Chapter 13

Sharing, Subsistence, and Social Norms in Northern Siberia
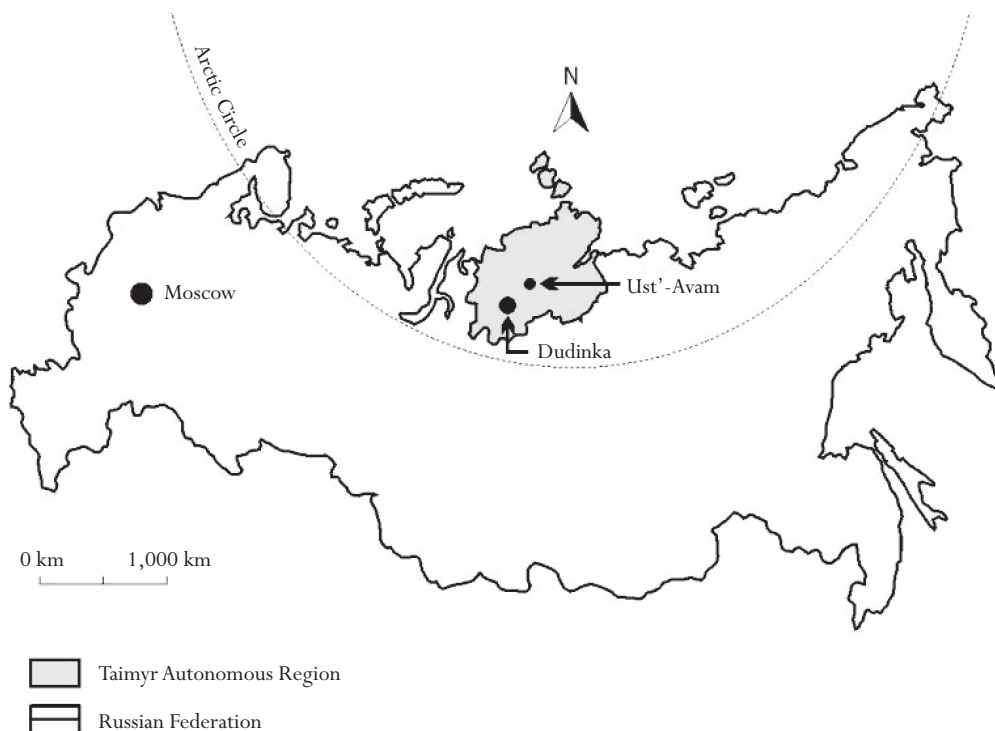
John P. Ziker

The majority of families in Ust'-Avam in northern Siberia are dependent on subsistence hunting, fishing, and trapping and have been part of a vertically integrated industrial economy in a remote area of the former Soviet Union. Thus, the results from behavioral games conducted there in 2003—the dictator game (DG), the ultimatum game (UG), and the third-party punishment game (TPG)—lend themselves to comparison with other indigenous hunter-gatherers, as well as with working communities in other nation-states.

My ethnographic research in the region beginning in 1992 helps to contextualize these results. The two indigenous ethnic minorities in the community (Dolgan and Nganasan) have differing linguistic, religious, and economic histories, and I took these differences into account in my analysis of the game results. Group characteristics did not result in different outcomes in the experiments, although individual and household characteristics did. The results show moderate levels of second-party punishment in the ultimatum game, along with relatively high offers and a notable concern for fairness in the dictator game.

The chapter begins with a summary of the ethnographic material relevant to this community of indigenous hunter-fisher-trappers in northern Siberia. Next, results of player surveys and a descriptive analysis of the game results are presented. The chapter closes with a presentation and discussion of the multiple regressions of the game results.

SUBSISTENCE AND SHARING IN UST'-AVAM

This section presents empirical data on resource use and distribution at the Ust'-Avam research site, as well as ethnographic facts about the population, ethnic groups and languages, and religions. These facts embody relevant information about the community's institutions and social norms, which historically were based on kinship, reciprocity, and reputational mechanisms. Its resource base and property institutions shifted with economic intensification and shifts in settlement patterns during the Soviet period. However, traditional limits on production and prosocial sharing norms remained a defining characteristic of the indigenous communities in the Taimyr region throughout this time. The recent economic history of this remote community in the postsocialist context shows an increased reliance on subsistence and sharing. In particular, a study of contemporary food-sharing practices in the community highlights observed prosocial behavior and references to the norms for sharing summed up in a number of local aphorisms

FIGURE 13.1   *Location of Ust'-Avam, Taimyr Autonomous Region, Russian Federation*

or heuristics. These material and ideological contexts help to explain why certain independent variables affect the game results reported in the following section.

Location

This research was conducted within the political boundaries of the Taimyr (Dolgano-Nenetskii) Autonomous Region, Russian Federation (see figure 13.1). The region was officially subsumed under the larger Krasnoyarsk Krai as a municipal district, beginning January 1, 2007, as part of a suite of similar consolidations occurring across Siberia in the last few years.

Ust'-Avam, an indigenous Siberian community of 550 people, is situated at latitude 71°07′ north and longitude 92°49′ east on the Taimyr Peninsula, the northernmost extension of the Eurasian landmass. Ust'-Avam is approximately 250 kilometers by air from the regional capital, Dudinka, and 400 kilometers by water from the industrial city of Noril'sk. Ust'-Avam is one of two native communities in closest proximity to that city. Noril'sk is located adjacent to the northwestern foothills of the Putoran Mountains, which form the northern boundary of the central Siberian plateau. Modern indigenous settlements such as Ust'-Avam—named for the confluence (ust') of the Avam and Dudypta Rivers—have developed largely in lowland taiga-tundra transition areas and along rivers that cut across the peninsula to the north of the Putorans.

