
1	You are stingy. / The person is stingy.	2.33 (1.14)	2.52 (1.00)
2	You are ugly. / The person is ugly.	1.94 (0.83)	2.58 (1.02)
7	You are not intelligent. / The person is not intelligent.	1.83 (0.86)	2.40 (1.04)
10	You are a bad storyteller. / The person is a bad storyteller.	1.78 (0.94)	2.36 (0.95)
4	No matter how hard you try, you can't produce enough to keep yourself well-fed. / No matter how hard the person tries, he/she can't produce enough to keep himself/herself well-fed.	1.72 (0.83)	2.84 (1.25)
9	You don't have many skills. / The person doesn't have many skills.	1.61 (0.92)	2.08 (0.88)
6	You are sickly. / The person is sickly.	1.50 (0.86)	2.16 (1.07)

Note. Displayed are means, with standard deviations in parentheses. *N*s: devaluation: 17–18; shame: 24–25. The shame and devaluation scenarios are presented before and after the slash, respectively. As data collection was through self-administered questionnaires sent by mail, we used gender-neutral pronouns and instructed respondents to imagine someone of their same sex and age. Scenarios are displayed from highest to lowest mean devaluation scores. Scale range: 1–4.

Table S3

Within-community agreement on devaluation and shame, by community (Samples A–O)

Sample	Community	Within-community agreement on devaluation	Within-community agreement on shame
A	Cotopaxi, Ecuador	ICC(2,20) = .83	ICC(2,20) = .86
B	Morona-Santiago, Ecuador	ICC(2,20) = .44	ICC(2,21) = .74
C	Coquimbo, Chile	ICC(2,22) = .93	ICC(2,22) = .80
D	Drâa-Tafilalet, Morocco	ICC(2,38) = .79	ICC(2,37) = .84
E	Enugu, Nigeria	ICC(2,40) = .98	ICC(2,40) = .97
F	Chalkidiki, Greece	ICC(2,30) = .95	ICC(2,30) = .92
G	Ikland, Uganda	ICC(2,56) = .89	ICC(2,40) = .79
H	Le Morne, Mauritius	ICC(2,40) = .96	ICC(2,40) = .94
I	La Gaulette, Mauritius	ICC(2,40) = .95	ICC(2,40) = .95
J	Dhading, Nepal	ICC(2,20) = .82	ICC(2,21) = .56
K	Tuva, Russia	ICC(2,26) = .18	ICC(2,27) = .35
L	Khövsgöl, Mongolia	ICC(2,19) = .81	ICC(2,20) = .91
M	Shaanxi, China	ICC(2,33) = .97	ICC(2,32) = .92
N	Farming Communities, Japan	ICC(2,27) = .95	ICC(2,33) = .92
O	Fishing Communities, Japan	ICC(2,18) = .95	ICC(2,25) = .93

Table S4

Correlations between shame and devaluation within and between communities (Samples A–O)

	Devaluation														
Shame	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
(A) Cotopaxi, Ecuador	.86	.58	.24	.21	.29	.34	.74	.55	.64	.55	.24	.59	.58	.41	.29
(B) Morona-Santiago, Ecuador	.66	.80	.72	.68	.61	.75	.53	.84	.72	.71	.70	.61	.84	.64	.60
(C) Coquimbo, Chile	.57	.82	.81	.88	.80	.82	.59	.82	.82	.80	.89	.72	.85	.83	.83
(D) Drâa-Tafilalet, Morocco	.31	.64	.73	.87	.71	.63	.33	.68	.62	.55	.73	.50	.68	.67	.63
(E) Enugu, Nigeria	.41	.65	.83	.89	.92	.83	.45	.69	.72	.56	.76	.77	.69	.78	.74
(F) Chalkidiki, Greece	.36	.62	.92	.78	.85	.83	.30	.71	.65	.56	.84	.67	.71	.73	.68
(G) Ikland, Uganda	.83	.57	.44	.44	.44	.61	.76	.77	.77	.64	.54	.60	.76	.60	.57
(H) Le Morne, Mauritius	.64	.71	.76	.65	.62	.72	.69	.93	.84	.69	.78	.64	.91	.80	.75
(I) La Gaulette, Mauritius	.75	.84	.72	.70	.69	.71	.75	.88	.92	.82	.73	.81	.91	.81	.71
(J) Dhading, Nepal	.88	.74	.65	.60	.61	.63	.76	.82	.84	.69	.63	.69	.86	.72	.60
(K) Tuva, Russia	.68	.63	.68	.72	.70	.82	.71	.79	.87	.67	.76	.68	.82	.77	.82
(L) Khövsgöl, Mongolia	.63	.80	.81	.82	.83	.85	.66	.84	.85	.82	.89	.83	.86	.88	.85
(M) Shaanxi, China	.73	.66	.82	.79	.74	.79	.58	.91	.88	.63	.76	.70	.94	.81	.75
(N) Farming Communities, Japan	.29	.56	.62	.58	.52	.56	.30	.76	.73	.73	.78	.62	.75	.80	.77
(O) Fishing Communities, Japan	.45	.54	.86	.75	.77	.82	.49	.90	.85	.68	.92	.76	.90	.95	.94

Coefficients are Pearson's *r*s. All the correlations, except the underlined ones, meet the false discovery rate (FDR) threshold of *P* < .05. N = number of scenarios = 12. Grey cells: within-community correlations. Shame ratings and devaluation ratings were given by different participants.

