Invariances in the architecture of pride across small-scale societies

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Becoming valuable to fellow group members so that one would attract assistance in times of need is a major adaptive problem. To solve it, the individual needs a predictive map of the degree to which others value different acts so that, in choosing how to act, the payoff arising from others' valuation of a potential action (e.g., showing bandmates that one is a skilled forager by pursuing a hard-to-acquire prey item) can be added to the direct payoff of the action (e.g., gaining the nutrients of the prey captured). The pride system seems to incorporate all of the elements necessary to solve this adaptive problem. Importantly, data from western(-ized), educated, industrialized, rich, and democratic (WEIRD) societies indicate close quantitative correspondences between pride and the valuations of audiences. Do those results generalize beyond industrial mass societies? To find out, we conducted an experiment among 567 participants in 10 small-scale societies scattered across Central and South America, Africa, and Asia: (*i*) Bosawás Reserve, Nicaragua; (*ii*) Cotopaxi, Ecuador; (*iii*) Drâa-Tafilalet, Morocco; (*iv*) Enugu, Nigeria; (*v*) Le Morne, Mauritius; (*vi*) La Gaulette, Mauritius; (*vii*) Tuva, Russia; (*viii*) Shaanxi and Henan, China; (*ix*) farming communities in Japan; and (*x*) fishing communities in Japan. Despite widely varying languages, cultures, and subsistence modes, pride in each community closely tracked the valuation of audiences locally (mean $r = +0.66$) and even across communities (mean $r = +0.29$). This suggests that the pride system not only develops the same functional architecture everywhere but also operates with a substantial degree of universality in its content.

cognition | emotion | cooperation | morality | culture

Evidence from behavioral ecology, archaeology, and contemporary forager societies suggests that our hominin ancestors evolved in an ecology characterized by high rates of mortality, scarcity and high variance in food acquisition (1), high incidence of disease and injury (2), and attacks by predators and conspecifics (3, 4). Reliance on fellow group members, including nonkin, for the assistance necessary to survive and reproduce is a distinctively human characteristic (5). 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. In this social ecology, it would have been essential to incentivize mates, cooperative partners, and fellow group members to value one's welfare so that they would be inclined to render assistance in times of hunger, incapacitation, and interpersonal conflict (2). The extent to which fellow group members valued, helped, and refrained from exploiting an individual and the extent to which they deferred to the individual in conflicts of interests would have sensitively impacted whether that individual reproduced successfully, struggled, or died early (6).

In general, there are two classes of bargaining tactics organisms have available for influencing others' choices. First, they can conditionally inflict costs—aggression; second, they can bestow (or withhold) benefits—altruism. The first causes individuals to be respected (or feared). The second causes individuals to be valued. Thus, it might be advantageous to put weight on another's welfare, (*i*) because the individual is formidable and could inflict costs if not propitiated or (*ii*) because the individual's actions or existence make positive fitness contributions to the valuer, which would be diminished or lost if assistance was not given. Here, we call these two components respect (for formidability) and valuation (for positive fitness contributions)—also referred to as dominance and prestige (7). Being respected and being favorably valued by others were resources, and selection on our ancestors would have shaped the human motivational system to cost-effectively promote access to both of those different types of resources.

Because nonhumans are far more limited in the kinds of assistance that they can render each other, almost all nonhuman

Significance

It has been proposed that one key function of pride is to guide behavior in ways that would increase others' valuation of the individual. To incline choice, the pride system must compute for a potential action an anticipated pride intensity that tracks the magnitude of the approval or deference that the action would generate among local audiences. Data from industrial mass societies support this expectation. However, it is presently not known whether those data reflect cultural evolutionary processes or a panhuman adaptation. Experiments conducted in 10 traditional small-scale societies with widely varying cultures and subsistence modes replicate the pattern observed in mass societies. This suggests that pride is a universal system that is part of our species' cooperative biology.

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bargaining is based on aggression. Differences in the ability to inflict costs (formidability or resource holding power) led to adaptations for the advertisement of formidability and adaptations for assessing own and others' formidability (8, 9). In group-living species, dominance hierarchies emerge from patterns of deference to those with more formidability—individuals cede resources or rank to avoid being harmed (10).

Although humans fully retain and exploit phylogenetically ancient adaptations for aggression and dominance [including systems for threat, fighting, display, and assessment (8, 10–12)]—as seen in groups of children, adolescents, and adults (13–16)—human evolution was distinctive in the greatly expanded role that mutual assistance played in daily group living, and hence in the reproductive fortunes of individuals (2, 17). The hominin entry into the cognitive niche (involving the emergence and integration of intelligence, language, tool use, coordination, and culture) greatly amplified the opportunities for mutually advantageous prosocial interactions (18, 19). As our ancestors entered the cognitive niche and became hunter-gatherers, there would have been novel and intense selection for adaptations designed to make the self valuable to others, and hence recruit assistance from others. We hypothesize that the emotion of pride functions as an evolved guidance system that modulates behavior to cost-effectively manage and capitalize on the propensities of others to both respect and value the actor.

Mechanisms favoring the valuation of others evolved through several distinct selection pressures, including kin selection (20), reciprocation (21), reputation (22), risk pooling (1), externality management (23), and (substituting respect for valuation) the asymmetric war of attrition (24). These selection pressures, in turn, crafted an array of specialized choice architectures to promote altruistic (or selfish) decisions given the information available to the actor about a potential recipient [e.g., how to respond to cues of the recipient's relatedness, skills, trustworthiness, or ability to defend her interests (25)]. This implies that humans will have evolved a neurocognitive architecture for computing the social value of others, which governs altruistic behavior (26). We note that formidability—the ability to inflict costs through aggression—commonly incentivizes others (in bargaining contexts) to place more weight on the welfare of the more formidable, even when such aggressive capacity is not deployed in ways that help others. Hence, both the ability to confer benefits (e.g., skills, the emission of positive externalities) and the ability to inflict costs should act as inputs to the systems that compute the social value of others (7, 11, 15).

