

# EVOLUTION, CULTURE, AND THE HUMAN MIND

Edited by

Mark Schaller, Ara Norenzayan, Steven J. Heine,  
Toshio Yamagishi, Tatsuya Kameda

 Psychology Press  
Taylor & Francis Group

---

New York London

# 11

## Are Our Minds Fundamentally Egalitarian? Adaptive Bases of Different Sociocultural Models About Distributive Justice

TATSUYA KAMEDA, MASANORI TAKEZAWA,  
YOSUKE OHTSUBO, and REID HASTIE

**E**galitarianism is a morally and ideologically charged concept with many facets. It has been relied on for solutions to moral dilemmas in almost every aspect of human life, including economic, political, legal, racial, gender, and religious domains. As far as material egalitarianism is concerned, however, the ideology that dictates equal sharing of key resources regardless of individual contributions seems to be out of place in today's world, when meritocracy and related capitalist ideologies appear to be becoming more and more dominant. In line with such observations, Francis Fukuyama, an influential American political economist and social philosopher, has argued that the progression of human history as a struggle between ideologies has ended, with the world settling on a capitalist liberal democracy since the end of the cold war and the collapse of the Berlin Wall in 1989 (Fukuyama, 1992). Yet, more than 15 years after the publication of *The End of History and the Last Man*, we (including Fukuyama himself, 2006) are not so sure if the prophecy has been (or will be) fulfilled in a world that is divided by so many religious, cultural, and political barriers.

This chapter takes an adaptationist approach to the ubiquity of egalitarian sharing in human societies. We argue that, although income inequality sharply divides industrialized societies all over the world, material egalitarianism may still operate as a fundamental principle affecting social sharing and exchange under uncertainty in many domains of human activity. We present some preliminary evidence for this claim from an original social survey, ethnographies in anthropology, evolutionary

computer simulations, and behavioral experiments. We then discuss the broader implications of these data sets, concluding with a conjecture that human minds may be structured fundamentally as egalitarian sharers and that merit-based ideologies which pervade our modern lives may be seen as an adjustment on top of such a psychological foundation.

## IS EGALITARIAN SHARING WORKING IN COMPETITIVE SOCIETIES?

Where can we find egalitarianism alive in the modern, competitive societies? One obvious example, morally motivated by this notion, is found in our tax systems. Progressive taxation whereby people with more income pay a higher percentage of it in taxes is common across many liberal democratic societies including the United States, Japan, and the United Kingdom. In principle, income redistribution through such tax systems in combination with various social welfare policies reduces gaps between the rich and the poor, trending toward ultimate equality. Other less obvious examples may be found in medical policies concerning organ transplantation and in workers' attitudes about job layoffs (Elster, 1992). In most countries, organ recipients are selected not only on the basis of need and compatibility but also on a somewhat egalitarian scheme that considers how long the patients have been on the waiting list. Likewise, there is some evidence that people prefer work-sharing (i.e., working fewer hours) to layoffs as a solution to a shrinking labor market. In either case, a purely market-driven solution (e.g., buying and selling of organs) is avoided.

## DIFFERENTIAL ENDORSEMENT OF EGALITARIAN IDEOLOGY

As illustrated by these examples, material egalitarianism seems to be still alive and sometimes institutionalized in some key institutions of our societies. Do we actually endorse egalitarian sharing as a general social policy? What factors underlie people's (possibly different) preferences for distribution rules? We conducted a preliminary survey to address this question with students from seven Japanese universities. These students answered a series of questions regarding their preferences for various resource allocation schemes. One example question is shown in Figure 11.1.

Division A is an allocation proportional to individual production levels (referred to as an equity rule in social psychology; Adams, 1965), whereas Division B follows an egalitarian rule. Notice that the recipient's (*Y*'s) share is the same in the two divisions. Note this question asked about preferences for resource allocation beyond direct self-interest—preferences for a desirable *social* state rather than a desirable *personal* state. Among a total of 1,322 Japanese students who answered the question, 73% chose Division B, which dictated an egalitarian allocation. More important, the proportion of egalitarian-ideology endorsers differed substantively across the seven schools, ranging from 63% to 83%. How can we explain these

Imagine that you participated in a TV quiz show as a member of a 3-person team. You were teamed with two other persons, *X* and *Z*, whom you met for the first time at the show. In the quiz, *X* gave 2 answers correctly, you (= *Y*) gave 3 answers correctly, and *Z* gave 4 answers correctly. Thus, in total, your team answered 9 questions correctly, winning the first prize, 180,000 yen.