Table S5

Devaluation correlations between communities (Samples A–O)

Devaluation							Devaluation							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
(A) Cotopaxi, Ecuador		.51	.46	.36	.42	.54	.84	.74	.73	.51	.48	.53	.75	.58	.50
(B) Morona-Santiago, Ecuador			.56	.63	.58	.53	.61	.58	.68	.80	.55	.66	.64	.54	.48
(C) Coquimbo, Chile				.89	.94	.95	.43	.82	.79	.48	.87	.71	.82	.84	.84
(D) Drâa-Tafilalet, Morocco					.91	.86	.37	.73	.74	.51	.80	.64	.75	.77	.80
(E) Enugu, Nigeria						.91	.43	.71	.79	.51	.82	.80	.73	.84	.81
(F) Chalkidiki, Greece							.46	.85	.82	.54	.90	.74	.85	.86	.89
(G) Ikland, Uganda								.66	.75	.54	.47	.53	.66	.60	.54
(H) Le Morne, Mauritius									.90	.68	.88	.71	.99	.90	.88
(I) La Gaulette, Mauritius										.76	.81	.87	.94	.93	.87
(J) Dhading, Nepal											.72	.80	.74	.72	.65
(K) Tuva, Russia												.75	.87	.92	.93
(L) Khövsgöl, Mongolia													.77	.86	.76
(M) Shaanxi, China														.91	.89
(N) Farming Communities, Japan															.97
(O) Fishing Communities, Japan															

Coefficients are Pearson's *r*s. All the correlations, except the underlined ones, meet the false discovery rate (FDR) threshold of $P < .05$. N on which the correlations are based = number of scenarios = 12.

Table S6

Shame correlations between communities (Samples A–O)

Shame								Shame							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
(A) Cotopaxi, Ecuador		.62	.40	.15	.39	.17	.84	.51	.73	.78	.55	.53	.58	.16	.26
(B) Morona-Santiago, Ecuador			.80	.65	.67	.73	.74	.84	.86	.81	.67	.81	.83	.56	.67
(C) Coquimbo, Chile				.84	.81	.80	.59	.78	.84	.77	.81	.95	.82	.72	.81
(D) Drâa-Tafilalet, Morocco					.73	.76	.32	.69	.71	.66	.50	.71	.79	.67	.70
(E) Enugu, Nigeria						.76	.51	.60	.71	.62	.66	.88	.70	.48	.69
(F) Chalkidiki, Greece							.30	.71	.67	.62	.50	.78	.73	.60	.77
(G) Ikland, Uganda								.68	.78	.73	.83	.67	.67	.39	.48
(H) Le Morne, Mauritius									.91	.81	.68	.78	.85	.85	.86
(I) La Gaulette, Mauritius										.93	.75	.86	.91	.73	.78
(J) Dhading, Nepal											.65	.78	.91	.54	.65
(K) Tuva, Russia												.81	.71	.53	.67
(L) Khövsgöl, Mongolia													.78	.67	.82
(M) Shaanxi, China														.64	.80
(N) Farming Communities, Japan															.90
(O) Fishing Communities, Japan															

Coefficients are Pearson's *r*s. All the correlations, except the underlined ones, meet the false discovery rate (FDR) threshold of *P* < .05. N on which the correlations are based = number of scenarios = 12.

Supplementary Note 1.

One reviewer inquired about the variance of the shame and devaluation ratings within vs. between communities. We note that our main analyses are based on correlations because correlations are precisely the metric required to establish whether individuals agree both within and between communities in their relative shame and devaluation ratings and the relationship between them. We also note that absolute values of shame and devaluation ratings are not directly comparable across our samples. This is because response biases are likely to exist in our samples, and, moreover, there are likely—but unknown—cultural differences in the type and degree of response biases across our samples. By contrast, our correlational analyses control for, and therefore are not susceptible to, probable response biases. Nevertheless, in order to address the question raised by the reviewer, we conducted a regression on each of the shame and devaluation response items to quantify the percentage of variation attributable to community. We regressed scenario-specific devaluation or shame ratings on participant sex and method of administration, with or without community as an additional predictor. Participant age was not included as predictor because age data are not available for Shaanxi, China. We find that community accounts for only 7–23% of the variation in shame ratings (mean = 15.5%) and 12–27% of the variation in devaluation ratings (mean = 17.4%) (See Tables S7a and S7b). This indicates that, although individuals generally agree in their judgments across our samples, most of the variation that does occur occurs within communities rather than between communities, confirming that judgments are indeed not greatly different across communities. We note, however, that the percentage of variation in shame and devaluation ratings attributed to community in our regressions includes likely cross-cultural response biases in type of response generally, meaning that these percentages probably overestimate actual differences in shame and devaluation between communities.

