Chapter 6

Better to Receive Than to Give: Hadza Behavior in Three Experimental Economic Games

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High levels of cooperation can be achieved via strong reciprocity in which individuals cooperate with cooperators, defect on defectors, and punish even those who defect on third parties (Fehr, Fischbacher, and Gächter 2002). Much human cooperation could have its origins in the extensive food-sharing that is typical of hunter-gatherers, and food-sharing could be based on strong reciprocity. If so, then we might expect that in games that measure norms of sharing, hunter-gatherers would cooperate by sharing stakes equally, would punish those who do not share with them equally, and would punish third parties who do not share the stakes equally with others. Here I report on three games that measure norms of sharing, the dictator game (DG), the ultimatum game (UG), and the third-party punishment game (TPG), which I played with Hadza hunter-gatherers of Tanzania in 2002 as part of a cross-cultural, experimental economics project (see chapter 3).

The results of the 2002 games were largely consistent with earlier results in the DG and UG that I played with the Hadza in 1998 (Marlowe 2004a, 2004b). As in the 1998 DG and UG, the Hadza in 2002 gave low amounts to their partners in these games relative to other societies tested here and previously (Henrich et al. 2004; Marlowe 2009; Marlowe et al. 2008; Marlowe et al. 2011). The only predictor of offers in 1998 was camp population, with people in larger camps giving higher offers. Population was not a significant predictor this time. The best predictor of offers was head of household status, with household heads giving higher offers.

As in 1998, the Hadza rejected at a high rate low offers given to them when they were in the role of the receiver, but the TPG revealed that they did not punish at a high rate those who gave low offers to third parties. Even though these games were one-shot and anonymous, unlike their daily interactions, deciding how much money to give another might remind the Hadza of the situation they face every day when they give food to others. If it does, the combination of low offers, high rejections, and low punishment of third parties indicates that strong reciprocity is a poor explanation of Hadza food-sharing.

THE HADZA

The Hadza are hunter-gatherers who live in northern Tanzania in a savanna-woodland habitat. The total population is about one thousand. The Hadza live in camps that average twenty-nine people, and they move four to ten times a year (Marlowe 2002, 2006). During the dry season, camps grow larger because there are only so many permanent waterholes. In these larger camps,

there is noticeably more bickering, as the Hadza themselves point out. During the rainy season, water is no constraint, so large camps break up into many smaller camps. People often visit or move into other camps, and this fluid movement partly explains Hadza egalitarianism: anyone who is bothered by someone trying to boss them around can simply move away from the bossy person (Vehrencamp 1983).

The Hadza enjoy great individual freedom from an early age, and there are few socially imposed rules. There is no wedding ceremony, and marriages are not arranged. First marriages follow brief courtship and premarital sex. If all goes well, the couple soon begins living together. The age at first marriage for females is seventeen years and for males twenty years. About 4 percent of the men have two wives (Marlowe 2003). There is a fairly high rate of divorce, so the best term to describe the mating system is "serial monogamy" (Blurton Jones et al. 2000). Couples live with the kin of the wife or the husband, or both, or neither. In a census of couples whose mothers were alive, 68 percent were living in the same camp with the wife's mother (Woodburn 1968).

The Hadza are central place provisioners (Marlowe 2006). They often feed themselves while foraging, but they also take food back to camp. Men collect honey and use bows and arrows to hunt game that ranges in size from small birds to giraffes (Marlowe 2002, 2003). Men usually go hunting alone during the day, but during the late dry season they wait at waterholes to ambush animals that come to drink. They always do this in pairs because of how dangerous it is: other predators use the same hunting strategy. Once an animal is hit, the hunter often returns to camp and gets other men to help him track the wounded animal. During honey season, men use the axes they make to break into beehives. While men usually go alone, a man's wife may join him when he goes for honey and she will forage for other foods, and sometimes men go for honey in groups of two or three. When men bring honey back to camp, it often gets shared with those present, but unlike larger game, it can sometimes be concealed and then directed to a man's household (Marlowe 2003). When men bring medium-sized and large game into camp, it is shared with all others, and each household gets pretty equal shares (Hawkes, O'Connell, and Blurton Jones 2001). There are no formal rules about who gets how much meat or what parts, other than the few special parts of large game animals (neck, heart, liver), which are supposed to be eaten only by grown men (Woodburn 1998).

Women gather fruit and berries and dig tubers. They usually go foraging every day in groups of three to eight (Marlowe 2006). A mother will take her nursing infant with her, but leave her weanlings in camp. Once children reach about seven or eight years old, they may accompany the women on forays. By ten years of age, children are able to acquire about half of the food they need (Blurton-Jones, Draper, and Hawkes 1994). When women are digging tubers, they often help others. For example, a woman may lever large boulders up so that another woman can get at the tuber, and sometimes they take turns digging the same tuber. Women may also help each other when they are picking berries. For example, one woman may pull a branch down so that another can reach the berries. In general, there tends to be less cooperation when women are collecting baobab fruit off the ground. Even though, relative to men, more of the food women take back to camp is shared only within the household or with close relatives, a considerable amount is also shared with others.

METHODS

The standard protocol for our project was followed (see chapter 3). Here I describe only those methods that varied by site and researcher. To avoid the possibility that people would influence others with their comments while all were gathered to listen to a group instruction, instructions for the games were not given in a group setting, but only in private just before play began.

The stake in all three games was 2,000 Tanzanian shillings, which is about one day's wage in Tanzania.[1] The money consisted of ten 200-shilling coins, which worked as a visual aid. Because the Hadza have no written language and most of them have had very little, if any, education, dealing with numbers is difficult for most Hadza. Using the ten coins made it easy to do the addition and subtraction necessary to figure out how much money would go to each player, because the ten coins were laid out in front of them and they could move them around.

The games were played in six different camps altogether, with populations of twenty, twenty-two, twenty-four, twenty-seven, twenty-nine, and seventy-six. The DG and UG were played in four of these camps and the TPG in three of the same camps, plus two others. I played with each player individually. As there were no buildings, the only place where one could have some privacy was in the car. Thus, I sat with the player in a Land Rover with the windows covered so that anyone standing outside could not see in, and I alone gave instructions to each player. Then trials were run to ensure that players understood the games before actually beginning to play.