Ethnic Groups and Languages

The indigenous population of Taimyr includes five ethnic groups: the formerly titular Dolgan and Nenets, along with Enets, Nganasan, and Evenk.[1] The Dolgan is a métis population known to descend from Yakut, Tungus (Evenk), Russian, and Samoyedic ancestors. The Nenets, Enets, and Nganasan are considered to be descended from Iron Age immigrants to the region (Klobystin 2006) and related through their Samoyedic languages. Evenks, one of the most widespread indigenous populations in Siberia (Tungus language family), generally live in taiga zones and are known for small communities and small domestic reindeer herds. Russian industrial expansion and mass immigration to the region began in the 1940s with the development of Noril'sk Alpine Metallurgical Combine; the population of newcomers now numbers over 150,000.[2] The indigenous population has come be less than 10 percent of the entire population since the amalgamation with Krasnoyarsk in 2007.

The study community, Ust'-Avam, is approximately 50 percent Dolgan, 45 percent Nganasan, and 5 percent other nationalities from the former Soviet Union. The distinction between Dolgan and Nganasan has been blurring in recent decades, as there have been many mixed marriages between these groups and between members of these groups and non-indigenous individuals (Ziker 2002a). Since elementary education was made mandatory in the 1950s, most everyone in the community speaks Russian. The elders in an ethnic group commonly use the native language (Dolgan or Nganasan) among themselves. Between elders of different ethnic groups, Russian is used. When elders speak to middle-aged or young people, they often use the native language, but the younger people tend to respond in Russian. Young people learn their native language in school as a second language, and the use of Russian is almost universal for people forty years old and younger.

The Dolgan language is similar to Sakha (Yakut), the northernmost branch of the Turkic language family.[3] Nganasan is one of six languages in the Samoyedic branch of the Uralic language family (Dolgikh 1962).[4] The total Dolgan population is approximately 5,500 people in the Taimyr region. The Nganasan population is much smaller at approximately 766 people.

Social Structure and Demographics

Until the mid-1970s, Dolgan families traditionally practiced reindeer pastoralism, mostly in combination with terrestrial game hunting, fishing, trapping, and mercantile trading in extended family groups (Popov 1937, 1964), and later in Soviet-era work collectives. A minority of Dolgan families utilized dog teams for travel instead of domestic reindeer. Mobility was critical for subsistence production and trapping of fur-bearers. Despite the harsh climatic conditions and their focus on hunting, fishing, and trapping, at the beginning of the Soviet era in the 1920s census-takers had identified a small proportion of Dolgan families who owned domestic reindeer herds running into the thousands of head as being rich. To keep track of these animals these families often hired young people from poorer families or distant relatives and paid them with food, supplies, and a small number of reindeer. Some of these families had strong reputations in mercantile trade and would travel hundreds of kilometers from Lake Essei to Volochanka and Dudinka. Soviet authorities viewed such families as exploiters, and many were disenfranchised from the political process when nomadic and clan soviets were established. Most of the Dolgan population lived at that time with smaller reindeer herds used for seasonal subsistence migrations and for checking trap lines (Ziker 2012).

The Nganasan were traditionally known for their wild-reindeer hunting and use of small herds of domestic reindeer for decoys. At the time of the advent of Soviet power, the Nganasan

lived in extended family units and had seven exogamous patrilineal clans. Bilateral cross-cousin marriages occurred into the 1940s and 1950s. Shamanism was a strong tradition among the Nganasan, and a few individuals had reputations for being powerful shamans. The shamans' reputation for antisocial behavior is still discussed (for example, a shaman used a human girl's skin on a drum) as the reason for the extinction of that lineage of shamans.

According to 2002 statistics, approximately 80 percent of the native population in Taimyr lived in rural locations such as Ust'-Avam (Goskomstat RF 2002). Today, after eighty years of Soviet and post-Soviet development, the Dolgan live primarily in remote villages, from which they procure areas to hunt, fish, and trap. In Khatangskii District at the far eastern frontier of the Taimyr Region, three predominantly Dolgan communities practice reindeer pastoralism alongside hunting, fishing, and trapping. The majority of Nganasan today live alongside the Dolgan in three permanent settlements; one of these communities is Ust'-Avam.

The construction of modern villages in the 1960s and 1970s increased the total population living in one location, and the kinship relationships that had existed when people lived in families and bands and worked in earlier forms of Soviet enterprises, or in families and bands before Sovietization, became less dense. In addition, some populations were moved significant distances to join people with whom they had previously had few direct relationships. Such politically imposed changes probably put pressure on social norms as the number of contacts with unfamiliar and unrelated individuals increased. In modern Soviet villages, medical care, schools, stores, and the community centers and offices of the vertically integrated hunting-fishing enterprise provided a complex institutional framework, largely managed from the outside. Concomitantly, the 1970s saw a shift in mortality patterns from one of high infant and childhood mortality to one of low infant mortality but increased adult mortality (Krupnik 1987; Ziker 2002a), following the patterns of the demographic transition. In many ways, the Dolgan and Nganasan lived under conditions that paralleled life in northern indigenous communities in North America.

Religion

The Dolgan accepted Russian Orthodoxy in the nineteenth century. Dolgan shamans coexisted with Dolgan Christianity until the mid to late 1930s, when purges under Joseph Stalin resulted in the arrest and execution of shamans across Siberia. Nevertheless, animistic beliefs and taboos of various sorts exist to the present day. Dolgan informants often claim Russian Orthodoxy as their religion, and although there are no churches in the immediate area, symbols of Orthodox Christianity, such as icons, are displayed in some houses.

The Nganasan did not adopt Christianity during the Russian colonial period (Popov 1963, 1966). The Nganasan modified their settlement pattern to live largely north of the tree line, thus avoiding Russians and the ancestors of the Dolgan population who migrated from the south. This more northerly strategy facilitated minimal involvement with the Russian state. Nganasan shamans were active in the 1970s, but all of the elder Nganasan shamans are now deceased, and few, if any, Nganasan have the knowledge to conduct a traditional suite of shamanic rituals. However, some Nganasan religious rituals, such as paying homage to the family protector spirit, are still practiced.

Economic History

Native people in Taimyr began the twentieth century as sovereign tribute-paying nationalities within the Russian empire. Then, beginning in the 1930s, extended families and native bands in the Avam tundra became increasingly drawn into economic development under Soviet ministries.