Tables S7a and S7b

Regression analyses: Scenario-specific devaluation or shame ratings regressed on participant sex and method of administration, with or without community as additional predictor.

(a) Devaluation ratings

Y	Sum of Squares	F	p-value	R^2 wo Site [a]	R^2 w Site [b]	R^2 wSite - R^2 woSite
scenario # 1	13.65	11.37	3E-22	0.01	0.28	0.27
scenario # 2	4.02	4.32	3E-07	0.01	0.13	0.12
scenario # 3	8.78	7.70	1E-14	0.01	0.21	0.20
scenario # 4	7.03	5.47	1E-09	0.002	0.15	0.15
scenario # 5	7.03	4.59	9E-08	0.01	0.14	0.13
scenario # 6	6.60	6.58	4E-12	0.04	0.21	0.17
scenario # 7	8.45	7.88	6E-15	0.03	0.22	0.20
scenario # 8	8.12	6.53	5E-12	0.03	0.20	0.17
scenario # 9	5.58	5.68	4E-10	0.04	0.19	0.15
scenario # 10	6.47	5.42	1E-09	0.01	0.16	0.15
scenario # 11	12.97	10.06	1E-19	0.003	0.25	0.25
scenario # 12	5.84	4.99	1E-08	0.01	0.15	0.14

[a] R^2 when scenario-specific devaluation ratings are regressed on participant sex and method of administration. Note: participant age is not included as predictor because age data are not available for Shaanxi, China. [b] R^2 when scenario-specific devaluation ratings are regressed on participant sex, method of administration, and community. Note: Devaluation ratings were standardized with a range of 0–1, separately for each scenario, because scale ranges differed across sites.

(b) Shame ratings

Y	Sum of Squares	F	p-value	R^2 wo Site [a]	R^2 w Site [b]	R^2 wSite - R^2 woSite
scenario # 1	11.76	9.28	6E-18	0.002	0.24	0.23
scenario # 2	6.51	6.18	3E-11	0.003	0.17	0.17
scenario # 3	10.56	7.94	5E-15	0.03	0.23	0.20
scenario # 4	8.37	6.25	2E-11	0.01	0.18	0.17
scenario # 5	7.00	4.97	1E-08	0.07	0.20	0.13
scenario # 6	7.22	5.01	1E-08	0.003	0.15	0.14
scenario # 7	6.46	5.17	5E-09	0.01	0.16	0.14
scenario # 8	7.70	6.43	9E-12	0.01	0.18	0.17
scenario # 9	5.61	4.94	2E-08	0.01	0.15	0.14
scenario # 10	3.83	2.36	4E-03	0.01	0.08	0.07
scenario # 11	11.25	8.38	5E-16	0.005	0.22	0.22
scenario # 12	2.70	2.28	5E-03	0.01	0.08	0.07

[a] R^2 when scenario-specific shame ratings are regressed on participant sex and method of administration. Note: participant age is not included as predictor because age data are not available for Shaanxi, China. [b] R^2 when scenario-specific shame ratings are regressed on participant sex, method of administration, and community. Note: Shame ratings were standardized with a range of 0–1, separately for each scenario, because scale ranges differed across sites.

Supplementary Note 2.

Predicting between-community correlations in shame, devaluation, and the shame-devaluation link

The strength of between-community correlations in shame and devaluation ratings vary across community pairs (Table S5 [devaluation correlations]; Table S6 [shame correlations]; Table S4, off-diagonal values [shame-devaluation correlations]), and indicate the degree of similarity in relative shame and devaluation scores between communities. One question that arises when evaluating hypotheses about species-wide cognitive adaptations is the extent to which similarities across populations reflect, instead, shared cultural norms due to, for example, geographic diffusion, or shared religious or linguistic ancestry. Our sample of 15 communities was chosen to represent a diverse set of cultures. In order to quantify the degree to which similarities in our sample reflect cultural proximity, we examined the association between inter-community correlations in shame, devaluation, and shame-devaluation on the one hand, and three metrics of cultural proximity—geographic distance, language family affiliation, and religious affiliation—on the other hand. Whilst these metrics do not completely capture the diverse sources of cultural variation around the globe, they nevertheless represent three important and widely acknowledged sources of variation—cultural diffusion of ideas between neighbouring groups, ancient cultural affinities reflected in deep language ancestry, and the impact of major world religions (Inglehart & Welzel, 2010).