RESULTS

Altogether, 111 people played in the three games. Thirty-one pairs played the DG and UG, and 27 threesomes played the TPG. All sixty-two people played in the same role of either player 1 or player 2 in the DG and UG. Among those, thirteen player 1s were also a player 1 in the TPG, and sixteen player 2s were also a player 2 in the TPG. One player 1 was a player 3 in the TPG, and one player 2 was a player 3 in the TPG. In the sample as a whole, there were sixty-four men (mean age = 36.1, standard deviation = 14.6) and forty-seven women (mean age = 36.3, standard deviation = 16.0). Figure 6.1 shows the demographics of the total sample in all three games.

In the DG, the modal offer was 0 percent (mean = 26 percent, standard deviation = 25, N = 31). In the UG, the modal offer was 10 percent (mean = 26 percent, standard deviation = 17, N = 31). In the TPG, the modal offer was 0 percent, with a secondary mode at 50 percent (mean = 26 percent, standard deviation = 19, N = 27) (see figure 6.2). The means are all very close to the means of offers in 1998, though the modal offers were lower this time (table 6.1).

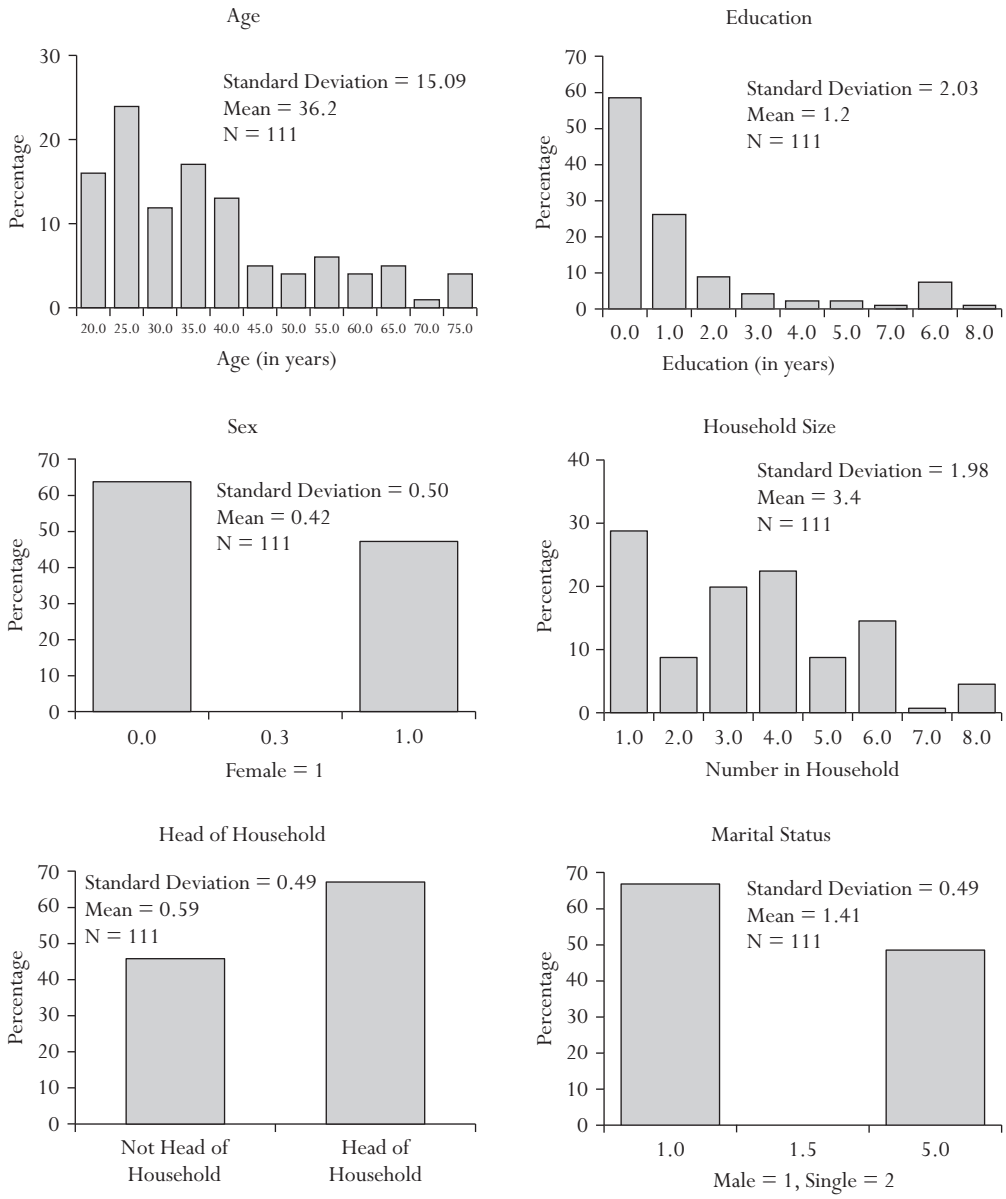
There were no significant sex differences in offers, though men gave slightly higher amounts in all three games (DG mean: male = 31 percent, female = 18 percent; UG mean: male = 29 percent, female = 22 percent; TPG mean: male = 33 percent, female = 19 percent). There were also no significant sex differences in the tendency to punish in the TPG or to reject in the UG.

Offers by player 1 in the DG were correlated with their offers in the UG ($r = 0.498$, $p = 0.004$, N = 31). There was also a weakly significant correlation between offers in the UG and the TPG ($r = 0.488$, $p = 0.091$, N = 13). There was no correlation between the offers in the DG and those in the TPG ($r = 0.155$, $p = 0.613$, N = 13).

Offers by player 1 in the DG were somewhat higher if he or she was a household head (Mann-Whitney $U = 47$, $p = 0.085$, N = 31) (figure 6.3). Household heads were husbands for couples living together. In one case a woman was married but her husband was off working in a game park for a long time, so she was the household head. Single women were considered the household head unless they were very old and living with a son or daughter or an elderly sister or friend, in which case neither was considered the head. In two cases single women were living with their mothers, who were considered the household head because they still had young children of their own. Single men were considered household heads unless sharing a sleeping spot with other single men, in which case none were considered the head.