As to how to share the award, which division would you prefer between the following two?

	<i>X</i>	<i>Y (=You)</i>	<i>Z</i>
Division A:	40,000	60,000	80,000
Division B:	60,000	60,000	60,000

Figure 11.1 An example question about distributive ideologies used in the survey.

differences? Although these universities differed along many dimensions, including urban versus rural, size of the student body, private versus public, and so on, only one factor was correlated with the differences in the proportion of egalitarian endorsers—the social rank of the university. Students in the less prestigious schools, who tended to be from working-class families, endorsed the egalitarian ideology at higher rates. The correlation between the social rank of the university and the proportion of egalitarian-ideology endorsers was substantial ( $r = -.85$ ). A hierarchical linear model analysis further confirmed this observation; after controlling for the macrolevel (university) factor, socioeconomic status (e.g., income, education) of each student's parents was the strongest predictor of the student's attitude toward the egalitarian ideology.

## WHERE DO THESE SOCIAL-CLASS DIFFERENCES COME FROM?

These results suggest that distributive ideologies may be different in middle-class versus working-class populations. Then, why do blue-collar, working-class citizens endorse the egalitarian ideology more strongly than white-collar, middle-class citizens? Although the two classes could vary on many dimensions, we conjecture that the differential degree of uncertainty concerning the supply of vital resources in life (e.g., jobs, housing, health) may be a key. It is true that in modern societies various buffers operate to manage uncertainty about resources, including pension funds, health insurance, and so on. Yet, the availability of such buffers may differ across individuals within the same society, along with the availability of other *personal* defenses against uncertain fate (e.g., personal wealth, education). Compared to white-collar citizens, blue-collar citizens have less access to such buffers and are

more susceptible to injury from various life uncertainties. An egalitarian system, based on a distributive ideology dictating equal allocation of resources regardless of members' different production levels, would buffer some of the damage that unexpected life events inflict on individual welfare.

Thus, we argue that egalitarian ideology, as endorsed by blue-collar, working-class citizens, may be seen as a *collective* solution to cope with life uncertainties, when *personal* solutions (e.g., wealth, education) are unavailable. We also think that this type of collective solution for life uncertainties may have operated in many human societies until quite recently, possibly supporting the evolution of psychological algorithms designed to deal with resource uncertainty and sharing. In the following, we develop this argument with several lines of evidence, including ethnographies in anthropology, evolutionary computer simulations, and behavioral experiments.

## ETHNOGRAPHIES IN ANTHROPOLOGY

Sharing important resources, such as food, with nonkin associates is a general practice in human societies. Although a primitive form of food sharing is known in some primates (de Waal, 1996), no primate other than humans has broad social-sharing habits. Anthropologists have studied social exchange and sharing in various hunter-gatherer societies to explore their origins and early forms. Kaplan and Hill (1985) observed that food transfers among the Ache foragers, who live in subtropical eastern Paraguay, show markedly different patterns for hunted meat (e.g., peccary) and collected resources (e.g., cassava). Although some collected resources are shared with nonfamily members, hunted meat is much more likely to be the target of communal sharing. Because sharing with kin is a universal practice across many species (Hamilton, 1963), the central question here is why hunted meat is shared communally beyond the acquirer's direct kin and why different sharing norms apply to different resources within the same culture.

### *Risk-Reduction Hypothesis*

Kaplan and Hill (1985) explained these differences in terms of the degree of uncertainty involved in resource acquisition. Although provision of vegetables and fruits is relatively stable and dependable, acquisition of meat is a highly variable, uncertain prospect. On average, there is a 40% chance that an Ache hunter will come back from a hunt empty-handed. It is essential for the Ache to manage the variance associated with meat acquisition, securing a stable supply of the precious resource. Storage by freezing or other preservation methods is not efficient in a hunter-gatherer situation. Kaplan and Hill (1985) argued that, instead, the sharing system functions as a collective risk-reduction device. By including many individuals in the risk-pooling group, the variance in meat supply decreases exponentially. Once established and maintained, the communal-sharing system will buffer the variance in the meat supply.