As a result of Stalin's collectivization campaign, eventually most domestic reindeer herds were collectivized and turned over to a growing cadre of professional managers, veterinarians, and distribution networks. Simultaneously, cultural stations were set up at traditional trading and gathering locations along major rivers. Cultural stations manned by Soviet activists grew over the years to include schools, medical services, and stores. These locations also housed the offices of early Soviet work groups (artel') and collective farms (kolkhoz).

More than eighty kolkhozes were developed in the region, but these were amalgamated in the 1950s and 1960s into seventeen larger, more sedentary, and more ethnically diverse state companies (sovkhoz). By the 1970s, most native adults worked as salaried hunters, fishers and trappers, craft producers, and laborers within state companies, as well as in administrative and educational staff positions. Thus, the concepts and experience of working in a salaried organization, receiving bonuses, and purchasing goods have a reasonably long history in Taimyr.

In 1971 the government hunting enterprise GPKh Taimyrskii was established in the Avam tundra and along the Piasino River. GPKh Taimyrskii was one of four such enterprises in the Soviet Union—large units administered directly by the Ministry of Hunting. GPKh Taimyrskii had four subdivisions, three of which were predominantly staffed with non-natives. In 1993 the Ust'-Avam subdivision had fifty-five local indigenous men distributed in twenty-one assigned hunting territories (ugod'ia). GPKh Taimyrskii annually procured more than 50,000 caribou in the late 1980s. In the state economy, the production of meat from wild and domestic reindeer, freshwater fish, and the pelts of fur-bearers reached all-time highs during Mikhail Gorbachev's Perestroika period (1987 to 1991).

The GPKh Taimyrskii hunting and fishing brigades in Ust'-Avam each had annual plans for the production of white and red fish, reindeer, Arctic fox, and other fur-bearers. Staff hunters were paid, and they had the opportunity to receive prizes and additional cash for surplus production. By the 1980s, there were no domestic reindeer left in the organization, and the focus had shifted to the procurement of wild resources. The standard of living in communities like Ust'-Avam was high by Soviet standards, and residents had access to trade goods that were difficult to obtain in Soviet cities. The people of Ust'-Avam were well integrated into the cash-based planned economy.

Major economic changes occurred after 1993. Sovkhozes and the GPKh Taimyrskii were stripped of most of their functions other than basic municipal services for remote communities. Dolgan and Nganasan hunters no longer received salaries, and the production of game, fish, and fur began to fall. Women, many of whom worked in the GPKh Taimyrskii sewing shop, were reclassified as hunters in 2000, meaning that they, too, would no longer be salaried workers. Currently, a small number of community members are employed as teachers and civil servants, and many people receive social security pensions and environmental degradation compensation from Noril'sk Nickel, the mining and metallurgy company in Noril'sk.

The people of Ust'-Avam now have a mixed-subsistence economy in which hunting, fishing, and trapping predominate over commercial food production and exchange. In my ethnographic study among the Dolgan and Nganasan during the 1990s (Ziker 2002a), I found that the local subsistence economy had become increasingly important after the collapse of the Soviet planned economy and that other consequences of the economic upheaval were an increase in the incidence of violent death and reduced overall fertility (Ziker 2009).

Natural Resources and Property

Today the Dolgan and Nganasan in Ust'-Avam continue to hunt wild reindeer, fish, and trap, and they still consume these foods at almost every meal (Ziker 2002b). As a result of Soviet development

of their economy, the loss of domestic reindeer, and their settlement in large villages, they now largely rely on combustion-powered transportation (snowmobiles and outboard motors) for much of their subsistence activity. However, depending on a family's wealth, the time of year, and fuel supplies, a portion of hunting, fishing, and trapping activity occurs on foot (Ziker 2007).

Alongside the economic depression and emergent subsistence economy in the post-Soviet period, presidential decrees, federal laws, and regional edicts have favored a variety of forms of property intended to protect the traditional economic activities of the indigenous population. A mix of formal landholdings and informally managed common-pool territories has been utilized.

Surrounding the village of Ust'-Avam itself, a common-pool hunting and fishing territory (liubitel'skaia ugod'ia) became more important as hunters and other workers were laid off and more distant hunting territories were not supplied by the GPKh Taimyrskii. Common-pool territory effectively expanded after the cessation of large-scale caribou hunts on water in 1993.

"Family-clan" holdings and similar types of collective property, otherwise known as "communes" (obshchina), were carved out of former state-farm lands to aid the indigenous people in protecting their economic traditions (Ziker 2003).[5] The Avam tundra had only one registered family-clan holding at the time of this research. The holding was rarely used because of its distance from the village.

The land surrounding the common-pool territory of Ust'-Avam, previously assigned to hunting and fishing brigades during the Soviet Union, continued to be used by those individuals who were members of those brigades or their relatives. These lands were mainly used for subsistence hunting and fishing, with the surplus distributed within the community and exchanged for fuel and spare parts. Extremely distant territories, more than 150 kilometers from the village and those not located on major waterways, fell into disuse in the 1990s.

The Dolgan and Nganasan manage their common-pool resources with a variety of context-specific norms that include and exclude specific people in particular forays at particular spots (tochki). I documented such informal means of regulating property in the bush, particularly during goose-hunting season and the on-water caribou hunt, and I also documented ways of regulating access to and multiple rights for resources in the community (Ziker 2002a, 2003; see Anderson 2000).

Contemporary Food-Sharing

The collapse of rural food production in Russia after 1991 increased dependence on subsistence production across a wide range of the population. Dolgan and Nganasan widely share in the distribution of meat, fish, and fur—goods necessary to survival in this region. Women and elders are prominent actors in the distribution and preparation of game, fish, and fowl. Empirical data on the inputs, outputs, and conditions of hunting, along with data on food distributions, relative quantities, relationships of receivers to givers, and hunters' rationale for sharing, showed a number of significant social and ecological effects (Ziker 2007).