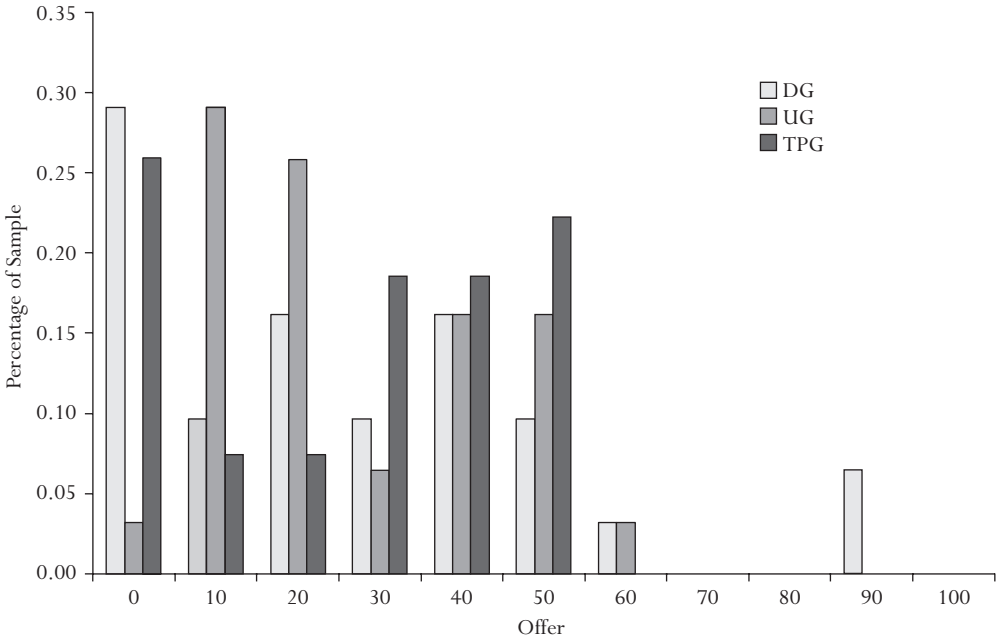
A multiple linear regression of DG offers onto the independent variables of age, sex, education, and household size revealed that none were significant predictors (table 6.2). Since income and household wealth have no meaning among the Hadza, I omitted these variables.

FIGURE 6.1 *Demographic Characteristics of the Hadza*



Source: Author's calculations based on author data.

FIGURE 6.2 *Hadza Offers in the Dictator Game, the Ultimatum Game, and the Third-Party Punishment Game*



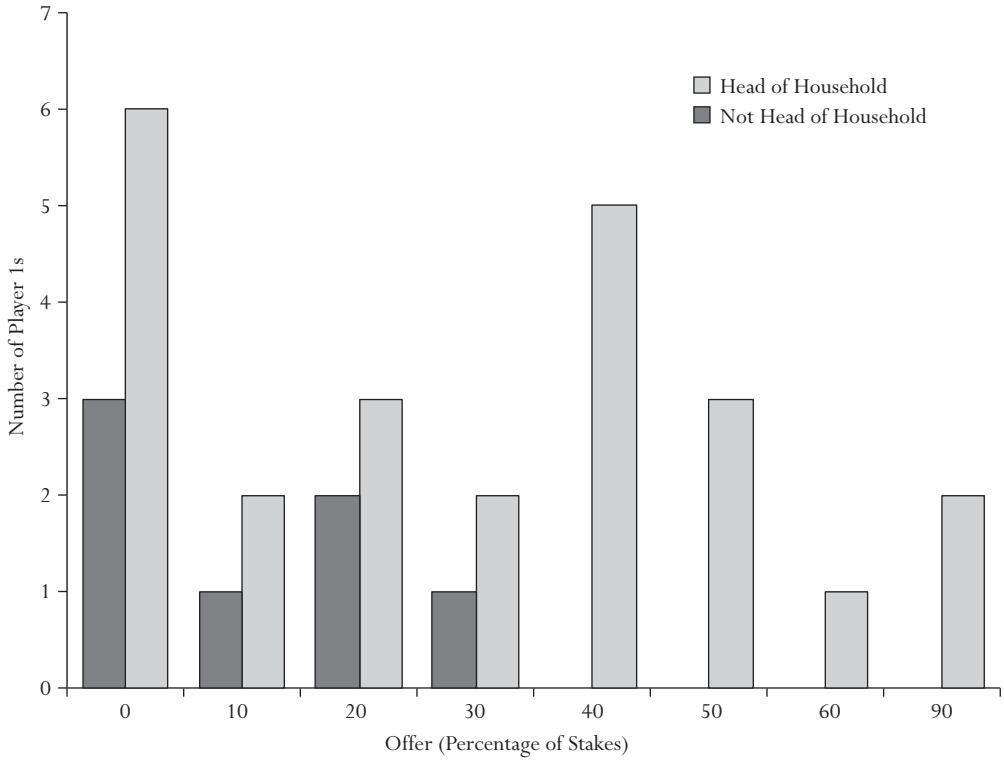
Source: Author's compilation based on author dates.

TABLE 6.1 *Results in the 2002 Round Compared to the 1998 Rounds*

	DG	UG	TPG
1998			
Mode	10	20	
Mean ± Standard deviation	20 ± 16.2	33 ± 17	
N	43	55	
2002			
Mode	0	10	0
Mean ± Standard deviation	26 ± 25.26	26 ± 16.6	26 ± 19.4
N	31	31	27

Source: Marlowe (2009), reprinted with permission.

FIGURE 6.3 *Hadza Dictator Game Offers by Head of Household Status*



Source: Author's compilation based on author data.

After controlling for these four variables, single people gave lower offers than married people did in the DG. Entering head of household status along with marital status led to the best model, with household heads giving higher offers, though only 15 percent of the variance is explained.

In a regression of UG offers onto the same independent four variables, only age was a significant predictor (table 6.3). Older people gave higher offers, controlling for the other variables. Again, when marital and head of household status were included, the best model was achieved with household heads giving higher offers. In this model, an appreciable 45 percent of the variance is explained. Without controlling for other variables, household heads gave marginally more than nonheads (Mann-Whitney $U = 0.43$, $p = 0.054$, N = 31) (figure 6.4).

In a regression of player 1 offers in the TPG onto the same variables, head of household status was again the best predictor, though only 9 percent of the variance is explained (table 6.4). In a simple comparison, household heads gave slightly higher offers (Mann-Whitney $U = 51$, $p = 0.062$, N = 27) (figure 6.5).

In the UG, 77 percent of player 2s rejected offers of 10 percent or less, which resulted in 65 percent of all offers actually being rejected, a higher rate than in 1998 (24 percent). Seventy-five percent of men rejected the amount of the offer they received, while 50 percent of women rejected their offers.