To assess whether cultural diffusion or other geographically-patterned factors impact the strength of shame/devaluation correlations between communities, we constructed a geographic distance matrix representing great circle distances between all community pairs based on community longitude and latitude (Table S1), calculated using the spDists function in the 'sp' (Pebesma, Bivand, Pebesma, RColorBrewer, & Collate, 2012) package in R (R Core Team, 2014).

Likewise, to investigate the impact of deep cultural ancestry on shame/devaluation correlations between communities, we constructed a distance matrix representing shared language family affiliation for the predominant language spoken by the community of interest (Hammarström, Forkel, Haspelmath, & Bank, 2015). Communities with different languages from different language families were assigned a distance of 2, those with different languages from the same language family were assigned a distance of 1, and those speaking the same language were assigned a value of 0.

Finally, to investigate the impact of major world religions on shame/devaluation correlations between communities, we constructed a distance matrix representing shared religious affiliations between communities. Communities with different world religions (i.e. Christianity, Islam, Hinduism, Buddhism) were assigned a distance of 2, communities with religion variants from the same world religion but different denominations or with influence from a different religion or denomination were assigned a distance of 1, and communities with the same religious affiliation were assigned a value of 0.

We quantified the association between pairwise community shame/devaluation correlations on the one hand, and geographic distance, language family affiliation, and religious affiliation on the other hand, by calculating correlations and partial correlations between the matrices using Mantel and partial Mantel tests (Mantel, 1967; Smouse, Long, & Sokal, 1986) in the 'vegan' (Oksanen, Kindt, Legendre, O'Hara, Stevens, Oksanen, & Suggests, 2007) package in R (R Core Team, 2014). Statistical significance was assessed using 1,000 random permutations.

None of the cultural proximity measures predicted the strength of inter-community correlations in shame, devaluation, or shame-devaluation, either on their own, or after controlling for the other cultural distance metrics (Table S8).

Table S8

Results of Mantel and partial Mantel tests of association between shame/devaluation correlations and geographic distance, language family affiliation, and religious affiliation.

Inter-community correlation	Predictor	Control	Statistic	p-value
Shame	Geography	−	−0.02	0.57
	Language	−	−0.23	0.99
	Religion	−	0.06	0.30
	Geography	Language	0.01	0.50
	Geography	Religion	−0.04	0.60
	Language	Geography	−0.23	0.98
	Language	Religion	−0.25	0.99
	Religion	Geography	0.07	0.30
	Religion	Language	0.07	0.30
Devaluation	Geography	−	−0.16	0.88
	Language	−	−0.16	0.86
	Religion	−	0.04	0.40
	Geography	Language	−0.14	0.87
	Geography	Religion	−0.18	0.90
	Language	Geography	−0.14	0.85
	Language	Religion	−0.17	0.88
	Religion	Geography	0.10	0.23
	Religion	Language	0.10	0.24
Shame–devaluation	Geography	−	−0.13	0.87
	Language	−	−0.20	0.95
	Religion	−	0.03	0.43
	Geography	Language	−0.11	0.80
	Geography	Religion	−0.15	0.85
	Language	Geography	−0.19	0.96
	Language	Religion	−0.21	0.96
	Religion	Geography	0.08	0.28
	Religion	Language	0.08	0.30

Supplementary Note 3. Descriptions of communities (Samples A–O)

Cotopaxi, Ecuador (Quechua)

The Quechua (also known as Kichwa, in Peru) are an Amerind indigenous people (Cavalli-Sforza, Menozzi, and Piazza 1994:316-342) living mainly on the Andes mountains in South America. In Ecuador, most are located in the Andes region and some in the Amazon region. The Quechua in Ecuador number around 2.2 million people. They live in villages, in extended-family households, and their economy is based on agriculture, pastoralism, and some eco-tourism. They speak the Quechua language (which belongs to the Quechua language family), and Spanish as a second language. Historically, the Quechua may have spoken a pre-Incaican language such as Puruhá, but due to the Inca and Spaniard conquests the Quechua language was adopted.

Participants were sampled from two communities: Tingo Pucará and Curingue, with a population of approximately 100 people each. These communities are part of the Guangaje parish, in Pujilí town of the Cotopaxi province situated in the central sierra of Ecuador. Both communities are located in a *paramo* (a treeless plateau), at 12,000 feet above sea level—an alpine tundra environment.

The Quechua have usually practiced Catholicism, but in recent years some of them, especially in the Tingo Pucará community, have converted to other Christian denominations. They attend church on Saturdays, while people from the Curingue community do it on Sundays. The people of these communities are very well organized as a political group. They have a patrilocal pattern of residence, and choose their leaders among members of their patriline.