In short, others' assessments of the acts and characteristics of a focal individual lead them to value (or disvalue) her. When others (an audience) detect new information about an individual that is at odds with their current level of valuation, their valuation is recalibrated either upward or downward, with correspondingly positive or negative effects on the individual's fitness (26). This would have selected on the recipient's end for motivational adaptations to cost-effectively manage the flow of information about the self to others (27). Indeed, cross-cultural evidence has recently provided support for the hypothesis that the emotion of shame is a neurocognitive adaptation that evolved to prevent audiences from receiving negative information about the individual and to limit the degree and costs of devaluation [e.g., by signaling submission to avoid aggression from audiences (10, 12)] if negative information does spread (28–32).

Reciprocally, the neurocomputational system that organizes the emotion of pride seems to be an adaptation that evolved to pursue and advertise acts or traits leading to enhanced respect and valuation of the individual in the minds of others. A system designed for this function should orchestrate a suite of cognitive mechanisms that (*i*) motivate the pursuit of acts or the cultivation of traits that would increase others' respect and valuations of the individual; (*ii*) motivate the advertisement of acts or characteristics that, when discovered by others, would lead them to increase their respect and valuations of the individual; and (*iii*) mobilize the individual to profit from the resulting enhanced social landscape (e.g., by pursuing gainful activities previously beyond reach or pressing for better treatment from others). This "advertisement–recalibration theory of pride" (33; see also refs. 10, 12, 34) deductively emerges from the integration of the dynamics of audience recalibration with evolutionary models of human dominance and valuation, which specify the direction and magnitude of those recalibrations.

Existing findings on pride are strongly consistent with this theory of its functional architecture. Pride-like behavior is taxonomically widespread [including primates (35, 36), cervids (37, 38), canids (39), and invertebrates (40)], and therefore phylogenetically ancient. Pride occurs in every known culture (41) and it appears reliably and early in development—as early as in toddlers (42, 43). Pride is triggered by achievements (42), aggressive formidability (44), and other socially valued characteristics. Pride is a highly pleasant emotion (45); this internal reward can incentivize people to undertake and persevere at costly but socially valued courses of action (46, 47). Pride has a full-body display featuring an erect and expanded posture and gaze directed at the audience (12, 42, 48), and thus it appears to generate common knowledge about the individual's enhanced value (49). This display conveys achievement or dominance (10, 12, 50, 51), is produced by congenitally blind individuals (45), and is recognized by young children (52) and by adults within and across cultures (53). Thus, pride and related indicators of being respected and valued affect second and third parties in lawful fashion: They appeal to potential mates (54, 55) (presumably because they indicate good genes, health, resource holding potential, and other types of embodied, social, and material capital); guide social learning through imitation (56, 57); elicit submissiveness (58); and intimidate rivals (10, 59), which reduces agonistic interactions (24) and stabilizes dominance hierarchies (60).

We note that human pride and its obverse, shame, are evolutionarily derived from physiological and behavioral features undergirding dominance and submission (10, 12, 17, 61, 62)—as articulated by the Dominance Hierarchy Model of pride and shame (10)—and various aspects of those emotions (e.g., the displays) are homologous with those of nonhuman primates (10). For example, receiving a pride display may elicit submission, while receiving a shame display may terminate aggression. Thus, these two complementary systems reduce overt conflict and subsequent attacks (refs. 10 and 63; nonhuman primate examples are in refs. 37, 64, and 65). Pride provides an internal reward for competitive success, whereas shame punishes failure; since much animal competition, including human competition, is ultimately over reproductive opportunities (40, 66–68), this may account for the heightened hubristic pride and, to a lesser extent, shame observed during adolescence and early adulthood (69).

The decision-making architecture of a social organism should evaluate and integrate two kinds of payoffs to regulate behavior adaptively: (*i*) the direct payoff of the potential action (e.g., the value of foraging for a food item) and (*ii*) the social valuation payoff [e.g., showing bandmates that one is a skilled forager by pursuing a hard-to-acquire prey item (70)]. According to the advertisement–recalibration theory, the feeling of pride is an internal signal of the estimated social valuation payoff—a payoff that can motivate, for example, status-seeking behavior.

One central prediction of the theory then is that the intensity of the feeling of pride will track the magnitude of audience evaluations incrementally and closely for each kind of information. This calibration is necessary if the intensity of the internal signal (anticipatory pride) is used prospectively to compute whether the benefit of enhanced audience valuation or respect outweighs the cost of engaging in a given act—and to decide whether the likely net payoff of a candidate act will make that act worth pursuing. An internal pride signal that is too weak