TABLE 6.2 *Linear Regressions of Hadza Dictator Game Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)	(5)
Age	3.01				
	(4.67)				
Female	4.20	5.32			
	(14.06)	(13.79)			
Education	−1.26	−1.40	−1.90		
	(4.82)	(4.76)	(4.51)		
Individual income (U.S. dollars)	—	—	—	—	
Household wealth (U.S. dollars)	—	—	—	—	—
Household size	−4.09	−3.69	−3.76	−3.59	
	(5.35)	(5.25)	(5.16)	(5.07)	
Single	−20.60*	−21.00*	−19.49*	−19.51*	−16.34*
	(11.01)	(10.86)	(9.97)	(9.81)	(8.66)
Head of household	24.82	27.57*	23.13**	22.22**	23.85**
	(16.83)	(16.09)	(11.07)	(10.69)	(10.35)
Constant	35.64	40.93	44.51*	43.95*	32.44**
	(25.88)	(24.25)	(22.04)	(21.66)	(14.20)
Observations	31	31	31	31	31
Model significance	0.307	0.233	0.146	0.080	0.041
Adjusted R-squared	0.051	0.074	0.104	0.131	0.147

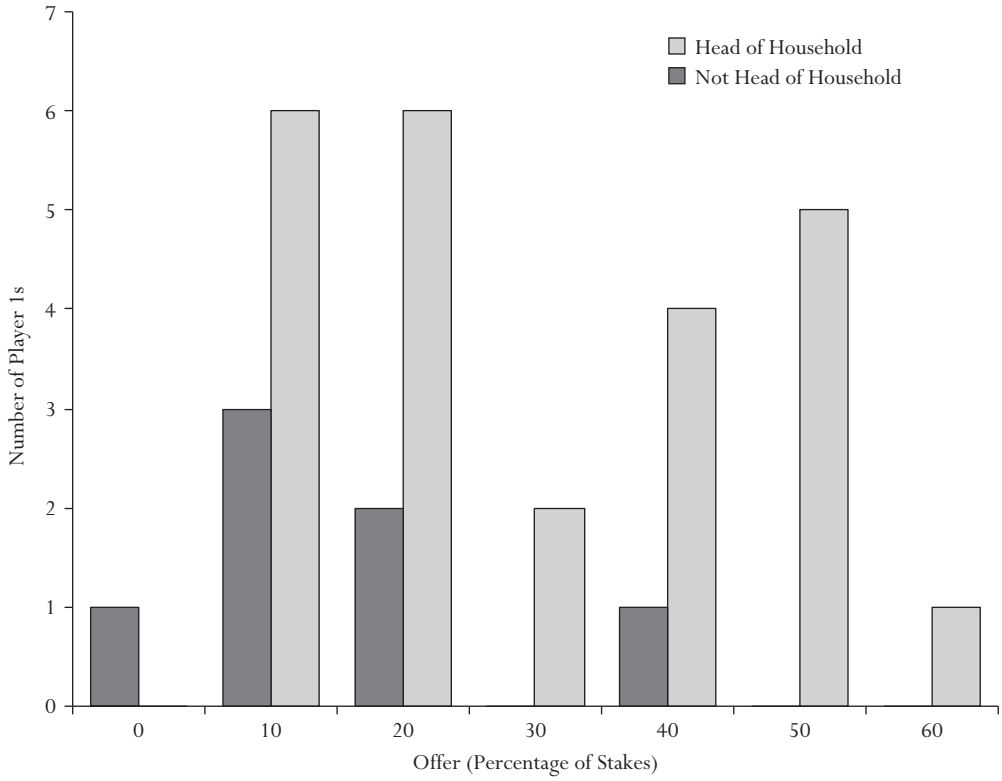
Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. All coefficients are normalized (divided by standard deviation).
**Coefficient significant at < 0.05 level in two-tailed test
*Coefficient significant at < 0.10 level in two-tailed test

TABLE 6.3 *Linear Regressions of Hadza Ultimatum Game Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)
Age	8.93***	9.05***	9.13***	9.07***
	(2.47)	(2.41)	(2.36)	(2.31)
Female	2.85			
	(7.43)			
Education	−.74	−1.00		
	(2.55)	(2.41)		
Individual income (U.S. dollars)	—	—	—	—
Household wealth (U.S. dollars)	—	—	—	—
Household size	−0.64	−0.69	−0.61	
	(2.83)	(2.78)	(2.73)	
Single	−10.39*	−9.58*	−9.59*	−9.06*
	(5.82)	(5.33)	(5.24)	(4.60)
Head of household	15.09	12.64**	12.12**	12.42**
	(8.90)	(6.09)	(5.86)	(5.60)
Constant	7.80	9.48	9.03	7.22
	(13.68)	(12.73)	(12.48)	(9.35)
Observations	31	31	31	31
Model significance	0.005	0.002	0.001	0.000
Adjusted R-squared	0.390	0.410	0.429	0.449

Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. All coefficients are normalized (divided by standard deviation).
***Coefficient significant at < 0.01 level in two-tailed test
**Coefficient significant at < 0.05 level in two-tailed test
*Coefficient significant at < 0.10 level in two-tailed test

FIGURE 6.4 *Hadza Ultimatum Game Offers by Head of Household Status*



Source: Author's compilation based on author data.

Hadza player 1s played a sensible strategy in both the UG and the TPG: the modal offer in the UG was 10 percent, which was also the income-maximizing offer (IMO), and the modal offer in the TPG was 0 percent, which was likewise the IMO (figure 6.6).

After controlling for the same four variables, the minimum acceptable offer (MinAO) in the UG was predicted by camp population, with those in larger camps requiring higher offers before accepting (table 6.5). This could explain why player 1s in the UG gave higher offers in larger camps in 1998.

In the TPG, only 27 percent of player 3s said that they would punish offers of zero. This resulted in 22 percent of player 3s actually punishing player 1s. The mean minimum offer that would not be punished was 11 percent (for more in-depth analysis of TPG MinAOs, see Marlowe 2009, n. 5). In a correlation, the only variable that predicted the minimum offer that would not be punished was camp population ($r = 0.482$, $p = 0.011$, N = 27), with those in larger camps more readily punishing low offers. Camp population was also a significant predictor after controlling for the same four control variables used in all linear regressions. Sex, education, and household size were also significant predictors (table 6.6). The greater likelihood of punishment in larger camps in the TPG seems to match the greater tendency to reject low offers in larger camps in the UG.