Recently, Gurven (2004) provided a comprehensive review of worldwide ethnographic examples about food-transfer patterns. According to his review,

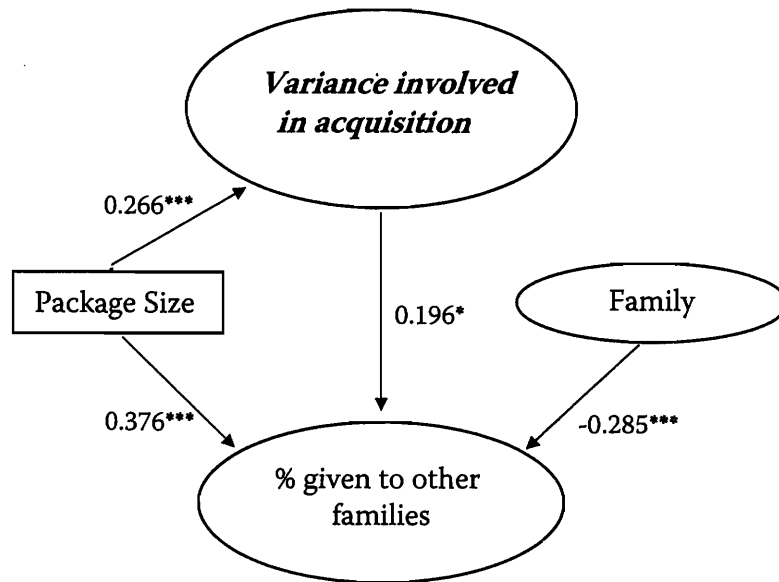


Figure 11.2 What determines how much a Hiwi acquirer gives to other families? *Note.* “Variance involved in acquisition” refers to a composite index involving the degree of asynchrony in acquisition of the resource among individuals, variation of encounter rates in search, and variation in energy per pursuit. Only significant paths are shown in the figure (based on Gurven, 2004, with minor modifications). \*  $p \leq .05$ , \*\*\*  $p < .001$ .

communal sharing of hunted meat is robust across many primordial societies, including forager-agriculturalists and hunter-gatherers. Figure 11.2 depicts results of a path analysis about food transfers among the Hiwi foragers who used to live in southwestern Venezuela (based on Gurven, 2004, with minor modifications by the present authors). As can be seen in the figure, variance involved in acquisition is a significant predictor of the percentage of the food resource given to other families, when controlling for package size (e.g., big game versus small game) of the resource as well as family size of the acquirer.

Although communal sharing of hunted meat in hunter-gatherer societies does not necessarily mean that the food items are shared exactly equally (Gurven, 2004), the notion of risk reduction fits closely with our observation that the egalitarian ideology was endorsed more strongly by working-class citizens than by middle-class citizens. Yet, is the communal-sharing system robust and sustainable as a collective risk-reduction device under uncertainty?

## EVOLUTIONARY COMPUTER SIMULATIONS

### *Problem of Egoism*

The risk-reduction hypothesis is a functional explanation; the communal-sharing system serves the survival of the whole group. If the system exists, everybody is better off under uncertainty. Yet, from the adaptationist perspective that focuses on fitness outcomes to each individual, this explanation leaves one critical question unanswered—the problem of egoism in social dilemmas (Dawes, 1980). Hunted meat, especially when a large portion is acquired, is regarded as a common property in most hunter-gatherer societies; the process of meat distribution is treated

as appropriation from the public domain. Then, what if some individuals behave as egoists who share in other people's acquisitions but are declining to share their own acquisitions with others? Such egoists might be better off in terms of individual fitness than are those who are loyal to the communal-sharing norm. If so, Darwinian logic implies that such egoists would proliferate, eventually coming to dominate the group. The risk-reduction explanation is incomplete, because it is silent about how the proliferation of such egoists is suppressed.

### *Evolutionary Games*

The social dynamics as illustrated previously are analogous to biological competition for an ecological niche, in that a behavioral trait producing more beneficial outcomes spreads and eventually dominates in a population. Biologists and economists have developed a mathematical tool, evolutionary game theory, for modeling such adaptive dynamics (Gintis, 2000; Maynard Smith, 1982). Evolutionary game theory is different from classical game theory in that it does not assume that players are superhuman information processors. Instead, it represents various behavioral tendencies as strategies in a game and examines how each strategy performs against other strategies in terms of net profit. Even though a given strategy may be limited by players' information-processing capacity, it will proliferate gradually in the population if it can outperform other strategies.