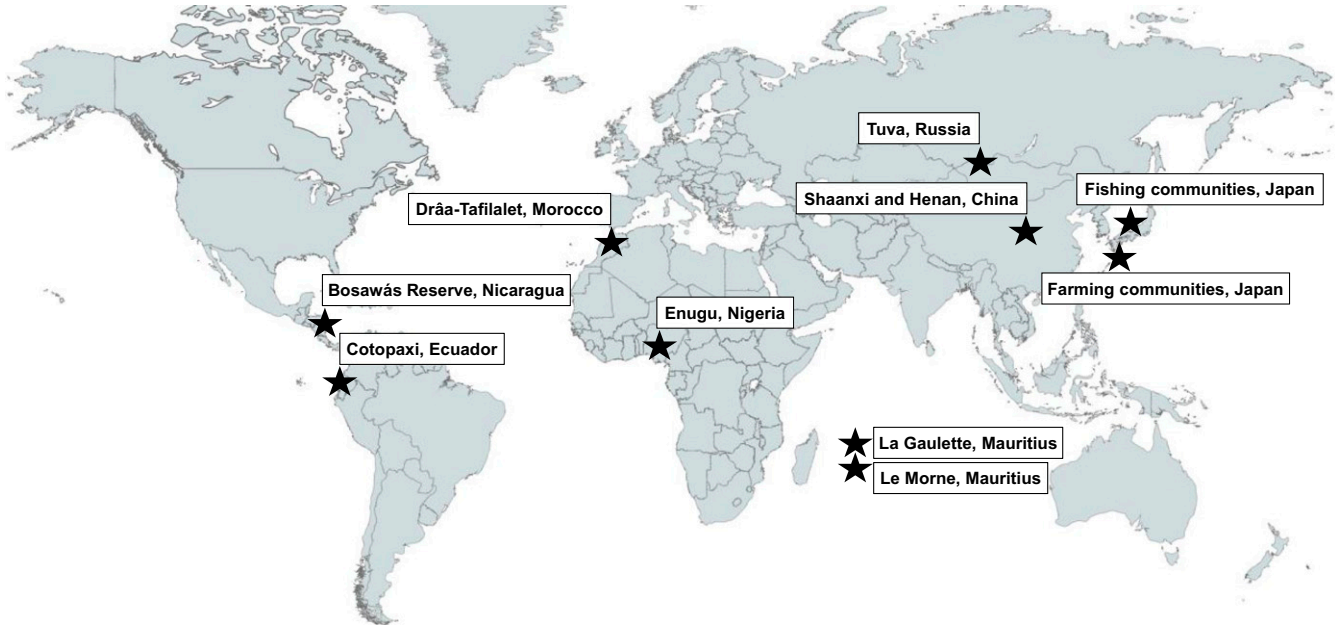

Fig. 1. Map of the 10 field sites.

compared with the prevalent magnitude of audience valuation would lead to maladaptive choices where the relevant act is insufficiently pursued (or if achieved, underadvertised), the increase in valuation in the audience is less than what it would be under more complete knowledge resulting from fuller advertisement, and the individual foregoes valuation that would have been cost-effective to acquire. A pride signal that is too strong yields diminishing or even negative returns, as beneficial courses of action are pursued in excess of their actual return, and moreover, audiences are designed to resist and devalue entitled actions that exceed the individual's actual social value (71, 72). To avoid these errors, the pride system should estimate the magnitude of valuation that a given act would cause among local audiences and calibrate the intensity of its internal signal in proportion to those estimates. This internal signal is expected to be equally well-calibrated for traits (e.g., physical formidability) and other attributes (e.g., sibling of chief) for the individual to know the right degree of advertisement and entitlement afforded by those attributes. Pride is sometimes referred to as a self-conscious (73) or self-focused (74) emotion; however, the preceding analysis suggests that a well-designed pride system must be coupled to the evaluative psychology of others. Importantly, because the internal pride signal is used by the systems that decide how to act, the intensity of felt pride should track the magnitude of audience valuation even when there is no communication between audiences and the individual who is evaluating alternative courses of action based on anticipated pride. The internal pride signal is useful for promoting audience valuation and respect by choosing certain acts, displays, and modes of conduct over others. The system generating this signal would be handicapped if it needed to observe audience valuation to know its magnitude instead of computing those magnitudes in advance.

These predictions were tested experimentally in 16 countries: the United States, Canada, the United Kingdom, France, Belgium, The Netherlands, Switzerland, Italy, Turkey, Israel, India, Singapore, the Philippines, South Korea, Japan, and Australia (33). Subjects were given a set of scenarios that tapped situations likely to vary in how much valuation the actions or traits that they described might elicit. One group of subjects rated how positively they would evaluate the person described in each scenario. A second independent group of subjects rated how much pride they would feel if they were the person described in the situation. As predicted, the intensity of anticipated pride for a given act or trait closely tracked the corresponding magnitude of audience valuation. This result replicated

Table 1. Demographic information (samples A–J)

Community	Economy	Religion	*N*	*N* female	Age, y (SD)
Bosawás Reserve, Nicaragua	Foraging, horticulture	Syncretic Catholicism	46	23	40 (12)
Cotopaxi, Ecuador	Subsistence agriculture, pastoralism	Evangelism	34	25	41 (18)
Drâa-Tafilalet, Morocco	Subsistence agriculture	Sunni Islam	75	43	32 (13)
Enugu, Nigeria	Subsistence agriculture	Catholicism	80	39	34 (8)
Le Morne, Mauritius	Fishing, farming, wage labor	Catholicism	80	33	40 (13)
La Gaulette, Mauritius	Fishing, farming, service sector	Hinduism	80	53	35 (12)
Tuva, Russia	Seminomadic pastoralism	Shamanism, Buddhism	29	22	36 (13)
Shaanxi and Henan, China	Farming	Mostly nonreligious	41	17	41 (12)
Farming communities, Japan*	Farming, wage labor	Buddhism, Shintoism	50	23	68 (11)
Fishing communities, Japan†	Fishing, farming, wage labor	Buddhism, Shintoism	52	18	66 (12)

Means (SDs in parentheses).
*Participants sampled from 13 communities (in three prefectures) where at least 25% of the residents are farmers.
†Participants sampled from 13 communities (in three prefectures) where at least 25% of the residents are fishers.

in each of the 16 countries. Importantly, valuation was tracked specifically by pride. Excitement, amusement, and happiness—three other positively valenced and arousing emotions and states that coactivate with pride—failed to track audience valuation.

Although this 16-nation experiment is suggestive, those populations are all western(-ized), educated, industrialized, rich, and democratic mass societies (75) and importantly, are in close media contact, sharing many norms, values, and attitudes. Hence, the goal of these studies is twofold. (*i*) The claim being evaluated is that the pride system is a fundamental part of human biology, and therefore, the signature of its operation should be detectable in all human societies, no matter how widely distributed and mutually unfamiliar they are. (*ii*) By hypothesis, the pride system evolved in small-scale face-to-face social groups where people knew each other, and therefore, it is important to assess the evidence for its operation in small coresidential social ecologies.