Participants were sampled through s*ocial networks*. The researcher and the local leader organized a general meeting where the study date was agreed upon and announced. The study was conducted verbally in Spanish, but a few participants requested, and were given, additional clarifications of the stimuli in Quechua.

Morona-Santiago, Ecuador (Shuar)

The Shuar number ~100,000 persons, living mostly in over 650 Shuar communities in Morona-Santiago and Zamora-Chinchipe provinces, Ecuador. Shuar territory includes the 600-800 m. high Upano Valley, bordered by the Andean foothills to the west and the rugged, sparsely populated, 2,225 m high Cordillera de Cutucú to the east. This is a tropical low-montane forest, with average temperatures of 24°C, and ~2200 mm rainfall annually. Participants for this study lived at the western edge of Shuar territory in the Andean foothills, about 10 km east of Parque Nacional Sangay, at an elevation of ~1100 m.

Traditionally, the Shuar lived in scattered nuclear family clusters organized around matrilocal post-marital residence, with men often later returning to be near their father and brothers in times of war (Harner 1984; Hendricks 1994; Karsten 1935; Rubenstein 2001; Stirling 1928). Shuar economy was based on subsistence horticulture, fishing, hunting, and foraging (Harner, 1984; Karsten, 1935; Rubenstein, 2001; Stirling, 1938). They have an Iroquois kinship classification system, bilateral descent, but no strong lineage structure. Although organized into more centralized communities since the 1960s for political reasons, matrilocal post-marital residence and ties of kinship and affinity organize social relationships, and nuclear family houses remain the basic units of production. The Shuar continue to interpret the world through a culturally distinctive, recognizably Shuar worldview.

Participants for this study are a convenience sample of adults. Shuar is the first language of participants, but the study was conducted in Spanish, in which all participants were fluent. Among this sample, subsistence horticulture, fishing and some hunting is augmented with a mixed economy of small-scale agro-pastoralism, sale of forest products, and occasional day wage labor.

Coquimbo, Chile
Tongoy is a small coastal fishing village located on the semi-arid coast of Northern-Central Chile. Tongoy belongs to the municipality of Coquimbo, but holds a strong claim for administrative independence given its relative isolation from the main regional administrative centres. Tongoy has experienced the destruction of most of its fishing gear and boats following the tsunamis (most recently, in 2015) and large storms associated with the El Niño cycles. The number of permanent residents is about 5,000. The local residents tend to live in extended family households, and single parents are common. Residents are chiefly Christian, with Catholics and Evangelicals being among the most numerous groups. Their language is Spanish. Tongoy's economy is based on artisanal fishing and diving, tourism, small-scale aquaculture and wage labour. Artisanal fishermen and divers in particular are grouped in organizations or unions that in small coastal towns can be sources of social prestige since being a union member allows exclusive user rights to specific areas of the seafloor where they can target shellfish or algae.

Drâa-Tafilalet, Morocco (Amazigh)
Tinghir is a village located in a Tamazight-speaking oasis on the southern slopes of the high Atlas Mountains in the Drâa-Tafilalet region of Morocco. In 2014, the village housed approximately 900 individuals. Traditionally, villagers depended mainly on subsistence oasis agriculture, but labour migration to Europe and other Moroccan urban centres has been a pervasive phenomenon since the 1960s. In the past, most migrants were men who usually left their wives and children in their native village, either alone or with their families, and sent them remittances regularly. Female migration and family reunification, however, have become increasingly common in the past decades. Like in the rest of Morocco, villagers are predominantly Sunni Muslims belonging to the Maliki school of Jurisprudence. Traditionally, descent is patrilineal and post-marital residence is patrilocal.

Enugu, Nigeria (Igbo)
The study was carried out among rural famers in Nsukka, a northern Igbo community in the State of Enugu. The Igbo are one of the largest ethnic groups in Nigeria and occupy the five states in the Southeast region of the country. They speak Igbo, a member of the Niger–Congo family of languages. The people of Nsukka speak a local dialect of Igbo.

   The people of Nsukka are predominantly Catholic, with a few of the inhabitants practicing the Traditional African Religion—the religion of the people prior to colonization by the British. They live in clusters of villages, reckon descent patrilineally, and have a patrilocal pattern of post-marital residence. However, there are some cases of neolocal residence where capable couples build their own houses and live separately from their parents, but most often within the community. The residents live in extended family households, and this influences mate selection, marriages, and other aspects of social life. Participants were recruited via convenience sampling.

Chalkidiki, Greece
Ierissos is a small coastal town located in the Athos peninsula in the Chalkidiki district of Northern Greece. The area has been inhabited since antiquity, but had to be entirely rebuilt following a devastating earthquake in 1932. The landscape is very diverse, progressively changing from deciduous forests to shrub-covered hills, to sandy beaches. The land is rocky, but not barren. Some of the most common cultivars include olive trees and durum wheat. The climate is Mediterranean, with hot and dry summers and cold and rainy winters.