We (Kameda, Takezawa, & Hastie, 2003) developed an evolutionary game theory model for the emergence of a communal-sharing norm when foraging under conditions of uncertainty. Our model assumed that, because of the highly uncertain nature of meat acquisition, an individual hunter constantly faces two kinds of decision problems: how to behave when successful, and how to behave when unsuccessful. This analysis yields four mutually exclusive and exhaustive behavioral strategies, depicted in Table 11.1; each individual in a group is assumed to behave according to one of these strategies. The model also posits that, because of the highly uncertain nature of hunting, acquisition of meat by some members yields a large asymmetry in resource level between haves and have-nots (cf. the "twists of fate" situation as conceived of by Kelley et al., 2003). A hunter's attempt to monopolize the meat under such situations can lead to fights with other community members who demand communal sharing, imposing a cost on each loser. In other words, those communal sharers, the purest supporters of an egalitarian ideology (see Table 11.1), try to punish the violator and enforce the sharing norm by engaging in costly fights. The theoretical question then becomes whether the communal sharers outperform members pursuing alternative strategies (the egoists, in particular). If the communal sharers perform well, the evolutionary logic implies that they will proliferate and dominate in the group, resulting in the establishment of a communal-sharing system.

### *Computer Simulations*

A series of evolutionary simulations in which model parameters (group size, resource value, fighting cost) were varied systematically revealed the following results. First,

TABLE 11.1 Four Behavioral Strategies in the Evolutionary Game Model When Resource Acquisition (Hunted Meat) Is Uncertain

When one is a successful hunter	When one is an unsuccessful hunter	
	Demands share of meat as a common property	Grants successful hunter's private ownership
Provisions as a common property	<i>Communal sharer</i>	<i>Saint</i>
Claims private ownership of meat	<i>Egoist</i>	<i>Bourgeois</i>

even when communal sharers were introduced as a rare “mutant” strategy into an egoist-dominant group, they overcame the initial handicap in frequency and dominated the group rather quickly, within a few hundred iterations (“generations”). Second, once dominant, the communal sharers continued to outperform any other mutant strategies (egoist, saint, bourgeois; see Table 11.1) in fitness, thus blocking their intrusion into the group. In all simulation runs, the dominance of communal sharers continued over thousands of generations. Figure 11.3 displays a representative result of such simulation runs (see Kameda et al., 2003, for details).

In terms of evolutionary game theory, these results imply that communal sharing is an *evolutionarily stable strategy*. The egoist strategy does not qualify as such, because egoists’ attempts to defend their own acquisitions against many have-nots (including other egoists who were unsuccessful) tax them heavily in fighting costs. But how sensitive is this result to model parameters such as group size, resource value, and fighting cost? A sensitivity analysis, whereby we varied the parameters systematically, revealed that the communal-sharing strategy was indeed robust.