TABLE 6.4 *Linear Regressions of Hadza Third-Party Punishment Game Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)	(5)
Age	0.96				
	(3.96)				
Female	−5.16	−5.41			
	(15.31)	(14.94)			
Education	0.70	0.50	0.30		
	(4.18)	(4.01)	(3.90)		
Individual income (U.S. dollars)	—	—	—	—	
Household wealth (U.S. dollars)	—	—	—	—	
Household size	−3.83	−3.78	−4.07	−4.10	
	(4.09)	(4.00)	(3.84)	(3.74)	
Head of household	6.86	6.79	11.50	11.66	13.69*
	(15.64)	(15.30)	(7.92)	(7.47)	(7.27)
Constant	29.68	31.87*	27.12***	27.23**	18.18***
	(19.37)	(16.76)	(10.26)	(9.96)	(5.60)
Observations	27	27	27	27	27
Model significance	0.510	0.365	0.234	0.113	0.071
Adjusted R-squared	−0.023	0.021	0.058	0.097	0.089

Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. All coefficients are normalized (divided by standard deviation).
***Coefficient significant at < 0.01 level in two-tailed test
**Coefficient significant at < 0.05 level in two-tailed test
*Coefficient significant at < 0.10 level in two-tailed test

In 1998 DG and UG offers were significantly higher in larger camps. Camp population was not a significant predictor this time, but when the 2002 results are combined with those of 1998, offers are significantly higher in larger camps in both the DG ($r = 0.335$, $p = 0.004$, N = 74) and the UG ($r = 0.321$, $p = 0.003$, N = 86). Figures 6.7 and 6.8 show offers against camp population divided into small (16 to 20), medium-sized (24 to 42), and large camps (76 to 134).

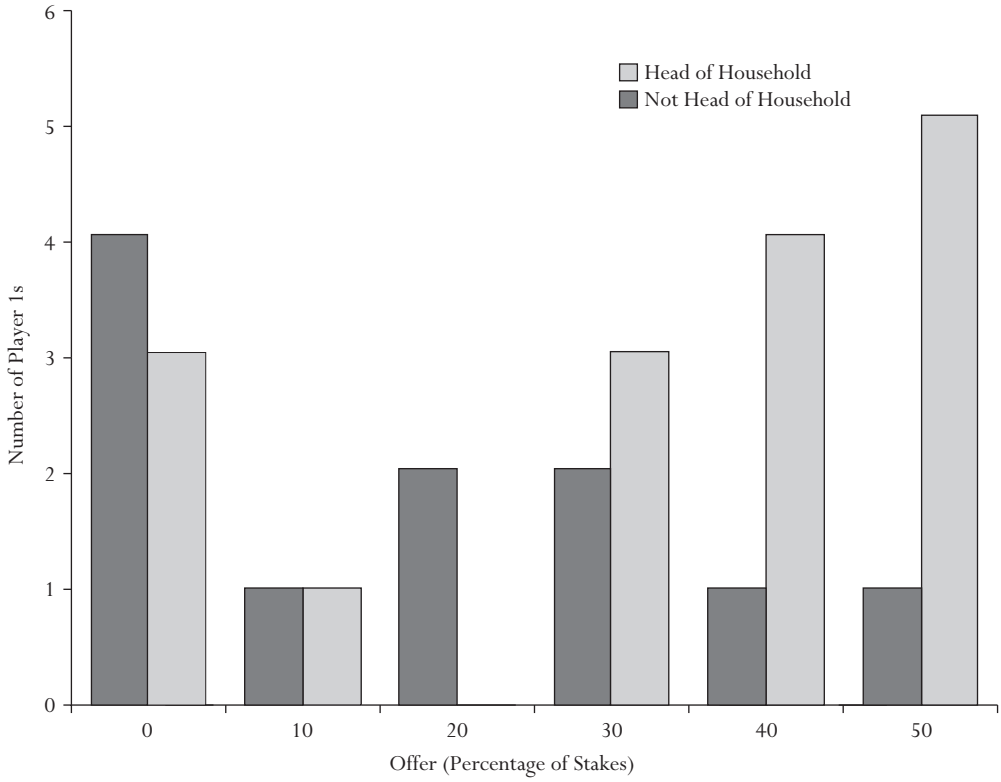
DISCUSSION AND CONCLUSIONS

The 2002 results largely reaffirm those in the 1998 DG and UG. Player 1s made low offers in the DG and UG. They made low offers in the TPG as well. Player 2s again rejected low offers, even more than in 1998, perhaps owing to the strategy method, as the Hadza just seemed more willing to reject the range of possible offers than the one real offer they were made in 1998.

As a result of low offers and high rejection rates, group earnings for the Hadza as a whole were low in the UG. But player 1s played sensibly. In all three games, the modal offer was the income-maximizing offer. Of course, this is a risky strategy in the UG, given that so many player 2s rejected low offers and many player 1s got nothing. Still, many player 1s maximized their earnings, more so than participants in most of the societies tested.

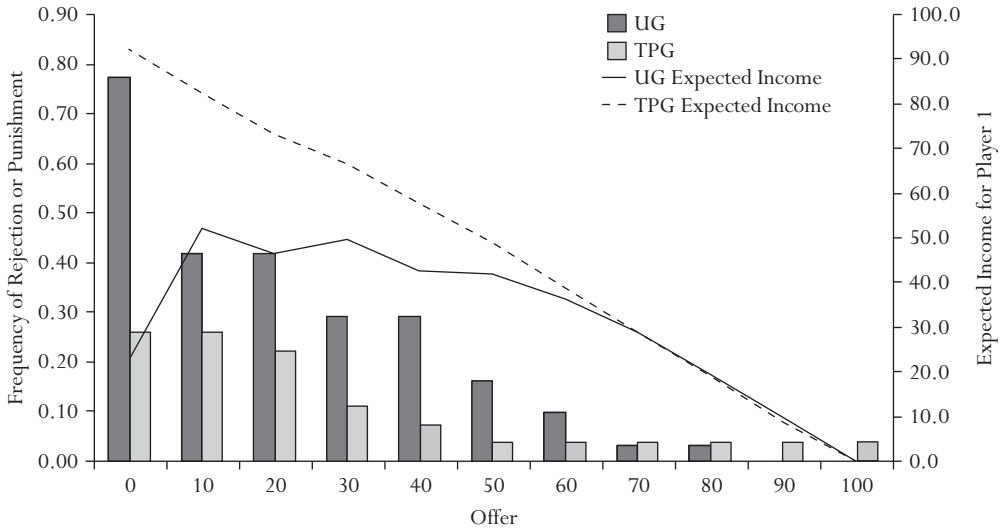
In the 1998 games, there was a higher rate of rejection in large camps (Marlowe 2004a), which may explain why people made higher offers in larger camps. Consistent with the 1998 results, people in this round had higher minimum acceptable offers in larger camps. In addition, even though the Hadza were not very likely to punish third parties, they were more likely to do so in larger camps. These results imply that the Hadza should give higher offers in larger camps, which is just what they did in 1998, though they did not do so this time. There is more

FIGURE 6.5 *Hadza Third-Party Punishment Game Offers by Head of Household Status*



Source: Author's compilation based on author data.