   The approximately 3,500 inhabitants are overwhelmingly Orthodox Christians. Most households consist of nuclear families, although it is common for more than two generations to live together.

Parents typically work hard to build a home for their children or bequeath their own to them, with the expectation that they will move in with them to be cared for towards the end of their lives. Elderly homes are rare and frowned upon in Greece. Post-marital residence is mostly patrilocal, with the couple typically moving into a separate floor in the husband's family house. Extended families tend to stay in close proximity, often in adjacent plots of land. Relatives, especially close kin, are heavily involved in the couple's life and play an active role in child-rearing and financial decision-making. Ritual kinship, particularly in the form of godparents and wedding sponsors, is retained throughout one's life and plays a very important role in creating social ties. Descent is bilateral, and inheritance is equally partible. A significant share of the parents' wealth is transferred to the children upon their marriage. It is common for the child who takes in and cares for the elder parents (typically the youngest one), to inherit the house.

Most locals work in fishing, shipbuilding, farming, logging, mining, and construction in the nearby monastic community of Athos. Over the last decades, the area has experienced significant and rapid tourist development, and thus an increasing number of inhabitants are employed in trade and the service sector.

Participants were recruited through a combination of random and snowball sampling. Surveys were administered by a local research assistant in the Greek language.

Ikland, Uganda (Ik)
The Ik people of North-eastern Uganda are an ethnic group of former hunter-gatherers who speak Icé-tód, an isolate Nilo-Saharan language. They are culturally distinct from neighbouring pastoralist peoples such as the Karimojong and the Turkana. The Ik people became notorious following Colin Turnbull's ethnography *The Mountain People*, in which he described them as "unfriendly, uncharitable, inhospitable and generally mean as any people can be" (1972, p. 32). Turnbull documented a period of famine in 1965-1966, during which social networks and sharing practices broke down to the point of societal collapse.

Today, the Ik practice a mixed subsistence strategy involving seasonal cultivation of maize, sorghum, and millet alongside year-round gathering, hunting and honey collection. Their social organization can be classified as *delayed return* (Woodburn, 1982). Horticulture has become more important in recent generations due to territory encroachment and violence related to cattle raids, which culminated in defensive retreat into villages on the Morungole escarpment bordering Kenya.

The Ik are predominantly patrilineal and patrilocal, and have an Omaha kinship terminology system. Marriage and inheritance practices are flexible, due to a relatively mobile lifestyle. Kin of the paternal and maternal clan are considered important, and may be called upon for help in times of difficulty. Cooperation and sharing between Ik people are both rigorous and extensive, as is typical for hunter-gatherer peoples. The Ik do not, however, practice *demand sharing* of the kind typically observed among *immediate-return* hunter-gatherers (Woodburn, 1982).

As resources are scarce, ritual occasions are rare. However, specialists (*Nkwa*) perform rituals involving stone-throwing or the inspection of goat intestines to appease the nature spirits responsible for adverse events, to foretell the future, or to heal. Nature spirits known as *kijawikå* bring misfortune to those who are unwilling to share their resources.

Data were collected via convenience sampling in the village of Lokinene and surrounding villages (a community of approximately 500 people), in the Timu parish of Ikland.

Rivière Noire, Mauritius Mauritius is an island nation in the Indian Ocean that forms part of the Mascarene archipelago, located on the tropic of Capricorn, approximately 500 miles East of Madagascar. Having gone through Dutch, French, and British rule, it gained independence in 1968.

Today, its mere 788 square miles of land are home to 1.3 million people, making it one of the most densely populated countries on Earth.

The Mauritian landscape is dominated by a mountain range cutting across the main island. The climate is tropical, with a hot and wet season between November and March and a moderate, relatively drier season between April and October. The combination of this hilly topography and high precipitation produces several rivers, lakes, and reservoirs that provide a fresh water supply for drinking and irrigation, and the fertile volcanic soil favours agricultural activities. Indeed, Mauritian history has been shaped by the production of sugar cane (Xygalatas et al., 2017), which to this day dominates all arable land. Until recently, Mauritius was entirely dependent on sugar export, but since independence its economy has diversified and the island has experienced rapid economic development.

Mauritius is one of the world's most diverse societies. The numerous ethnic groups that inhabit Mauritius consist of people descended from African slaves, Asian indentured labourers, and European colonial landowners, as well as people of mixed origin (Eriksen, 2007). These groups are subdivided into multiple ethnic-religious groups. Almost half of the population are Hindus, slightly over 30% are Christians, and 17% are Muslims, subdivided into numerous denominations of these religions. There are also smaller groups of adherents of Buddhism, Taoism, and Judaism. This ethnic diversity is also reflected in the linguistic landscape of Mauritius. The Mauritian Creole language is the lingua franca on the island, but English and French are widely spoken, and a variety of ancestral languages are used at home and in places of worship.