First, distributions of food procured while hunting on foot were largely oriented to provisioning kin, through the rationale of "hosting" and "returning aid." A minority of distributions went to those who asked. Second, hunts that utilized mechanical transportation had more participants, the distributions were broader, and the rationales for hunting included more requests and trades; in addition, significantly more food was distributed in recognition of participation in the hunt. In mechanized hunts, procurement events represent more cooperation (by-product mutualism, tit-for-tat reciprocity, or exchange) in the production and distribution process. Overall, production volume and parameters affect distribution patterns and rationales: when production levels increase and hunting partners are included, more food goes to nonkin; when production levels are limited, the bulk of food goes to kin, particularly close kin. Third, informal social networks

are the main conduits by which local food is locally distributed (Ziker 2002a; Ziker and Schnegg 2005), providing another venue for collective-action coordination. Focal follow-up surveys and rank-order interviews of households in the community indicated that the average household's food-sharing network included ten to fifteen other households.

The local cultural logic of sharing appears to encourage altruistic giving through heuristics (Ziker 2006) that reflect salient evolutionary pressures (kin selection, reciprocity, ancestral value on cooperation). Finally, close kin are differentially "gifted" food, while more distant kin, friends, acquaintances, and others tend either to help on the hunt or to ask for food. This indicates that the most altruistic giving is more common with kin, while reciprocal altruism and tolerated scrounging are more common with more distant social relations.

Implications for the Economic Experiments

The hardships of the postsocialist economy, the use of common-pool territories and nonmarket food-sharing, the demographic profile of the community, and the study community's continuing but limited contact with markets held a number of implications for the behavioral experiments.

First, food-sharing is in large part a manifestation of the larger kinship estate that maintains active use of hunting spots and territories. Kinship, both genealogical and affinal, is the most commonly mentioned vector for food transfer. One might expect that a kinship variable, such as the number of descendants in the community, could have an effect on decisions in the experiments.

Beyond kin, there is an expectation in the community that those with food (the "haves") will give it to those who are unable to produce food (the "have-nots," including the elderly, single mothers, and those who are not good at hunting). This expectation is expressed in local social norms. If individuals who are relatively well off carry such ideas into the experimental games, one might expect a positive correlation between generosity and economic indicators.

Similarly, as production levels increase and surpluses can be exchanged for fuel, spare parts, hunting supplies, and consumer goods—necessary for months-long hunting seasons in the tundra—one finds greater dependence on actors in the regional market (middlemen). Such people have various reputations in the community for dealing unfairly (often) or fairly (rarely). A concern for fairness would be expected among those who have greater experience with the market.

Third, because of the different religious and ethnic backgrounds of the two major indigenous ethnic groups in the community, one might expect some differences in the game results. These expectations are discussed after the description of the methods and the results of the experiment.

METHODS

Here I first describe the details of the experiment that were particular to this research setting. Then I provide some descriptive information on the independent variables, including income, wealth, and religion, that were derived from the questionnaire associated with the experimental protocol. The section closes with a description of the results of decisions in the games.

My research in Ust'-Avam began in January 1994 and ran intermittently for a total of twenty months through March 2003. I spent an additional eighteen months in the regional capital and three other small communities in the Taimyr region, beginning in 1992. The trust and rapport I built up with the community over this period helped both to achieve consensus in performing the experiments and to guarantee that participants believed that their decisions were real and they would be paid.

The ultimatum game and dictator game experiments were administered in Ust'-Avam during a January–March 2003 research visit supported by the Max Planck Institute for Social

PHOTO 13.1   *Reading a Game Protocol*

Source: Author's photograph.
Note: Research assistant Natasha Chuprina reads a game protocol in Ust'-Avam, 2003.

Anthropology. The experiments followed the protocols provided by Joseph Henrich (chapter 3). I conducted the experiments in Russian—the community lingua franca. Three rooms in the village school were used, and five research assistants monitored subjects and read protocols (see photo 13.1). The show-up fee of 100 rubles (U.S. $3.10) was approximately equal to an average daily income. The stake for each game was also set at 100 rubles.

The village administration supplied what is called a "social passport" for the community, which was a list that included individual and household information. There were 163 households listed on the document. (Fifteen households located in an outlying community 180 kilometers by river away from Ust'-Avam were not included.) Of the individuals living in Ust'-Avam, I chose every third adult and did not pick more than two individuals from one household. One ethnic Russian refused to participate in the experiment. One individual could not understand the instructions during individual testing and had to be excused after filling out a player data sheet (and being given the show-up fee). One passerby was added to the subject pool prior to initiation of the games because of a no-show. With these exceptions, the sample is a random selection of the adults in households across the community. Fifty-nine individuals played both games—thirty playing the role of player 1 and twenty-nine playing the role of player 2.[6]

Independent Variables

Player data sheets were used to generate independent variables on the players. There were thirty-two female and twenty-eight male participants, age eighteen to seventy-nine. As mentioned, one participant, a seventy-one-year-old female, dropped out of the experiments after

she failed to understand the test questions. The average age of participants was 38.72, with a standard deviation of 12.75 years. The skewness and kurtosis figures were low, and a histogram of age closely follows a normal curve.

Education, in years, was reported for fifty-eight of the sixty participants. The mean education was 9.60 years, with a standard deviation of 2.36 years. The distribution is not skewed, but thirty-three individuals reported the mode (ten years of education), and the variable's kurtosis is abnormal. Square root and natural log transforms of years of education also show a lot of variation on normal probability (Q-Q) plots.

There were twenty-eight Nganasan and thirty-two Dolgan participants. Ethnicity was described in the social passport under "national'nost'" (Dolgan, Nganasan, Nenets, and so on) and coded as a dummy variable (Nganasan and non-Nganasan). Because of the correspondence between ethnicity and religion (all pagans are Nganasan, as described below), the two variables were not used in regression models at the same time.