Is the tracking of audience valuation by pride limited to industrial mass societies? Or does this tracking occur throughout the range of human societies, potentially reflecting the operation of a panhuman pride system? To answer this question, we conducted an experiment with 567 adult participants from 10 small-scale communities living in widely different physical ecologies and featuring very different languages, cultures, and modes of subsistence: (*i*) Bosawás Reserve, Nicaragua; (*ii*) Cotopaxi, Ecuador; (*iii*) Drâa-Tafilalet, Morocco; (*iv*) Enugu, Nigeria; (*v*) Le Morne, Mauritius; (*vi*) La Gaulette, Mauritius; (*vii*) Tuva, Russia; (*viii*) Shaanxi and Henan, China; (*ix*) farming communities in Japan; and (*x*) fishing communities in Japan (Fig. 1 and Table 1). We created 10 scenarios in which someone's acts, traits, or circumstances might lead her to be viewed positively. The scenarios were designed to elicit reactions in a variety of evolutionarily relevant domains, such as generosity, social exchange, dominance contests, skills, and health. They were expressed at a level of abstraction that was not culturally particular (e.g., "You have many skills" rather than "You know how to bake and how to pilot airplanes").

The experimental design was adapted from Sznycer et al. (33). Participants were randomly assigned to either an audience condition or a pride condition. Participants in the audience condition were asked to provide their reactions to 10 scenarios involving a third party: a same-sex individual other than themselves (e.g., "He has many skills," "He is generous with others," "He can defend himself, so people never push him around"). 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 one (I would not view them positively at all) to four (I would view them very positively). These ratings provide situation-specific measures of the degree to which members of a given population would positively evaluate the individual described in the scenarios.

In the pride condition, a different set of participants was asked to "indicate how much pride you would feel if you were in those situations" (i.e., in each of the 10 scenarios; e.g., "You have many skills," "You are generous with others," "You can defend yourself, so people never push you around"), with scales ranging from one (no pride at all) to four (a lot of pride; the exceptions being Bosawás Reserve, Nicaragua and Drâa-Tafilalet, Morocco, where valuation and pride were measured on 1–3 and 1–7 scales, respectively). The stimuli in the audience condition and the pride 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 valuation and pride results for each community (*SI Appendix*, *SI Text* and Tables S1–S2j). There was widespread agreement on how valuation-enhancing these situations are relative to one another: mean intraclass correlation (ICC) across the 10 communities: ICC (2,*n*) = 0.70 (*SI Appendix*, Table S3). In other words, participants agreed about the extent to which they would positively view the individual described in these scenarios. Participants also agreed about the relative degree to which these various situations would elicit pride: mean ICC (2,*n*) = 0.61 (*SI Appendix*, Table S3). To test the main prediction that pride tracks audience valuation, we calculated, for each scenario, the mean pride ratings provided by participants in the pride condition and the mean valuation ratings provided by participants in the audience condition. Pride and valuation means were highly correlated with one another within each community, with a mean $r = 0.66$ (SD = 0.24; minimum $r = 0.36$; maximum $r = 0.92$; N r values = 10) and P values = 0.0002–0.31 (Fig. 2 and Table 2, diagonal values). Recall that the pride ratings and the valuation ratings originate from different participants. Consequently, these high correlations cannot be attributed to participants matching their pride ratings and valuation ratings. This is consistent with the primary hypothesis.

Between-Community Results. The pride system evolved for making decisions in—and tracking the values of—one's local group and not people from other cultures. Obviously, there would have been no selection to map the valuations of persons with whom one has never interacted. However, if there is a human-universal system of social valuation, then scenarios that tap this system

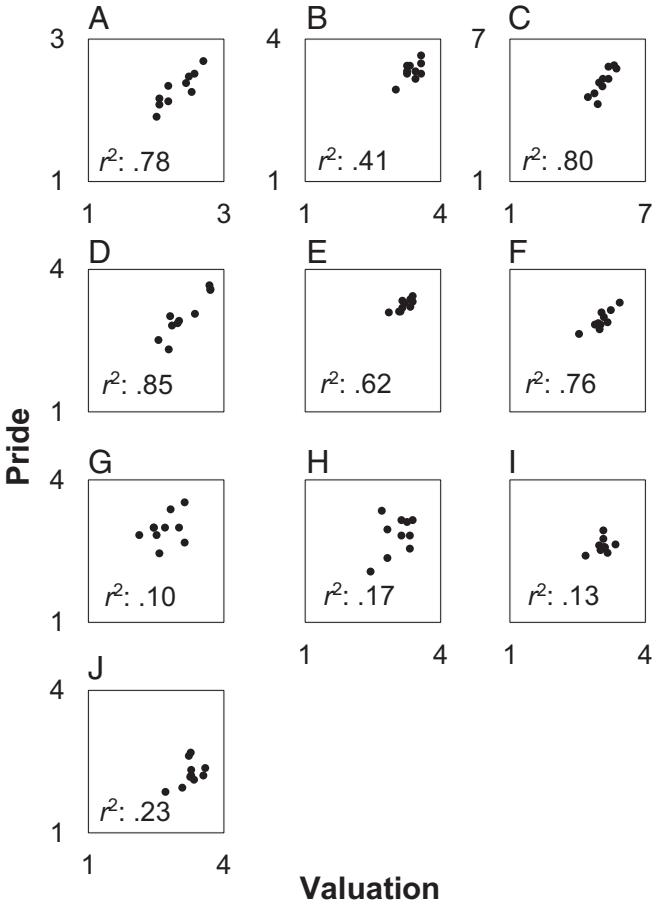

Fig. 2. Scatterplots: pride as a function of valuation (samples A–J). Each point represents the mean pride rating and mean valuation rating of one scenario. Pride ratings and valuation ratings were given by different participants. *N* on which the correlations are based is the number of scenarios = 10. Effect size: r^2 linear. (*A*) Bosawás Reserve, Nicaragua; (*B*) Cotopaxi, Ecuador; (*C*) Drâa-Tafilalet, Morocco; (*D*) Enugu, Nigeria; (*E*) Le Morne, Mauritius; (*F*) La Gaulette, Mauritius; (*G*) Tuva, Russia; (*H*) Shaanxi and Henan, China; (*I*) farming communities in Japan; and (*J*) fishing communities in Japan.