FIGURE 6.6 *Expected Income for the Ultimatum Game and the Third-Party Punishment Game, Based on Rejection and Punishment*



Source: Marlowe (2009) reprinted with permission.

TABLE 6.5 *Linear Regressions of Hadza Ultimatum Game Minimum Acceptable Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)	(5)
Age	0.354				
	(4.68)				
Female	6.93	6.96			
	(10.27)	(10.06)			
Education	2.79	2.80	1.80		
	(4.78)	(4.69)	(4.41)		
Individual income (U.S. dollars)	—	—	—	—	—
Household wealth (U.S. dollars)	—	—	—	—	—
Household size	0.874	0.933	1.09	0.94	
	(4.80)	(4.65)	(4.59)	(4.51)	
Village (camp) population	13.34**	13.43**	14.26**	14.23**	13.93***
	(5.72)	(5.47)	(5.29)	(5.21)	(4.92)
Constant	−3.79	−3.15	−1.95	−0.43	2.01
	(18.28)	(15.91)	(15.66)	(14.98)	(9.19)
Observations	31	31	31	31	31
Model significance	0.210	0.122	0.075	0.032	0.008
Adjusted R-squared	0.084	0.119	0.136	0.162	0.190

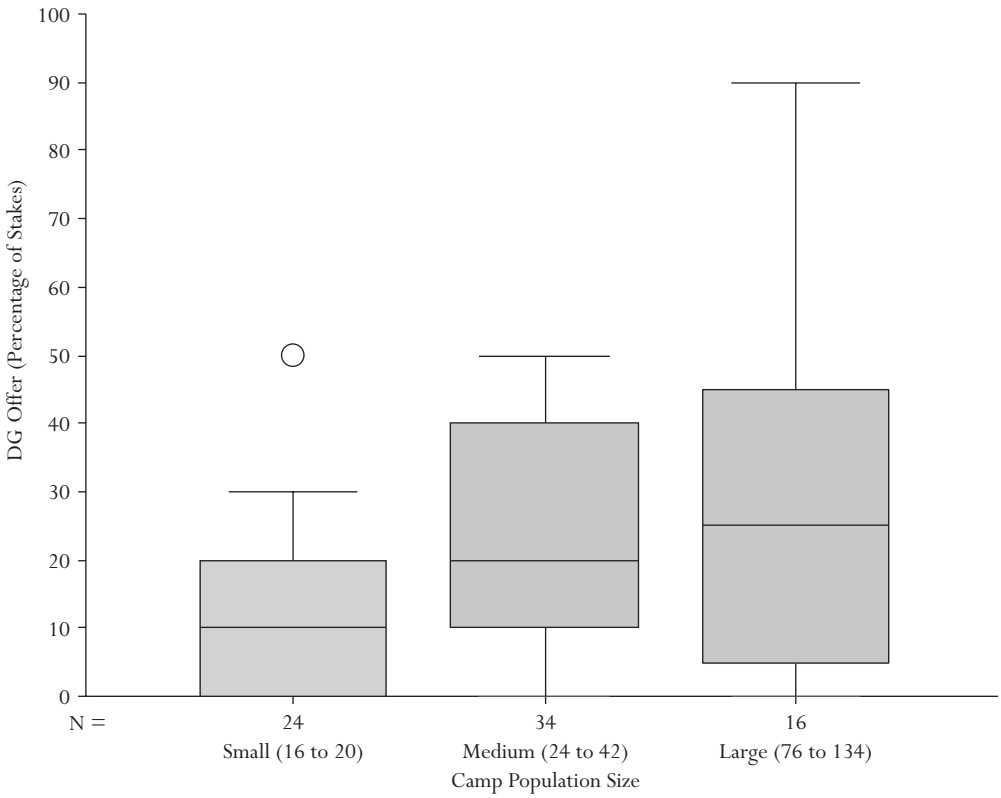
Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. All coefficients are normalized (divided by standard deviation).
***Coefficient significant at < 0.01 level in two-tailed test
**Coefficient significant at < 0.05 level in two-tailed test
*Coefficient significant at < 0.10 level in two-tailed test

TABLE 6.6 *Linear Regressions of Hadza Third-Party Punishment Game Minimum Nonpunished Offers*

Variable (Divided by Standard Deviation)	(1)	(2)
Age	−2.26	
	(4.97)	
Female	−16.78*	−16.84*
	(8.41)	(8.26)
Education	−8.25*	−7.55*
	(4.20)	(3.84)
Individual income (U.S. dollars)	—	—
Household wealth (U.S. dollars)	—	—
Household Size	7.24	7.00*
	(3.85)	(3.74)
Village (camp) population	11.82**	13.10***
	(5.18)	(4.10)
Constant	−2.09	−9.80
	(20.29)	(10.92)
Observations	27	27
Model significance	0.033	0.016
Adjusted R-squared	0.279	0.305

Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. All coefficients are normalized (divided by standard deviation).
***Coefficient significant at < 0.01 level in two-tailed test
**Coefficient significant at < 0.05 level in two-tailed test
*Coefficient significant at < 0.10 level in two-tailed test