Household size ranged from one to eight individuals and averaged 4.68 individuals, with a standard deviation of 2.11. The distribution is relatively flat across the sample. Nevertheless, the normal Q-Q plot shows observed values very close to those expected, and so the variable is useful for multiple regressions. The mean number of children was 2.25, with a standard deviation of 2.25. Households did not necessarily include all of an individual's offspring, however, as older children tended to get their own apartment. The distribution of the total number of offspring is skewed right among Ust'-Avam participants because eighteen of sixty individuals had no children. Further, there is a strong correlation between age and number of descendants in the data set, so controlling for age is important when considering the number of offspring. Only one of these variables is used at a time in further analysis since there is a strong relationship between household size and number of offspring.

There were two questions regarding religion on the player data sheets. The first question was an open-ended inquiry on religious affiliation. The second had to do with the frequency of religious attendance. Sixteen respondents—all Nganasan, and approximately one-quarter of the pool—classified their religion as "pagan" (iazychnik) or "Nganasan." Twenty-four respondents said that they were Russian Orthodox, including two Nganasan. There was one expressed atheist. The remainder left the question blank (ten Nganasan and nine Dolgan). I set up three dummy variables to represent the positive listing of religion: pagan, Christian, and either religion. The fact that approximately one-third of the sample was equivocal about religion (or was an expressed atheist) probably reflects the influence of Soviet economic development and political activism, which repressed indigenous Siberian religions in the early nineteenth century.

Twelve of sixty participants filling out data sheets reported religious attendance greater than zero times per week. Since only three of these participants ended up being assigned the role of player 1, using the religious attendance variable entails the loss of many cases for looking at game results. However, religious attendance indicates a strong commitment to social norms and may be of interest. In addition, attendance at religious services is not related to being pagan (Pearson chi-squared 0.341, $p = 0.559$), but it is related to being Christian (Pearson chi-squared 4.444, $p = 0.035$), even though there are no churches in the vicinity. This is because two individuals indicated that they attended church more than once a day, and they were both Christian. It is possible that they conducted religious rituals in their homes, as Orthodox icons are found in some homes.

Income showed great variance. Annual incomes ranged from 0 to 171,000 rubles (U.S.$5,516). The annual mean income was 38,964 rubles (U.S.$1,256) for all participants in the study. These figures include individuals with jobs in the village, individuals receiving pensions and other social payments, and the unemployed. The standard deviation was 39,617 rubles. The distribution is skewed right because of six individuals making over 100,000 rubles per year and

FIGURE 13.2   *Distribution of Offers in the Dictator Game and the Ultimatum Game in Ust'-Avam, 2003*
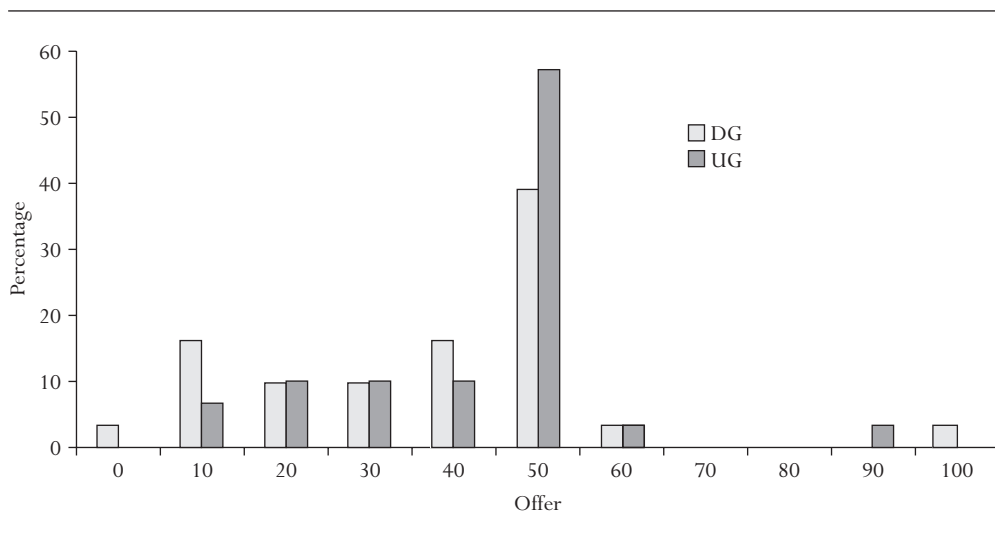
Source: Author's compilation of author data.

30 percent of the sample making less than 10,000 rubles (U.S.$310) per annum. Six claimed to have no annual income at all. Although these are missing data, it is unlikely that they would change anything significantly, as these informants were unemployed and probably received only minimal social compensation from the state (that is, in the 10,000-ruble-per-year range). The log transform drops six cases because their income was zero. Both the log and square root transforms are very close to expected values according to normal probability (Q-Q) plots. The square root of income is preferred because it is less skewed and does not drop the zeros.

To understand the average purchasing power of the average income, consider that in March 2003 a one-way helicopter flight from Ust'-Avam to Dudinka cost the equivalent of U.S.$90.65—a figure close to the average month's income. Regular travel to and from the regional capital was not possible for many villagers. A loaf of bread—sold under state-supported prices—cost 20 rubles, or approximately 63 cents, at the village bakery. Many people made their own bread, however, and a kilogram of high-quality unbleached flour was relatively costly at 30 rubles, which is approximately what bulk flour costs today in U.S. supermarkets.

Participants were asked to list items that could be considered capital wealth, including snowmobiles, sleighs, boats and boat motors, firearms, sewing machines, bank accounts, and other items of capital wealth. Since many of these items were purchased either before the 1991 collapse of the Soviet economy or during the period of rapid inflation during the 1990s, depreciation was not figured. Rather, the wealth variable is simply a cumulative count of items listed. The range of answers was zero to seven, with a mean of 1.7 and a standard deviation of 2.02. Skewness and kurtosis figures for wealth are less than one, and a normal Q-Q plot of wealth shows observed values close to expected values.