Table 2. Correlations between pride and valuation within and between communities (samples A–J)

	Valuation									
Pride	A	B	C	D	E	F	G	H	I	J
(A) Bosawás Reserve, Nicaragua	0.88*	0.07	0.77*	0.60	0.56	0.57	0.87*	0.46	0.16	0.33
(B) Cotopaxi, Ecuador	0.62	0.64*	0.16	−0.01	0.06	0.05	0.24	0.35	0.77*	0.86*
(C) Drâa-Tafilalet, Morocco	0.77*	0.03	0.87*	0.77*	0.63	0.59	0.80*	0.22	0.32	0.31
(D) Enugu, Nigeria	0.11	−0.35	0.76*	0.92*	0.39	0.33	0.68*	−0.16	−0.04	−0.09
(E) Le Morne, Mauritius	0.60	0.11	0.56	0.37	0.79*	0.72*	0.65*	0.47	0.33	0.48
(F) La Gaulette, Mauritius	0.37	0.26	0.43	0.52	0.77*	0.87*	0.64*	0.51	−0.09	0.10
(G) Tuva, Russia	0.51	0.04	0.39	0.39	−0.05	0.45	0.36	0.32	−0.05	0.12
(H) Shaanxi and Henan, China	0.20	0.05	0.39	0.24	0.80*	0.58	0.53	0.42	0.03	0.23
(I) Farming communities, Japan	0.10	0.43	−0.42	−0.62	−0.06	−0.19	−0.29	0.48	0.36	0.36
(J) Fishing communities, Japan	−0.02	0.44	−0.41	−0.52	−0.10	−0.20	−0.30	0.46	0.51	0.48

Coefficients are Pearson's r values. N on which the correlations are based is the number of scenarios = 10. Pride ratings and valuation ratings were given by different participants. Grey cells, within-community correlations.
*Correlations meet $P < 0.05$ or less.

may elicit agreement across cultures about what is worthy of valuation and pride, and pride in a given culture may track valuation in other cultures, despite a lack of contact between them. Are there situations that provoke valuation and elicit pride across cultures? To test for between-community agreement in valuation, in pride, and in the pride–valuation link, we computed the extent to which the mean valuation ratings and the mean pride ratings are correlated across communities. There is between-community agreement on average on the extent to which a given situation would elicit valuation: mean $r = 0.37$ (SD = 0.30; minimum $r = -0.26$; maximum $r = 0.91$; N r values = 45) and P values = 0.0002–0.96 (*SI Appendix*, Table S4). There is also between-community agreement on the extent to which a given situation would elicit pride: mean $r = 0.20$ (SD = 0.38; minimum $r = -0.80$; maximum $r = 0.92$; N r values = 45) and P values = 0.0002–0.99 (*SI Appendix*, Table S5). Furthermore, the pride elicited in each of 10 communities is positively correlated on average with the valuation from the other 9 communities: mean $r = 0.29$ (SD = 0.34; minimum $r = -0.62$; maximum $r = 0.87$; N r values = 90) and P values = 0.001–0.98 (Table 2, off-diagonal values)—71 of these 90 correlations (79% of them) have a positive sign. Although there is substantial variation in the extent to which pride tracked valuation across communities, including null and negative correlations, the pride elicited by these scenarios in one community (e.g., Mayangna forager–horticulturalists of the Bosawás Reserve, Nicaragua) tended to track how positively people viewed these scenarios in the other communities (e.g., pastoralists from Tuva, Russia; Amazigh farmers from Drâa-Tafilalet, Morocco; and farmers from Enugu, Nigeria). Of course, some actions, traits, and situations elicit valuation and pride in some cultures but not others (33, 70).

Discussion

A cross-culturally replicable, close quantitative correspondence between anticipated pride and the valuation of local audiences is what one expects of a computational system that is well-designed for furthering the social value of the individual in the minds of others. Features causing this close calibration assist the individual in balancing the competing demands of effectiveness and restraint by steering between an internal pride signal that is too strong (which would lead to, for example, the overpursuit of socially valued acts) and one that is too weak (which would, for example, insufficiently motivate acts that are socially valued). This match is not limited to industrial mass societies but generalizes across populations with widely different cultures, subsistence modes, institutions, and languages. Thus, this feature is more likely to originate in a human-universal adaptation designed by natural selection than in cultural evolutionary processes (76). The agreement across cultures, and not just within them, on pride, valuation, and their interrelationship is noteworthy. According to some accounts, different cultures are richly and arbitrarily different from each other (77). If this were true, then what cultures value and what members of different cultures are proud about should be radically different. Cultural differences in pride and in the underlying items granted respect and valuation do exist, as shown here and elsewhere (45, 78, 79). However, these cultural differences can be adaptively patterned (33), and therefore cultural variation is not necessarily divorced from the logic of adaptive functionality. Moreover, regularities across vastly disparate cultures can emerge when pride is analyzed from the standpoint of its probable function and target domain. 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; East China Normal University; the University of Nigeria, Nsukka; Universidad San Francisco de Quito, and the University of Cincinnati, 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 567 participants in Bosawás Reserve, Nicaragua (sample A); Cotopaxi, Ecuador (sample B); Drâa-Tafilalet, Morocco (sample C); Enugu, Nigeria (sample D); Le Morne, Mauritius (sample E); La Gaulette, Mauritius (sample F); Tuva, Russia (sample G); Shaanxi and Henan, China (sample H); farming communities in Japan (sample I); and fishing communities in Japan (sample J). Sample sizes and demographic information are described in Table 1.

Procedure. The 10 scenarios are shown in *SI Appendix*, Tables S2a–S2j. Participants were randomly assigned to either the audience condition or the pride condition. The language in the scenarios was gendered according to participants' stated gender, except for at the two Japan sites. At 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, and language of stimuli are listed in *SI Appendix*, Table S1.