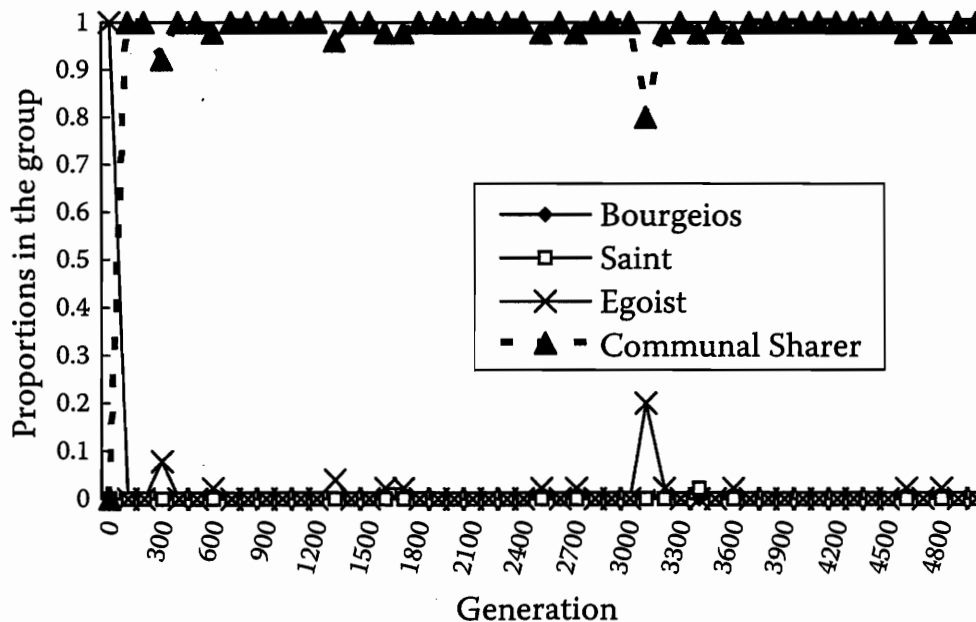


Figure 11.3 Representative results of a simulation run: Communal sharers can invade an egoist-dominant group and resist invasion by other “mutant” strategies (cited from Kameda, Takezawa, & Hastie, 2003).



For instance, except in rather unrealistic conditions in which the cost of potential injury accruing from a fight was essentially nonexistent (i.e., smaller than 0.3% of the resource value), the communal-sharing strategy always qualified as an evolutionarily stable strategy. In other words, in terms of individual fitness maximization, the communal-sharing norm consistently emerged and persisted under a broad parameter conditions, overcoming the problems of egoism and free riding in norm enforcement (Axelrod, 1986; Yamagishi, 1986).

## RESOURCE-SPECIFIC ALTRUISM

### *Windfall as a Common Property?*

Thus far, the argument has been strictly ecological: An adaptive strategy (e.g., communal sharing) should emerge in response to local ecology (e.g., a hunter-gatherer environment). Given that uncertainty in resource supply was a recurrent, adaptive problem faced by archaic hominids in the ancestral environment (Cosmides & Tooby, 1992), however, it is likely that human psychology is equipped with evolved algorithms designed specifically to deal with resource uncertainty and sharing. People's reactions to "windfall profits" may provide a case in point: People use windfall money, more often than money acquired by labor, for altruistic purposes such as treating friends or donating to charities. Although the fungible resource under consideration is the same (money), different habits seem to be triggered depending on how the resource is acquired. A common explanation for this phenomenon is provided by the labor theory of value ("money earned without effort is valued less"). Our evolutionary game theory analysis suggests, however, that the key factor triggering sharing may be the uncertainty associated with the acquisition of the resource rather than the absence of effort. As Cosmides and Tooby (1992) noted, "Information about variance in foraging success should activate different modes of operation of these algorithms, with high variance due to chance triggering a psychology of sharing" (p. 213).

### *Behavioral Experiments*

We (Kameda, Takezawa, Tindale, & Smith, 2002) tested this possibility by conducting vignette experiments in which the uncertainty factor was manipulated independently of the effort factor. We provided Japanese and American participants with a series of hypothetical scenarios in which they (or a friend) obtained some money, either (a) contingent on investing substantial effort, (b) unexpectedly but after investing substantial effort (i.e., low contingency between effort and outcome; chance was another key factor for success, yielding high outcome variance in the situation), or (c) unexpectedly with almost no effort. Table 11.2 presents one of the scenarios used in the experiment.

Participants were then asked to rate their willingness to share the money with a friend (or the extent to which they would demand some share from a friend). The results showed that the Japanese sample tended to be more generous and demanding than the American sample, essentially replicating the previous

TABLE 11.2 Example Scenarios (“Prize-Giveaway”) Used in Kameda, Takezawa, Tindale, and Smith (2002)

**Certain/High-Effort Condition**

An acquaintance requested you to fill out application forms for a prize-giveaway. It was a tedious job to fill out the forms. You completed 50 forms in total. Your acquaintance paid you \$100 for this service.

**Uncertain/High-Effort Condition**

You decided to apply for a prize-giveaway. Although it was a tedious job to fill out the application forms, you completed 50 of them to increase the chance to win. Later, you found that you won a prize of \$100.

**Uncertain/Low-Effort Condition**

You decided to apply for a prize-giveaway and submitted one application form. Later, you found that you won a prize of \$100.

finding that Japanese prefer equal distributions more than Americans (cf. Bond, Leung, & Wan, 1982). But more important, both Japanese and American participants were more willing to share (and demand more sharing for) the unexpected money, even when the amount of effort invested was identical for expected and unexpected gains. These differences were significant, even when personal ideologies about desirable distribution were controlled for; endorsers of merit-based ideology and of egalitarian ideology were both affected by the uncertainty factor.