Descriptive Statistics on the Game Results

The mean offer in the dictator game in Ust'-Avam was 37.3 percent of the stake, but the modal offer (twelve offers) was 50 percent of the stake (figure 13.2). The Dolgan and Nganasan had the

FIGURE 13.3   *Distribution of Rejections in the Ultimatum Game and Expected Income for Player 1 in Ust'-Avam, 2003*
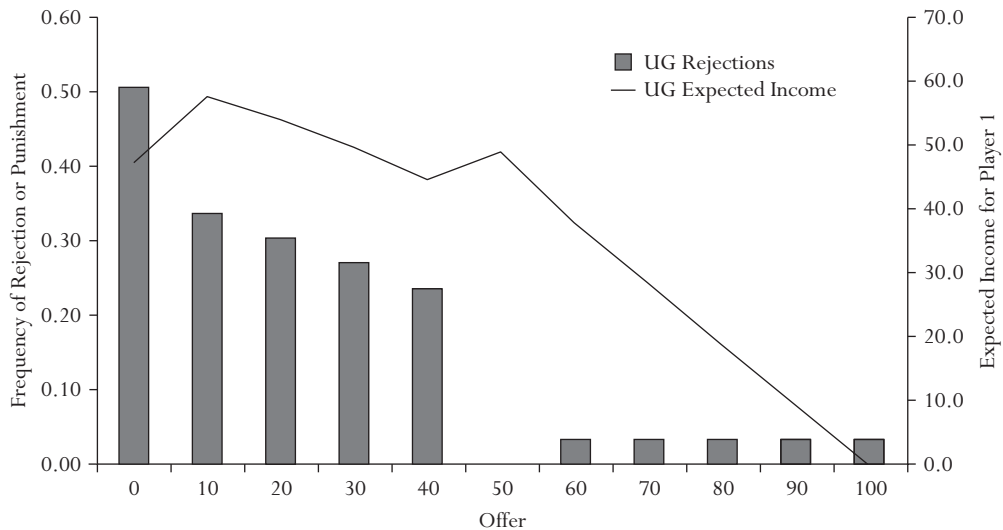
Source: Author's compilation of author data.

highest proportion of fifty-fifty offers across all study communities (see chapter 4). The mean offer was midway along the distribution of study communities. The second and third most frequent offers in the DG were 10 percent (five offers) and 40 percent (four offers). The distribution of these data suggests that concern for fairness was strongly internalized for the majority (53 percent) of participants. Attempts to maximize income (by offering 0 or 10 percent of the stake) were found for a small minority (20 percent). By far the majority of respondents were fairer than they had to be in the DG, considering the random and blind assignment of their decision.

The most frequent ultimatum game offers in Ust'-Avam (made by close to 60 percent of player 1s) were 50 percent of the stake; average offers were slightly lower (48 percent). To have mean offers hovering around 40 percent in the UG with the mode at the fifty-fifty split is characteristic of studies of university students and Western societies (Oosterbeek, Sloof, and van de Kuilen 2004; see also chapter 2). Mean and modal offers in Ust'-Avam were in the middle of the range of findings by Joseph Henrich and his colleagues (2004). There were two hyper-fair offers in both games, totaling 7 percent of offers.

In general, the UG results show a heightened tendency to make the modal offer in comparison to the DG, as should be expected under the knowledge of potential second-party punishment. In addition, in the UG there was a significant reduction in the frequency of offers at 10 percent or below. Hyper-fair offers occurred at the same low frequency in the UG and DG. The correlation between DG offers and UG offers in Ust'-Avam was 0.320, with a statistically suggestive *p*-value of 0.084 (two-tailed). The weak correlation between game results appears to be related to the shift of player offers to the modal offer with the knowledge of the potential for offers to be rejected.

Surprisingly, the Dolgan and Nganasan were moderately accepting of low offers on average in these experiments. An examination of the distribution of rejection rates (figure 13.3) shows that approximately 52 percent of respondents rejected offers of 0 percent. With offers of between 10 and 40 percent, player 2s were increasingly accepting. At offers of 50 percent, there

was universal acceptance. One informant rejected all hyper-fair offers. As mentioned earlier, two hyper-fair offers occurred once in the UG and once in the DG.

The average minimum acceptable offer (MinAO) for the Ust'-Avam experiments was 14.8 percent of the stake (with twenty-nine player 2s). For comparison, the average MinAO for experiments at Boise State University in 2005 (Ziker et al. 2006) was 25.5 percent (eleven player 2s). Daniel Kahneman, Jack Knetsch, and Richard Thaler (1986, S291) report an average MinAO of 25.9 percent in experiments with psychology students at the University of British Columbia.

Running over the player 2 rejection pattern in figure 13.3 is the projected income for each player 1 offer. The income-maximizing offer (IMO) for player 1s would be 10 rubles, considering the rejection pattern. It is possible that a number of player 1s had a sense that a 10 percent offer was acceptable for a significant number of community members (represented by player 2s in the UG) based on their own thinking about making such a decision. The risk of being rejected dropped 18 percent from offers of zero to offers of 10 rubles, and the potential payoff was relatively great. The next best offer was 50 rubles in the UG, with no rejections and thus a sure chance of receiving the 50 rubles.

REGRESSION RESULTS

What variables are related to these patterns? In this section, I present the results of multiple regression analysis of the DG, UG, and MinAO (dependent variables) in order to explore the independent variables related to patterns seen in the game results. In each case, I begin with the standard set of variables used in the project. I then change the sets of independent variables to focus on those that are the best predictors of the pattern within this community. Finally, I summarize the results of the regression analyses and suggest why some variables are good predictors of the dependent variable and others are not.

Table 13.1 shows the linear regression results for four different combinations of independent variables in predictions of DG offers. Model 1 is the standard set of variables as indicated in the guidelines for this book (see chapters 3 and 4). The variables age, sex, years of education, and wealth-divided-by-household-size were not related to DG offers. Individual income was the only significant variable. For each standard-deviation increase in income, DG offers increased almost 17 percent.

Model 2 leaves only income from the previous model and adds wealth, household size, and number of examples. This combination of variables significantly increases the adjusted R-squared of the model and results in high model significance. A standard-deviation increase in wealth results in a 7.5 percent decrease in DG offers. Similarly, a standard-deviation increase in household size decreases DG offers by 6.7 percent. This is probably why the combined variable showed no relationship to offers. On the other hand, increasing the number of examples read in the experiment resulted in a 6.5 percent increases in offers.