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Supplementary Information

Invariances in the architecture of pride across small-scale societies

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Table S1

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

Sample	Site	N	Order of scenarios	Method of stimuli administration			Language of stimuli
				Verbal (by researcher)	Written (self-administered)	Unknown	
A	Bosawás Reserve, Nicaragua	46	A	46	0	0	Mayangna and Miskito
B	Cotopaxi, Ecuador	34	B	34	0	0	Spanish
C	Drâa-Tafilalet, Morocco	75	B	75	0	0	Moroccan Arabic
D	Enugu, Nigeria	80	B	69	11	0	Igbo
E	Le Morne, Mauritius	80	B	56	21	3	Mauritian Creole
F	La Gaulette, Mauritius	80	B	15	60	5	Mauritian Creole
G	Tuva, Russia	29	B	0	29	0	Tuvanian
H	Shaanxi and Henan, China	41	B	0	41	0	Northern Mandarin
I	Farming Communities, Japan	50	B	0	50	0	Japanese
J	Fishing Communities, Japan	52	B	0	52	0	Japanese

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

Table S2a

Ratings of valuation and pride, by scenario: Bosawás Reserve, Nicaragua (Sample A)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	2.70 (0.47)	2.70 (0.47)
7	You have many skills. / He has many skills.	2.57 (0.51)	2.52 (0.51)
5	You are smart. / He is smart.	2.52 (0.59)	2.26 (0.45)
6	You keep your promises. / He keeps his promises.	2.48 (0.51)	2.48 (0.59)
1	You are generous with others. / He is generous with others.	2.43 (0.51)	2.39 (0.50)
4	You are healthy. / He is healthy.	2.17 (0.78)	2.13 (0.46)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	2.17 (0.58)	2.35 (0.49)
10	You are strong, physically. / He is strong, physically.	2.04 (0.37)	2.17 (0.65)
2	You are attractive. / He is attractive.	2.04 (0.64)	2.09 (0.51)
8	You are a good storyteller. / He is a good storyteller.	2.00 (0.43)	1.91 (0.67)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 23; pride: 23. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–3.

Table S2b

Ratings of valuation and pride, by scenario: Cotopaxi, Ecuador (Sample B)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.56 (0.51)	3.67 (0.59)
6	You keep your promises. / He keeps his promises.	3.56 (0.51)	3.50 (0.71)
8	You are a good storyteller. / He is a good storyteller.	3.56 (0.63)	3.28 (0.75)
5	You are smart. / He is smart.	3.44 (0.81)	3.33 (0.77)
10	You are strong, physically. / He is strong, physically.	3.44 (0.63)	3.17 (0.71)
7	You have many skills. / He has many skills.	3.31 (0.87)	3.44 (0.62)
1	You are generous with others. / He is generous with others.	3.25 (0.68)	3.33 (0.84)
2	You are attractive. / He is attractive.	3.25 (0.86)	3.44 (0.70)
4	You are healthy. / He is healthy.	3.25 (0.77)	3.28 (0.75)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	3.00 (1.15)	2.94 (1.00)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 16; pride: 18. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2c

Ratings of valuation and pride, by scenario: Drâa-Tafilalet, Morocco (Sample C)

#	Scenario	Valuation	Pride
1	You are generous with others. / He is generous with others.	5.71 (1.45)	5.78 (1.95)
6	You keep your promises. / He keeps his promises.	5.61 (1.81)	5.92 (1.61)
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	5.35 (1.83)	5.86 (1.65)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	5.34 (1.79)	5.35 (1.86)
5	You are smart. / He is smart.	5.11 (1.66)	5.35 (1.64)
7	You have many skills. / He has many skills.	5.08 (1.57)	5.03 (1.77)
4	You are healthy. / He is healthy.	4.95 (1.96)	5.19 (1.91)
10	You are strong, physically. / He is strong, physically.	4.87 (2.06)	4.27 (2.16)
2	You are attractive. / He is attractive.	4.74 (2.04)	4.73 (2.00)
8	You are a good storyteller. / He is a good storyteller.	4.45 (2.04)	4.57 (1.89)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 37–38; pride: 37. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–7.

Table S2d

Ratings of valuation and pride, by scenario: Enugu, Nigeria (Sample D)

#	Scenario	Valuation	Pride
1	You are generous with others. / He is generous with others.	3.70 (0.61)	3.60 (0.63)
6	You keep your promises. / He keeps his promises.	3.70 (0.56)	3.58 (0.50)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	3.68 (0.53)	3.68 (0.47)
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.35 (0.74)	3.08 (0.80)
2	You are attractive. / He is attractive.	3.00 (0.51)	2.93 (0.94)
5	You are smart. / He is smart.	2.98 (0.58)	2.88 (0.69)
10	You are strong, physically. / He is strong, physically.	2.85 (0.62)	2.83 (0.78)
4	You are healthy. / He is healthy.	2.80 (0.65)	3.03 (0.77)
7	You have many skills. / He has many skills.	2.78 (0.92)	2.33 (0.97)
8	You are a good storyteller. / He is a good storyteller.	2.55 (0.68)	2.53 (0.85)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 40; pride: 40. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2e

Ratings of valuation and pride, by scenario: Le Morne, Mauritius (Sample E)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.38 (0.67)	3.45 (0.64)
6	You keep your promises. / He keeps his promises.	3.38 (0.63)	3.33 (0.80)
4	You are healthy. / He is healthy.	3.33 (0.53)	3.38 (0.54)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	3.33 (0.69)	3.23 (0.83)
7	You have many skills. / He has many skills.	3.20 (0.65)	3.30 (0.76)
8	You are a good storyteller. / He is a good storyteller.	3.15 (0.77)	3.20 (0.65)
1	You are generous with others. / He is generous with others.	3.15 (0.74)	3.35 (0.66)
5	You are smart. / He is smart.	3.10 (0.71)	3.13 (0.79)
10	You are strong, physically. / He is strong, physically.	3.08 (0.73)	3.13 (0.76)
2	You are attractive. / He is attractive.	2.85 (0.77)	3.10 (0.96)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 40; pride: 40. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2f