This was also confirmed by a laboratory experiment (Study 4 in Kameda et al., 2002). After participants were paid for their work during the experiment, they were solicited to donate some money to help participants in another unrelated experiment. Even though they had received the identical amount of money for the identical amount of work, participants whose final rewards were determined in a random manner by using a roulette wheel of fortune made a greater donation than those who were rewarded in a deterministic manner. Notice that the modern notion of property rights makes no distinction between the legitimacy of entitled ownership in these two conditions.

*Is Social Sharing Under Uncertainty Always Conducted Willingly?*

The “just” view of egalitarianism as proposed by several moral philosophers (e.g., Rawls, 1971) implies that this rule is internalized as a basic moral value that binds us, unconditionally, under uncertainty. The “windfall psychology” could be interpreted as a manifestation of such a basic moral principle. Yet, we feel that this is probably an overstatement. Instead, we believe that an acquirer of a resource under uncertainty shows some egalitarian tendency behaviorally but not always willingly. In other words, an image of a “reluctant or cautious sharer” may be a more accurate description of the behavior than the image of a moralistic sharer.

Several lines of research provide support for this view. Eckblad and von der Lippe (1995) investigated 261 lottery winners of prizes of 1 million Norwegian kroner (\$150,000). Those winners were asked about various psychological reactions

after winning the prizes. The results revealed that a wish for anonymity, together with fear of envy from others, was one of the most frequent reactions among the respondents. Social sharing there, if any, could thus be characterized as a “vigilant sharing” (Erdal & Whiten, 1994), whereby distribution of the prize resulted from the vigilance of envious nonwinners who would immediately benefit from sharing.

Research on the ultimatum bargaining game by experimental economists is also illuminative of this point. Ultimatum bargaining is a two-person game in which Player 1 (proposer) divides a resource, and Player 2 (responder) then decides to either reject or accept the division. If Player 2 rejects the proposed division, both players receive nothing (Güth, Schmittberger, & Schwarze, 1982). Reviewing those studies of “one-shot” ultimatum games (played with a partner only once without switching roles), Camerer (2003) summarized the findings as follows:

The results ... are very regular. Modal and median ultimatum offers are usually 40–50 percent and means are 30–40 percent. There are hardly any offers in the outlying categories of 0, 1–10, and the hyper-fair category 51–100. Offers of 40–50 percent are rarely rejected. Offers below 20 percent or so are rejected about half the time. (p. 49)

Although exact frequencies of offers vary across societies, depending on the local cultural norms and ecological condition (see Henrich et al., 2004), no study has ever demonstrated that extremely small offers (1% to 10%) were a modal response. Notice, given that small offers are frequently rejected in the ultimatum game, it is vital for proposers to anticipate responders’ expectation for fairness and to offer more equitable divisions of the resource. As we conceive it, this situation is parallel to meat sharing under uncertainty—to the extent that some (many) have-nots in the group expect a share of the meat, it is to one’s personal advantage to share the meat with them.

To summarize, acquirers (lottery winners, proposers in the ultimatum game, successful hunters) should be highly sensitive to the expectations of nonacquirers. Put differently, it may be the case that nonacquirers play an active, initiative role in social sharing, either implicitly or explicitly (cf. Bliege Bird & Bird, 1997; Blurton Jones, 1987; Hawkes, O’Connell, & Blurton Jones, 2001). This reasoning implies that there may be some asymmetry between acquirers and nonacquirers, with the psychology of windfalls being more easily and more vigorously evoked among non-acquirers. Given that the modern notions of property rights operate in exactly the opposite way (i.e., sharing is at the acquirer’s discretion), this poses an intriguing possibility awaiting future investigations.

## CONCLUSION

In this chapter, we reviewed four sets of empirical and theoretical results with implications for the adaptive bases of material egalitarianism. To recapitulate, the social survey with Japanese university students showed that the egalitarian ideology was endorsed more strongly by blue-collar, working-class citizens than by white-collar, middle-class citizens. The cross-cultural ethnographies of primordial

societies revealed that variance in acquisition of a food resource is a key determinant of how much of the resource is shared with nonfamily members. The agent-based computer simulations showed that such a communal-sharing strategy is evolutionarily stable in uncertain environments. Last, both American and Japanese students showed the “windfall psychology” about uncertain resources, independent of their personal distributive ideologies.