FIGURE 6.7 *2002 Dictator Game Offers Combined with 1998 Dictator Game Offers*

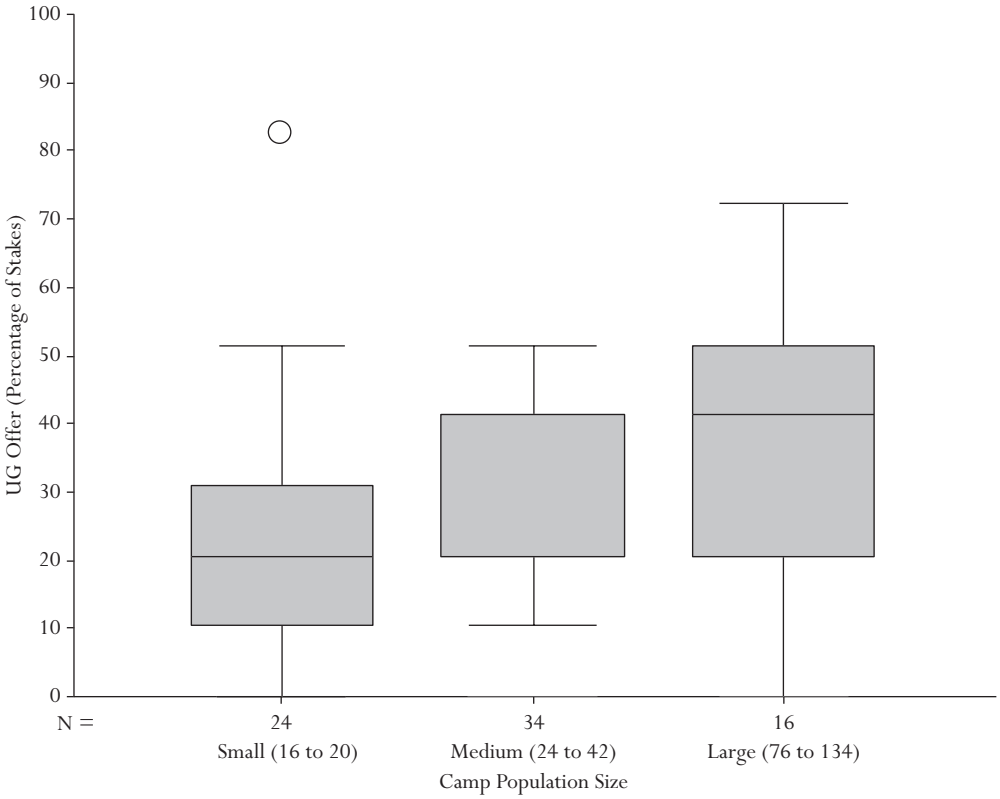


Source: Author's compilation based on author data.

bickering in large camps, which seems to be related to more persistent demands to share food in large camps, where the number of free-riders is absolutely greater (Marlowe 2004b). It could be that, even if it is more tempting to hoard food in larger camps, it is more costly to do so where there are more people to claim shares. This could explain why people felt compelled to make higher offers in 1998, but since offers were not higher in larger camps in any of the three games in this round, it is difficult to make that argument. Since offers in the DG and UG were higher in larger camps when combined with the 1998 round, the offers in 2002 were at least in line with the population effect in 1998. Perhaps there is too little spread in camp population to reveal any effect in 2002.

The Hadza share food every day, yet they gave low offers in all three games. Although they were willing to reject low offers in the UG, they were not inclined to punish someone who gave someone else a low offer. The way the Hadza play these games suggests that solving collective-action problems is difficult for them. If they had not made low offers or rejected low offers, then, as a group, the whole camp would have gotten a lot more money from me and therefore would have maximized the group benefit—even if that had come at the expense of some individuals. Any rejection meant that I kept the money I would have given to one or both of the two players. The Hadza often have difficulty maintaining a concerted effort to keep their agro-pastoralist

FIGURE 6.8 *2002 Ultimatum Game Offers Combined with 1998 Ultimatum Game Offers*



Source: Author's compilation based on author data.

neighbors out of their area because as soon as they finish agreeing among themselves to do just that, some individuals go right out and beg from, or trade with, an agro-pastoralist neighbor, undercutting Hadza solidarity. Strong reciprocity based on third-party punishment helps enforce cooperation by all, but the Hadza do not often punish third parties, only those who have slighted them directly. Most player 3s could not figure out why they would punish player 1, and those who did punish seemed to think they might somehow get money back. Once I stressed that they would not, almost all of them refused to punish. This tendency squares with my observations and interviews. When I ask Hadza what they will do if someone is being a slacker or being stingy, the most common answer is, "We move away from them," rather than, "We make them leave." They are averse to confrontations and solve most conflicts with others by moving, which is what they do when someone in camp is trying to boss them around.

The Hadza do engage in reciprocity, both with me and with each other. But just as we often think it bad form to keep close tabs on the balance of favors, so too do the Hadza. In fact, it seems to be the overriding ethic. In a stratified society with wealth disparities, like most complex societies, we might expect the poor to argue for the rich to share more of their wealth and to feel no need to repay the rich. Since there will always be a small number of people at the top, we might expect the ethical norm that serves the interests of the many on the bottom to spread.

But what should we expect in an egalitarian society without wealth like the Hadza? There are probably more occasions in a camp of thirty to forty people when even the best hunter does not have any food and someone else does. Therefore, it will often be in his interest to demand shares from others. The same cannot be said of women, who target more predictable foods. Their food returns depend more on effort and strength or stamina than luck (Blurton Jones and Marlowe 2002). Women appear to share their food more within the household and with close kin who remain in camp to look after their weanlings (Marlowe 2006) than with other households. Despite these sex differences, however, sex was not a significant predictor of offers.

Household heads gave higher offers in all three games. All player 1s were the same people in the DG and UG, so this is no more surprising than the correlation between offer amounts in those two games. However, only about half (thirteen of twenty-seven) of player 1s in the TPG were player 1s in the DG and UG. Thus, it appears that there is something meaningful about being the head of a household when it comes to giving. Perhaps being the head of a household means that one simply must get used to giving food to one's children and mate. Even if household heads would prefer to keep a larger share, perhaps for them the game more strongly triggers an obligation to give. This result was produced, however, largely by women who were not household heads, and in reality they are giving food to their children every day, though a smaller fraction of their food tends to go outside the household than men's.