Ratings of valuation and pride, by scenario: La Gaulette, Mauritius (Sample F)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.43 (0.75)	3.31 (0.69)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	3.23 (0.77)	3.15 (0.78)
1	You are generous with others. / He is generous with others.	3.15 (0.58)	2.90 (0.87)
8	You are a good storyteller. / He is a good storyteller.	3.08 (0.80)	3.00 (0.82)
6	You keep your promises. / He keeps his promises.	3.03 (0.73)	3.10 (0.68)
4	You are healthy. / He is healthy.	3.00 (0.68)	2.85 (0.84)
7	You have many skills. / He has many skills.	2.98 (0.73)	2.75 (1.03)
5	You are smart. / He is smart.	2.95 (0.68)	2.87 (0.86)
10	You are strong, physically. / He is strong, physically.	2.88 (0.79)	2.85 (0.93)
2	You are attractive. / He is attractive.	2.53 (0.88)	2.65 (0.86)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 40; pride: 39–40. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2g

Ratings of valuation and pride, by scenario: Tuva, Russia (Sample G)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.13 (0.96)	3.54 (0.97)
6	You keep your promises. / He keeps his promises.	3.13 (0.72)	2.69 (1.18)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	3.00 (0.89)	3.00 (1.29)
1	You are generous with others. / He is generous with others.	2.81 (0.75)	3.38 (0.87)
7	You have many skills. / He has many skills.	2.69 (0.79)	3.00 (1.00)
4	You are healthy. / He is healthy.	2.56 (1.21)	2.46 (0.88)
10	You are strong, physically. / He is strong, physically.	2.50 (0.73)	2.85 (1.28)
2	You are attractive. / He is attractive.	2.44 (0.81)	3.00 (1.08)
5	You are smart. / He is smart.	2.44 (0.81)	3.00 (1.08)
8	You are a good storyteller. / He is a good storyteller.	2.13 (0.81)	2.85 (0.99)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 16; pride: 13. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2h

Ratings of valuation and pride, by scenario: Shaanxi and Henan, China (Sample H)

#	Scenario	Valuation	Pride
3	You are a productive worker, and can keep your children healthy and well fed. / He is a productive worker, and can keep his children healthy and well fed.	3.38 (0.89)	3.16 (1.07)
8	You are a good storyteller. / He is a good storyteller.	3.31 (0.48)	2.56 (0.96)
7	You have many skills. / He has many skills.	3.31 (0.79)	2.84 (0.90)
6	You keep your promises. / He keeps his promises.	3.25 (0.77)	3.12 (1.05)
1	You are generous with others. / He is generous with others.	3.13 (0.96)	2.84 (1.18)
10	You are strong, physically. / He is strong, physically.	3.13 (0.89)	3.16 (1.18)
5	You are smart. / He is smart.	2.81 (1.11)	2.36 (1.08)
9	You can defend yourself, so people never push you around. / He can defend himself, so people never push him around.	2.81 (1.11)	2.96 (1.06)
4	You are healthy. / He is healthy.	2.69 (1.01)	3.36 (0.99)
2	You are attractive. / He is attractive.	2.44 (1.09)	2.08 (0.95)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 16; pride: 25. The male versions of the pride and valuation scenarios are presented before and after the slash, respectively. The female versions of the valuation 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 valuation scores. Scale range: 1–4.

Table S2i

Ratings of valuation and pride, by scenario: Farming Communities, Japan (Sample I)

#	Scenario	Valuation	Pride
6	You keep your promises. / The person keeps his/her promises.	3.33 (0.82)	2.65 (1.00)
1	You are generous with others. / The person is generous with others.	3.15 (0.94)	2.47 (1.12)
2	You are attractive. / The person is attractive.	3.09 (0.89)	2.59 (1.06)
3	You are a productive worker, and can keep your children healthy and well fed. / The person is a productive worker, and can keep his/her children healthy and well fed.	3.09 (1.04)	2.59 (1.12)
7	You have many skills. / The person has many skills.	3.06 (0.97)	2.94 (1.20)
8	You are a good storyteller. / The person is a good storyteller.	3.06 (0.86)	2.76 (1.03)
4	You are healthy. / The person is healthy.	3.06 (1.03)	2.59 (1.18)
5	You are smart. / The person is smart.	3.00 (0.87)	2.53 (1.07)
10	You are strong, physically. / The person is strong, physically.	2.97 (1.02)	2.63 (1.09)
9	You can defend yourself, so people never push you around. / The person can defend him/herself, so people never push him/her around.	2.67 (0.99)	2.41 (1.12)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 32–33; pride: 16–17. The pride and valuation 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 valuation scores. Scale range: 1–4.

Table S2j

Ratings of valuation and pride, by scenario: Fishing Communities, Japan (Sample J)

#	Scenario	Valuation	Pride
6	You keep your promises. / The person keeps his/her promises.	3.58 (0.70)	2.38 (0.82)
3	You are a productive worker, and can keep your children healthy and well fed. / The person is a productive worker, and can keep his/her children healthy and well fed.	3.54 (0.71)	2.22 (1.00)
1	You are generous with others. / The person is generous with others.	3.33 (0.73)	2.13 (0.80)
2	You are attractive. / The person is attractive.	3.27 (0.67)	2.33 (0.82)
4	You are healthy. / The person is healthy.	3.27 (0.92)	2.22 (0.90)
7	You have many skills. / The person has many skills.	3.26 (0.76)	2.70 (1.02)
10	You are strong, physically. / The person is strong, physically.	3.25 (0.94)	2.18 (0.96)
8	You are a good storyteller. / The person is a good storyteller.	3.22 (0.75)	2.63 (1.01)
5	You are smart. / The person is smart.	3.08 (0.80)	1.96 (0.88)
9	You can defend yourself, so people never push you around. / The person can defend him/herself, so people never push him/her around.	2.70 (0.91)	1.87 (0.92)

Note. Displayed are means, with standard deviations in parentheses. *N*s: valuation: 24–27; pride: 22–24. The pride and valuation 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 valuation scores. Scale range: 1–4.