Model 3 replaces wealth with attendance at religious services. The goodness of fit remains the same (adjusted R-square = 0.413) at high model significance, but the constant itself falls out of the range of significance. A standard-deviation change in attendance at religious services increases DG offers by 15 percent in model 3.

In model 4, both wealth and attendance at religious services are included. With t-statistics at $+/-1.5$, both variables have coefficient significances of $p = 0.135$ in model 4. Although this is far from standard levels of acceptable significance, these variables show some potential for being related to DG offers when each is considered separately, as shown in models 2 and 3. Model 4 explains the most variance (R-squared = 0.560), but adding the wealth and attendance at religious services variables at the same time dilutes their specificity.

TABLE 13.1   *Linear Regressions of Ust'-Avam Dictator Game Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)
Age	−0.186			
	(3. 949)			
Female	−5.181			
	(7.906)			
Education	−2.511			
	(4.540)			
Individual income	16.788**	16.424***	17.272***	17.856***
	(6.401)	(5.110)	(5.183)	(5.029)
Wealth/household size	−5.334			
	(4.305)			
Wealth		−7.534*		−6.813
		(4.494)		(4.373)
Household size		−6.736*	−6.774*	−6.537*
		(3.849)	(3.848)	(3.727)
Attendance at religious services			15.446*	13.969
			(9.211)	(8.963)
Number of examples		6.576*	6.828*	6.379*
		(3.546)	(3.535)	(3.433)
Constant	37.121	25.127*	17.863	21.776*
	(23.489)	(12.679)	(10.336)	(12.656)
Observations	29	29	29	29
Model significance	0.133*	0.000***	0.000***	0.004***
Adjusted R-squared	0.139	0.413	0.413	0.450

Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. Coefficients are standardized by (divided by) the 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 table 13.1, the income variable shown is the square root of income, following recommendations for normalizing the distribution (Tabachnick and Fidell 2007). If, instead, actual income figures are used, in model 1 the constant is significant at the < 0.10 level, and in models 2 to 4 the constant is significant at the < 0.01 level. In addition, the variable coefficient for income is lower at 12 to 13 (standardized errors of approximately 3) with much stronger significance (0.000 in most models). Also, the standardized coefficient for wealth (approximately 10 percent) is significant at the < 0.05 level in models 2 and 3, and the coefficient for attendance at religious services (15 percent) is significant at the < 0.10 level in model 4. Real income seems to be more comparable to the other continuous variables and may provide a better goodness of fit (adjusted R-squared $= 0.539$ in model 2).

Overall, the statistical analysis indicates that DG offers are most strongly predicted by individual income, household size, the number of examples given in the one-on-one sessions, and marginally by wealth and attendance at religious services. This is true for either income variable (actual income or its square root). Other variables, including age, sex, ethnicity (dummy), religion (pagan, Christian, all-religions dummies), years of education, wealth-divided-by-household-size, and number of offspring, show no indication of a relationship with DG offers when added individually to a regression on income and number of examples.

DG offers are increased by individual income, number of examples read, and attendance at religious services. Participants who had greater disposable income may have made higher offers

TABLE 13.2   *Linear Regressions of Ust'-Avam Ultimatum Game Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)
Age	1.353		
	(3.678)		
Female	−0.943		
	(7.364)		
Education	−1.699		
	(4.229)		
Individual income	1.563	2.077	
	(5.962)	(4.906)	
Wealth/household size	−1.085		
	(4.010)		
Household size		−2.279	
		(3.335)	
Number of examples		−3.051	
		(3.611)	
DG Offer			0.249*
			(0.139)
Constant	45.684**	51.106***	33.686***
	(21.879)	(12.726)	(5.935)
Observations	29	29	29
Model significance	0.984	0.680	0.084*
Adjusted R-squared	−0.184	−0.054	0.071

Source: Author's calculations based on author data.
Note: Standard errors are in parentheses. Coefficients are standardized by (divided by) the 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

because they felt a stronger compunction to follow social norms for fairness. Participants who had been given more examples took longer to understand the math. It is possible that they also did not identify with selfish motives, or that they were not as experienced in making monetary decisions and so went with what seemed like more equitable decisions. Religious attendance also may indicate an interest in social norms of fairness and greater egalitarianism in decisions. Household size and wealth decreased offers. With larger households, competition over household resources could train individuals to be more selfish overall. Similarly, it takes more selfishness to amass and maintain wealth items in small-scale communities such as Ust'-Avam.

Table 13.2 shows the linear regression results for three different combinations of independent variables in predictions of UG offers. Model 1 is the standard set of variables for this project. The variables age, sex, years of education, individual income, and wealth-divided-by-household-size were not related to UG offers. Model 1 had a negative and insignificant ability to predict variation in UG offers.

Model 2 includes variables that were successful in explaining DG offers: household size and number of examples. Wealth was also added, as were attendance at religious services, ethnicity, religious dummies, and number of offspring. None of these variables had any success in predicting UG offers.

Model 3 drops all unsuccessful variables and includes the offer made in the first game (the DG offer). A standard-deviation increase in DG offer was related to a one-quarter-percent increase in UG offer at the < 0.10 level of statistical significance. The model has a positive goodness of

TABLE 13.3　　*Linear Regressions of Ust'-Avam Minimum Acceptable Offers*

Variable (Divided by Standard Deviation)	(1)	(2)	(3)	(4)
Age	−4.950	−3.687	−4.134	
	(4.877)	(4.465)	(3.832)	
Female	8.291			
	(10.369)			
Education	−4.552			
	(4.931)			
Individual income	−1.386			
	(7.517)			
Wealth/household size	−0.926			
	(3.909)			
Wealth		−2.809		
		(3.683)		
Household size			−6.613*	−6.954*
			(3.487)	(3.483)
Ethnicity (dummy)		1.127		
		(9.550)		
Christian (dummy)		−1.198		
		(9.217)		
Number of examples			6.888**	6.607*
			(3.243)	(3.243)
Constant	46.397*	29.413*	28.351*	17.044
	(26.641)	(14.558)	(14.833)	(10.529)
Observations	30	30	30	30
Model significance	0.861	0.825	0.067*	0.047**
Adjusted R-squared	−0.131	−0.098	0.155	0.149

Source: Author's calculations based on author data.