What are the overall implications of these findings? Let us speculate. Given that uncertainty in resource supply was a recurrent adaptive problem in the Environments of Evolutionary Adaptedness (EEA) and that most humans have been unable to solve this problem individually until quite recently, our minds may have been built, by evolution, as egalitarian sharers. (Again, it should be emphasized that the image of the egalitarian sharer we propose here is not “moralistic,” as envisaged by Karl Marx, John Rawls, and other social philosophers, but better described as “cautious,” someone who reluctantly evinces an egalitarian tendency to preempt the implicit demands of others.) An egalitarian psychology could be an evolved adaptation to high uncertainty in the EEA and, if so, should be a pan-human universal.<sup>1</sup> Ethnographies of hunter-gatherer groups, evolutionary game analyses of communal sharing, and the operation of a windfall psychology all support this conjecture.

Yet, this cannot be the whole story. Recall, in our survey, that white-collar, middle-class citizens were less supportive for the egalitarian ideology than blue-collar, working-class citizens. How can such variations within the same society emerge and be sustained over time? We think that these within-society variations should be viewed as a consequence of adaptations to respective local ecologies, which have taken place over many generations. Recall that in the event that personal buffers are insufficient, a communal-sharing norm and its psychological counterpart (an egalitarian ideology) may represent the only viable adaptive solution available to ancestral humans when faced with uncertainty under poor ecological conditions. As pointed out by historians, however, modernization has freed a substantial portion of the population (the middle class) from this basic state through the accumulation of personal wealth and other buffers (e.g., education). Middle-class ideology can thus be seen as a new adaptation to the enriched ecology, inserted on top of a fundamentally egalitarian mind.

It is important to realize that macrosocial systems have played a vital role in emergence and persistence of related new adaptations over time. Merit-based education and employment systems, which are cornerstones of liberal democratic societies, provide a case in point. What longitudinal consequence do these social systems yield? As repeatedly pointed out by economists and sociologists, the merit-based systems perpetuate social classes across generations—because they have greater access to economic and cultural resources, children born into middle-class families are more likely to have white-collar jobs when they come of age than children born into working-class families (Bourdieu & Passeron, 1990; Bowles, Gintis, & Groves, 2005; Coleman, 1990). This means that material conditions of the parents’ generation are largely inherited by the children; the degree of life uncertainties experienced by children is also essentially similar to those experienced by their parents. Thus, fixations of different distributive ideologies and related values across

middle and working classes would result via the ecological inheritance of different material conditions, as well as via differential socialization processes.

We believe that such a “niche-construction” perspective, focusing on the complex relationships between microbehavior and macrosocial structure (Laland, Odling-Smee, & Feldman, 2000), is essential to explain different sociocultural models of distributive justice. Social justice systems that exist in our world may be highly complex and varied, yet they can all be understood as adaptations to respective social and natural ecologies where people live, that is, as adjustments to local ecologies on top of the fundamentally egalitarian mind.

## ACKNOWLEDGMENTS

Writing of this chapter was supported by the Grant-in-Aid for Scientific Research 17330133 from the Ministry of Education, Culture, Sports, Science, and Technology of Japan to the first author. We are grateful to Paul Wehr, Ryo Tamura, Keigo Inukai, Nobuyoshi Ishibashi, Megumi Iwabuchi, and Joanna Schug for their helpful comments.

## NOTE

1. We conjecture that the type of psychological universality here falls into the category of “functional universality” (Norenzayan & Heine, 2005), where the focal psychological process operates in all cultures, serves an identical adaptive function, but can vary across cultures in the extent to which it is activated. The experimental result that resource sharing was enhanced under uncertainty in both Japan and the United States but to a different extent is in line with this speculation.