Table S3

Within-site agreement on valuation and pride, by site (Samples A–J)

Sample	Site	Within-site agreement on valuation	Within-site agreement on pride
A	Bosawás Reserve, Nicaragua	ICC(2,23) = .81	ICC(2,23) = .84
B	Cotopaxi, Ecuador	ICC(2,16) = .10	ICC(2,18) = .47
C	Drâa-Tafilalet, Morocco	ICC(2,38) = .66	ICC(2,37) = .82
D	Enugu, Nigeria	ICC(2,40) = .95	ICC(2,40) = .94
E	Le Morne, Mauritius	ICC(2,40) = .80	ICC(2,40) = .47
F	La Gaulette, Mauritius	ICC(2,40) = .84	ICC(2,40) = .58
G	Tuva, Russia	ICC(2,16) = .76	ICC(2,13) = .43
H	Shaanxi and Henan, China	ICC(2,16) = .56	ICC(2,25) = .76
I	Farming Communities, Japan	ICC(2,33) = .67	ICC(2,17) = .13
J	Fishing Communities, Japan	ICC(2,27) = .87	ICC(2,24) = .67

Table S4

Valuation correlations between communities (Samples A–J)

	Valuation									
Valuation	A	B	C	D	E	F	G	H	I	J
(A) Bosawás Reserve, Nicaragua		.27	.67	.39	.47	.51	.62	.46	.33	.40
(B) Cotopaxi, Ecuador			-.14	-.26	.10	.12	-.10	.61	.65	.72
(C) Drâa-Tafilalet, Morocco				.90	.52	.49	.86	.23	.20	.19
(D) Enugu, Nigeria					.41	.42	.84	.06	.05	.03
(E) Le Morne, Mauritius						.81	.68	.48	.02	.14
(F) La Gaulette, Mauritius							.57	.62	-.15	.03
(G) Tuva, Russia								.28	.09	.23
(H) Shaanxi and Henan, China									.32	.46
(I) Farming Communities, Japan										.91
(J) Fishing Communities, Japan										

Coefficients are Pearson's *r*s. The underlined correlations meet $p < .05$ or less. N on which the correlations are based = number of scenarios = 10.

Table S5

Pride correlations between communities (Samples A–J)

	Pride									
Pride	A	B	C	D	E	F	G	H	I	J
(A) Bosawás Reserve, Nicaragua		.47	.74	.31	.64	.50	.56	.40	.00	-.11
(B) Cotopaxi, Ecuador			.40	-.22	.44	.10	.35	-.05	.39	.45
(C) Drâa-Tafilalet, Morocco				.65	.71	.57	.38	.29	-.35	-.29
(D) Enugu, Nigeria					.29	.47	.14	.29	-.80	-.66
(E) Le Morne, Mauritius						.55	.24	.69	.03	.11
(F) La Gaulette, Mauritius							.34	.49	-.30	-.26
(G) Tuva, Russia								-.18	-.22	-.18
(H) Shaanxi and Henan, China									-.02	-.09
(I) Farming Communities, Japan										.92
(J) Fishing Communities, Japan										

Coefficients are Pearson's *r*s. The underlined correlations meet $p < .05$ or less. N on which the correlations are based = number of scenarios = 10.

Supplementary Note
Descriptions of communities (Samples A–J)

Bosawás Reserve, Nicaragua (Mayangna)
The Mayangna are indigenous Nicaraguan horticulturalists, living primarily in the forested region of the Bosawas Biosphere Reserve. Their language belongs to the Macro-Chibchan language family. They cultivate staple crops such as beans, rice, manioc, and bananas. Fishing and hunting are leading sources of dietary protein, and they also keep livestock such as cattle, pigs, and fowl. Panning for gold is the leading source of monetary income for most households, and this activity is undertaken by both males and females. Some individuals, mostly males, hold salaried positions as schoolteachers. Wealth inequality is relatively high.

Descent is traced bilaterally, and the Mayangna generally employ the Eskimo kinship terminology (though there is evidence that this stems from recent influence by non-indigenous Nicaraguans). Residence rules are fluid, albeit with an uxorilocal bias. The Mayangna are prescriptively monogamous, though divorce is not uncommon and not stigmatized. Fertility is high, although the increasing availability of hormonal contraception at government clinics shows signs of reducing fertility. They have been converted to Christianity for over a century, and virtually all residents of the study community attend the Catholic church. Other indigenous residents of the Bosawas Reserve include the Miskito, the most numerous indigenous group in Nicaragua.

Located along the Lakus River, the study community is comprised of approximately 41 households. It is among the remotest of Mayangna settlements in Nicaragua, but virtually all adult residents have traveled at least once to non-indigenous communities outside of the reserve.

Interviews took place as part of a broader study of social support networks of all adult residents in the community. The present study was administered to a randomly selected subset of those adults. The interviews were conducted primarily in Mayangna by a tri-lingual assistant who served as the interpreter. For a handful of Miskito participants, the interviews were administered in Miskito. Participants received modest monetary compensation for the interview.

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 Puruh*á*, 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.

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.

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.

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.

China

Shaanxi. XiZhai is a village in Shaanxi province, in 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

Henan. Menglou is a village in Henan province, in Central China—a location with a temperate monsoon climate. The population size is about 3,000. The economy of Menglou is based on farming; the main agricultural products are wheat, cotton and garlic. The local language is Central Plains Mandarin (or Zhongyuan Mandarin)—a member of the Sino-Tibetan family of languages. Menglou villagers are ethnic Han; they are mostly non-religious, although a minority of them are Buddhist or Christian. Menglou 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 Kami city, Okawa village, 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 50 completed questionnaires from 13 communities in 10 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 52 completed questionnaires from 13 communities in 9 town or cities.

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