Tit-for-tat (TFT) is a good strategy for promoting cooperation, even if other strategies are better at maintaining it, at least in a prisoner's dilemma game (Axelrod 1984; Nowak and Sigmund 1993). Daily food-sharing might be one of the most ancient forms of human cooperation. In the TFT strategy, the first move is to *cooperate*. Therefore, if TFT captures Hadza norms in any situation where they have to decide whether to give to another or not (even in a one-shot, anonymous game that is alien to them), we might expect them to cooperate in the role of player 1. An understanding of what constitutes cooperation (full cooperation anyway) by the giver and receiver in the UG should converge on a convention of a fifty-fifty split of the stake, since it is difficult for anyone to argue that an equal split is unfair. We might therefore expect Hadza player 1s to give 50 percent in these games. Instead, they gave much lower offers. Thus, reciprocity based on a tit-for-tat strategy seems a poor explanation for the ubiquitous food-sharing among the Hadza. Of course, money is not food, and these games are not food-sharing. But it is precisely because money is not food that we gain insight. Money can be hidden and thus does not have to be shared, while food usually cannot be hidden. When certain foods can be hidden, the Hadza will often do just that, sneaking them into their household.

Except for their rejection of low offers, the Hadza come pretty close to the expectations of rational choice theory. For example, the modal offer of player 1s in all three games was the income-maximizing offer. It is their rejection of low offers that seems irrational. But surely we can understand them being disappointed with low offers and wanting more. Something is not necessarily better than nothing when others gain a relative advantage. It is the "something is better than nothing" principle in rational choice theory that is called into question by an evolutionary, relative fitness perspective.

In conclusion, the 2002 games reaffirm some results from the 1998 round. Hadza players gave low offers in all three games and rejected low offers from other players. Women continued to give slightly lower offers than men, but again, the difference was not significant. On the other hand, there were no correlations with camp population this time, although offers were higher in larger camps when combined with the 1998 results. Lastly, the Hadza were not very willing to incur a cost to punish third parties, calling into question the cross-cultural universality of strong reciprocity. To understand why the Hadza played the way they did, all we need to do is consider that self-regarding people without wealth, and in the absence of environmental

constraints, should not want to share with others but should want others to share with them, and they should not want to pay to punish those who cheat third parties to whom they are not related. That is what an evolutionary perspective tells us to expect. "It is better to give than to receive" is an aphorism that may have been designed to make others think we are generous and get them to give to us (Marlowe et al. 2011).

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NOTES

1. Richard McElreath used 1,000 rather than 2,000 Tanzanian shillings, but I needed to use ten 200-shilling coins to make it easier for Hadza and 100-shilling coins had been discontinued. A day's wage has little meaning among the Hadza anyway.

REFERENCES

Axelrod, Robert. 1984. *The Evolution of Cooperation.* New York: Basic Books.

Blurton-Jones, Nicholas, Patricia Draper, and Kristen Hawkes. 1994. "Foraging Returns of !Kung Adults and Children: Why Didn't !Kung Children Forage?" *Journal of Anthropological Research* 50(3): 217–48.

Blurton Jones, Nicholas G., and Frank W. Marlowe. 2002. "Selection for Delayed Maturity: Does It Take 20 Years to Learn to Hunt and Gather?" *Human Nature* 13(2): 199–238.

Blurton Jones, Nicholas G., Frank W. Marlowe, Kristen Hawkes, and James F. O'Connell. 2000. "Paternal Investment and Hunter-Gatherer Divorce Rates." In *Adaptation and Human Behavior: An Anthropological Perspective,* ed. Lee Cronk, Napoleon Chagnon, and William Irons. New York: Aldine de Gruyter.

Fehr, Ernst, Urs Fischbacher, and Simon Gächter. 2002. "Strong Reciprocity, Human Cooperation, and the Enforcement of Social Norms." *Human Nature* 13(1): 1–25.

Hawkes, Kristen, James F. O'Connell, and Nicholas G. Blurton Jones. 2001. "Hadza Meat Sharing." *Evolution and Human Behavior* 22(2): 113–42.

Henrich, Joseph, Robert Boyd, Samuel Bowles, Herbert Gintis, Colin Camerer, and Ernst Fehr. 2004. *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies.* Oxford: Oxford University Press.

Marlowe, Frank W. 2002. "Why the Hadza Are Still Hunter-Gatherers." In *Ethnicity, Hunter-Gatherers, and the "Other": Association or Assimilation in Africa,* ed. Susan Kent. Washington, D.C.: Smithsonian Institution Press.

———. 2003. "A Critical Period for Provisioning by Hadza Men: Implications for Pair Bonding." *Evolution and Human Behavior* 24(3): 217–29.

———. 2004a. "Dictators and Ultimatums in an Egalitarian Society of Hunter-Gatherers, the Hadza of Tanzania." In *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies,* ed. Joseph Henrich, Robert Boyd, Samuel Bowles, Herbert Gintis, Colin Camerer, and Ernst Fehr. Oxford: Oxford University Press.

———. 2004b. "What Explains Hadza Food Sharing?" *Research in Economic Anthropology* 23: 69–88.

———. 2006. "Central Place Provisioning: The Hadza as an Example." In *Feeding Ecology in Apes and Other Primates,* ed. Gottfried Hohmann, Martha M. Robbins, and Cristophe Boesch. Cambridge: Cambridge University Press.

———. 2009. "Hadza Cooperation: Second-Party Punishment, Yes; Third-Party Punishment, No." *Human Nature: An Interdisciplinary Biosocial Perspective* 20(4): 417–30.

Marlowe, Frank W., J. Colette Berbesque, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan-Camilo Cardenas, et al. 2008. "More Altruistic Punishment in Larger Societies." *Proceedings of the Royal Society: Biology* 275(1634): 587–90.

Marlowe, Frank W., J. Colette Berbesque, H. Clark Barrett, Alexander Bolyanatz, Michael Gurven, and David Tracer. 2011. "The 'Spiteful' Origins of Human Cooperation." *Proceedings of the Royal Society: Biology* 278(1715): 2159–64.

Nowak, Martin, and Karl Sigmund. 1993. "A Strategy of Win-Stay, Lose-Shift That Outperforms Tit for Tat in the Prisoner's Dilemma Game." *Nature* 364(6432): 56–58.

Vehrencamp, Sandra L. (1983). "A Model for the Evolution of Despotic Versus Egalitarian Societies." *Animal Behaviour* 31(1): 667–82.

Woodburn, James. 1968. "Stability and Flexibility in Hadza Residential Groupings." In *Man the Hunter,* ed. Richard B. Lee and Irven Devore. Chicago: Aldine de Gruyter.

———. 1998. "Sharing Is Not a Form of Exchange: An Analysis of Property-Sharing in Immediate-Return Hunter-Gatherer Societies." In *Property Relations: Renewing the Anthropological Tradition,* ed. C. M. Hann. Cambridge: Cambridge University Press.