Data were collected from two different populations in the Rivière Noire district, Creoles from the village of *Le Morne,* and Marathis living in the village of *La Gaulette*.

Le Morne. Creoles make up approximately 28% of the population, and are predominantly Catholic. They are descendants of slaves from various places in continental Africa and Madagascar, who were brought by French colonizers to work in sugar cane plantations. As their ancestors were historically excluded from land ownership, Mauritian Creoles generally cannot rely on inherited land. They typically occupy smaller lots and live in nuclear domestic units. Post-marital residence is neolocal, while descent and inheritance are cognatic. In contrast with other ethnic groups in Mauritius, Creoles have no strong preference for endogamous marriage. On the contrary, marriages with fair-skinned people are encouraged, as they contribute to upward social mobility.

Our sample was obtained in Le Morne, a fishing village on the Southwest coast. Le Morne is home to approximately 1,300 inhabitants, who are predominantly (over 80%) Creole. Most of the local villagers work in fishing, farming, and as unskilled manual labourers in the nearby tourist resorts (e.g. as gardeners or cleaners). Participants were recruited through a combination of random and snowball sampling.

La Gaulette. Marathi Indians are one of the smallest ethno-religious groups in Mauritius, consisting of about 20,000 people, descendent from indentured labourers who arrived during the 19th and 20th century from the Indian state of Maharashtra. Today, they live scattered mostly in rural areas in the central and southern parts of the island.

Most Marathis live in extended households with multiple nuclear families forming the core. These households typically include the husband's parents and unmarried siblings and cousins who reside on the same plot of land. As all Indo-Mauritians, Marathis have a strong preference for endogamous marriage. They have a patrilineal descent and inheritance system where land is passed down from father to son. Post-marital residence is thus patrilocal, although neolocality is becoming increasingly common in urban areas.

Our sample was obtained at the coastal village of La Gaulette in the Southwest, which is home to 700 Marathis and an overall population of 2,300, mostly Afro-Mauritian Catholics. Traditionally, locals made their living through fishing and small-scale agriculture, but today many are employed in the service sector and/or the tourism industry. Participants were recruited through a combination of random and snowball sampling.

Dhading, Nepal
The Nepali people sampled in this study are from the town of Naubise, located in the Dhading district, about 30 km from the capital city of Kathmandu. Naubise is in a valley, and, despite its proximity, access to Kathmandu requires passing over the Himalayan foothills on a two-lane highway. The total population of Naubise is 25,000 individuals, but the individuals are dispersed over a large area, and many people leave the area to find work. Most of the people of Naubise are farmers at varying scales, and some community members operate small shops or restaurants. Households frequently consist of extended families. People living in Naubise speak Nepali, which is part of the Indo-European language family. Most people in the community (and in the sample) are ethnic Nepalis, but there are also members of other ethnic groups, such as Newar, Tibetan, Tamang, etc. living in Naubise. Most Nepali people practice Hinduism. Descent is bilateral in this community. For the most part, women live with their husband's family post-marriage. Participants were recruited through convenience sampling in the most populous part of town close to the local market, which attracts people living in several different areas of Naubise.

Tuva, Russia
The Tuvans live approximately in the geographic centre of the Asian landmass, in the southern part of East Siberia, Russia. The population of the Tuvan Republic is about 310,000. Most of its inhabitants are Tuvans, but there are minorities of Russians, Tartars, Khakasses and other ethnicities. The study was conducted among ethnically Tuvan participants in Kungurtug, a remote highland village in the eastern part of the Tuvan Republic bordering on Mongolia, and in herder settlements in the vicinity of Kungurtug. The local economy is based mostly on herding in the mountains, seasonal gathering and hunting in the surrounding taiga and fishing in the lakes and rivers. The Kungurtug Tuvans (about 1,500 people) speak a local dialect of Tuvan, a member of the Turkic language family. Although Tuvans are bilingual by schooling and many of them can speak Russian fluently, in everyday life they speak Tuvan almost exclusively. Many practice Buddhism combined with animism and shamanistic rites, and some are agnostic. Descent rules are either bilateral or patrilineal. As many dwellers live outside the village grazing sheep during summer, participants were recruited through convenience sampling.

Khövsgöl, Mongolia
The Darhad are a group of nomadic pastoralists that live in the extreme north of Mongolia's Khövsgöl Province on the frontier between Mongolia and the Russian Federation. The Darhad ethnic group is one of Mongolia's minority tribal groups and consists of approximately 17,000 members. They live both in villages and in the countryside, in seasonally mobile groups of extended kin. The Darhad's main economic activity is based around herding cattle, yaks, horses, sheep, and goats. They also supplement their income through gathering timber and other forest products.