## REFERENCES

- Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp. 267–299). New York: Academic Press.
- Axelrod, R. (1986). An evolutionary approach to norms. *American Political Science Review*, 80, 1095–1111.
- Bliege Bird, R. L., & Bird, D. W. (1997). Delayed reciprocity and tolerated theft: The behavioral ecology of food-sharing strategies. *Current Anthropology*, 38, 49–77.
- Blurton Jones, N. (1987). Tolerated theft: Suggestions about the ecology and evolution of sharing, hoarding, and scrounging. *Social Science Information*, 26, 131–144.
- Bond, M. H., Leung, K., & Wan, K. C. (1982). How does cultural collectivism operate? The impact of task and maintenance contributions on reward distribution. *Journal of Cross Cultural Psychology*, 13, 186–200.
- Bourdieu, P., & Passeron, J. C. (1990). *Reproduction in education, society and culture* (2nd ed.). London: Sage.
- Bowles, S., Gintis, H., & Groves, M. O. (Eds.). (2005). *Unequal chances: Family background and economic success*. Princeton, NJ: Princeton University Press.
- Camerer, C. (2003). *Behavioral game theory: Experiments in strategic interaction*. Princeton, NJ: Princeton University Press.

- Coleman, J. S. (1990). *Foundations of social theory*. Cambridge, MA: Harvard University Press.
- Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 163–228). Oxford, UK: Oxford University Press.
- Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology*, 31, 169–193.
- de Waal, F. B. M. (1996). *Good natured: The origins of right and wrong in primates and other animals*. Cambridge, MA: Harvard University Press.
- Eckblad, G. F., & von der Lippe, A. L. (1995). Norwegian lottery winners: Cautious realists. *Journal of Gambling Studies*, 10, 305–322.
- Elster, J. (1992). *Local justice: How institutions allocate scarce goods and necessary burdens*. New York: Russell Sage Foundation.
- Erdal, D., & Whiten, A. (1994). On human egalitarianism: An evolutionary product of Machiavellian status escalation? *Current Anthropology*, 35, 175–178.
- Fukuyama, F. (1992). *The end of history and the last man*. New York: Free Press.
- Fukuyama, F. (2006). *America at the crossroads: Democracy, power, and the neoconservative legacy*. New Haven, CT: Yale University Press.
- Gintis, H. (2000). *Game theory evolving: A problem-centered introduction to modeling strategic behavior*. Princeton, NJ: Princeton University Press.
- Gurven, M. (2004). To give or not to give: An evolutionary ecology of human food transfers. *Behavioral and Brain Sciences*, 27, 543–559.
- Güth, W., Schmittberger, R., & Schwarze, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior and Organization*, 3, 367–388.
- Hamilton, W. D. (1963). The evolution of altruistic behavior. *American Naturalist*, 96, 354–356.
- Hawkes, K., O'Connell, J. F., & Blurton Jones, N. G. (2001). Hadza meat sharing. *Evolution and Human Behavior*, 22, 113–142.
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., & Gintis, H. (Eds.). (2004). *Foundations of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies*. Oxford, UK: Oxford University Press.
- Kameda, T., Takezawa, M., & Hastie, R. (2003). The logic of social sharing: An evolutionary game analysis of adaptive norm development. *Personality and Social Psychology Review*, 7, 2–19.
- Kameda, T., Takezawa, M., Tindale, R. S., & Smith, C. (2002). Social sharing and risk reduction: Exploring a computational algorithm for the psychology of windfall gains. *Evolution and Human Behavior*, 23, 11–33.
- Kaplan, H., & Hill, K. (1985). Food sharing among Ache foragers: Tests of explanatory hypotheses. *Current Anthropology*, 26, 223–246.
- Kelley, H. H., Holmes, J. G., Kerr, N. L., Reis, H. T., Rusbult, C. E., & Van Lange, P. A. M. (2003). *An atlas of interpersonal situations*. Cambridge, UK: Cambridge University Press.
- Laland, K. N., Odling-Smee, J., & Feldman, M. W. (2000). Niche construction, biological evolution, and cultural change. *Behavioral and Brain Sciences*, 23, 131–175.
- Maynard Smith, J. (1982). *Evolution and the theory of games*. Cambridge, UK: Cambridge University Press.
- Norenzayan, A., & Heine, S. J. (2005). Psychological universals: What are they and how can we know? *Psychological Bulletin*, 131, 763–784.
- Rawls, J. (1971). *A theory of justice*. Cambridge, MA: Harvard University Press.
- Yamagishi, T. (1986). The provision of a sanctioning system as a public good. *Journal of Personality and Social Psychology*, 50, 110–116.