The Darhad Valley has a subarctic climate and some of the harshest winter conditions in Mongolia. The valley's three *sum*, or county administrations, Ulaan Uul, Renchinkhlumbe, and Tsaagan Nuur are among Mongolia's most remote administrative districts and there is only limited access to transportation and communication infrastructure. The local ecology is a mixture of short

grass steppe, alpine tundra, temperate forest, and boreal forest that is interspersed by numerous lakes and rivers.

The local population reckon descent bilaterally, and they use the Omaha kinship system. While the population has a neolocal residential system, herding families will change their camping location between four and six times per year and often camp along with flexible groups of close and extended kin. The population speaks the Darhad dialect of the Mongolian language, which is part of the Mongolic family of languages.

The study participants were recruited through convenience sampling from the administrative village of Renchinkhlumbe sum.

Shaanxi, China

XiZhai is a village in Shaanxi province, Midwestern China—a location with a temperate monsoon climate. The population size is about 1,100. XiZhai residents live in extended-family households, and their economy is based on farming. The main agricultural products are maize and wheat. The local language is Xifu, a sub-dialect of Zhongyuan Mandarin—a member of the Sino-Tibetan family of languages. XiZhai villagers are ethnic Han; they are mostly non-religious, although a minority of them are Buddhist or Christian. XiZhai villagers are patrilocal. They have a Sudanese kinship terminology. Descent is unilineal, reckoned via the father's line. Participants were recruited through convenience sampling

Farming Communities, Japan

Data were collected from farming communities in rural and urban areas: From Uchiko town and Matsuyama city (Ehime Prefecture), from Shimanto city, Kami city, Okawa village, Shimanto town, and Kuroshio town (Kochi Prefecture), and from Fukuchiyama city, Maizuru city, Ayabe city, Kyotango city, and Kyotamba town (Kyoto Prefecture). Ehime and Kochi Prefectures are located in Shikoku island, while Kyoto Prefecture is located in Honshu island (the mainland of Japan). These communities have a temperate climate. The local people live in extended-family, nuclear family, or single-person households. Their economy is based mainly on farming, self-employment, and wage labour. They speak the Japanese language, a member of the Japonic language family. Prevalent religions in these areas are Buddhism and Shintoism (an indigenous religion).

Data collection was through self-administered questionnaires sent by mail. Based on the 2010 Population Census of Japan (Statistics Bureau, Ministry of Internal Affairs and Communications of Japan, 2010), we randomly sampled communities (*cho* or *chomoku*) from farming areas (i.e., communities where at least 25% of residents were farmers) from the three aforementioned prefectures. Our sampling goal was to contact at least 250 households in farming communities in each prefecture (i.e., at least 750 households in the three prefectures). The sampling process included the present study and one other study, to be reported elsewhere. We employed a mail delivery service that mailed one questionnaire to each of 853 potential participant households in 18 farming communities. The cover letter of the study indicated that the questionnaire should be completed by one (and only one) household member aged 20 or above. If more than one household member met the age criterion, the respondent had to be the household member most deeply involved with their local community. For the present study, we obtained 60 completed questionnaires from 16 communities in 12 villages, town, or cities.

Fishing Communities, Japan

Data were collected from fishing communities in rural or urban areas: From Uwajima city, Ikata town, and Ainan town (Ehime Prefecture), from Tosashimizu city, Otsuki town, and Kuroshio town (Kochi

Prefecture), and from Maizuru city, Miyazu city, and Ine town (Kyoto Prefecture). Ehime and Kochi Prefectures are located in Shikoku island, while Kyoto Prefecture is located in Honshu island (the mainland of Japan). These communities have a temperate climate. People in these communities live in extended-family, nuclear family, or one-person households. Their economy is based mainly on fishing, farming, self-employment, and wage labour. They speak the Japanese language, a member of the Japonic language family. Prevalent religions in these areas are Buddhism and Shintoism (an indigenous religion).

Data collection was through self-administered questionnaires sent by mail. Based on the 2010 Population Census of Japan (Statistics Bureau, Ministry of Internal Affairs and Communications of Japan, 2010), we randomly sampled communities (*cho* or *chomoku*) from fishing areas (i.e., communities where at least 25% of residents were fishers) from the three aforementioned prefectures. Our sampling goal was to contact at least 250 households in fishing communities in each prefecture (i.e., at least 750 households in the three prefectures). The sampling process included the present study and one other study, to be reported elsewhere. We employed a mail delivery service that mailed one questionnaire to each of 864 potential participant households in 16 fishing communities. The cover letter of the study indicated that the questionnaire should be completed by one (and only one) household member aged 20 or above. If more than one household member met the age criterion, the respondent had to be the household member most deeply involved with their local community. For the present study, we obtained 43 completed questionnaires from 16 communities in 9 town or cities.

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