Note: Standard errors are in parentheses. Coefficients are standardized by (divided by) the standard deviation.

**Coefficient significant at < 0.05 level in two-tailed test

*Coefficient significant at $=/< 0.10$ level in two-tailed test

fit. Along with the constant, model 3 explains about 10 percent of the variance in UG offers (R-squared $= 0.103$) at the < 0.10 level.

That no independent social or economic variables explained UG results indicates the strong pressure to make fair offers in light of the possibility of second-party punishment. Similar results were found when using real income instead of square root of income.

Table 13.3 shows the linear regression results for four different combinations of independent variables in predictions of minimum acceptable offers in the UG. Model 1 is the standard set of variables for this project. Importantly, data on MinAOs provide a way to analyze the decisions of those who participated as player 2 and to understand the willingness of the population to employ costly punishment to enforce social norms. The variables in model 1—age, sex, years of education, individual income, and wealth-divided-by-household-size—show no relationship with MinAOs.

Model 2 retains age, which was the variable that had the strongest *t*-statistic in model 1, and adds wealth, the ethnicity dummy variable, and the Christian dummy variable. Again, the adjusted R-squared (goodness of fit) is negative, and there is no statistical significance to the model. The result is similar when ethnicity, pagan, and religion dummy variables are considered separately in this model.

Model 3 again retains age, but drops other variables that previously showed no relationship to MinAOs. Model 3 adds the household size variable and the number of examples in the UG.

Other combinations are also attempted in place of age, including number of examples in the DG, attendance at religious services, ethnicity dummy, religion dummies, and number of offspring. No combination of variables provides any better goodness of fit or model significance. Model 3 has statistical significance and explains 24.5 percent of the variation (R-squared = 0.245) in MinAOs with a positive goodness of fit (adjusted R-squared = 0.155).

Model 4 drops age and retains number of examples and household size. Both independent variables retain t-statistics at or above -2 and statistical significances just over the $</=0.05$ level, but the model's constant drops out of statistical significance. Model 4 has the highest statistical significance overall and has goodness of fit close to that of model 3. Model 4 explains 21 percent of the variation (R-squared = 0.210), but it may be somewhat underspecified (adjusted R-squared = 0.149). No other independent variable could be found to help predict MinAOs.

Household size is negatively related to MinAOs in models 3 and 4. A standard-deviation increase in household size results in 6 to 7 percent decreases in minimum acceptable offers. Individuals in larger households may have been willing to accept lower offers because, living in such households, they were likely to be sharing a collective pie with a larger number of people on a daily basis and were thus accustomed to accepting smaller portions. Significantly, the effect of household size on DG offers is also reflected in MinAOs: increasing household size reduces DG offers and MinAOs. In models 3 and 4, a standard-deviation increase in the number of examples increases MinAOs by almost 7 percent. Similar to the effect of number of examples on DG offers, this effect may reflect some participants' lack of mathematical ability or the fact of being less mathematically inclined, which might have made them tend to be more careful and to search for the "right" (more egalitarian) decision.

The overall rejection rate in the Ust'-Avam experiments is somewhat lower than the 23.7 percent rate found among the Hadza (Marlowe 2004) and lower than the rejection rates found in experiments among university college students (Roth et al. 1991) and other Western populations among whom there was a 22.5 percent average rejection rate in six sessions (Abbink et al. 1999). The Ust'-Avam rejection rate is significantly higher than that found among the Kazakh, Quichua, Ache, and Tsimane', among whom rejection rates were less than 5 percent (Henrich et al. 2004). The rejection patterns among the Dolgan and Nganasan were close to those of the Hadza (chapter 6, available at: http://www.russellsage.org/Ensminger) and in the middle of the distribution of societies included in this project. The independent variables that explain the variance in rejection rates in Ust'-Avam are household size and number of examples read in the experimental session. These results suggest that the widespread practice of sharing within the community is reflected in both the relatively low average minimum acceptable offer and the effect of household size on MinAO. The social norm of food-sharing is reflected not only in the number of local concepts and aphorisms on the subject but also in the regular distributions to relatives, friends, and those who needed food that researchers consistently observed across the community.

CONCLUSIONS

What were the expectations for the games in light of the contextual information for Ust'-Avam provided at the outset? The first expectation was that kinship, as documented in interviews and repeated visits, would be confirmed as an important vector of resource and food-sharing in the community. If kinship assumptions carried over to the games, then one might expect individuals with more offspring to be more generous. A better measure might have been number of relatives in the community, but that information was not included on the player data sheet, since the definition of "relative" is difficult to standardize across cultures. Using my genealogies and census information for the community, I counted the number of living siblings, aunts and uncles, and

PHOTO 13.2   *Game Participants and Research Assistant Listening to the DG Protocol After Filling Out Player Data Sheets*

Source: Author's photograph.
Note: Ust'-Avam, 2003.

first cousins for every player. Linear regression of these kin counts on DG offers, UG offers, and MinAOs were uncorrelated.

I also investigated the effect of the presence of a living father, mother, or spouse on UG offers, DG offers, and MinAOs, using independent sample t-tests. Two of nine t-tests show significant differences. First, the difference in mean UG offer of players with living versus nonliving spouses (a mean of 40 for those with a living spouse versus a mean of 60 for those without a living spouse) is significant ($t = 2.162$, $p = 0.042$). Second, the mean MinAO of players with a living versus nonliving father (a mean of 18 for those without a living father and a mean of 3.333 for those with a living father) is significant ($t = 2.634$, $p = 0.022$). Having a living spouse lowers the mean UG offer, and having a living father lowers the mean MinAO. In both cases, the effect is a result of a few individuals with neither a living spouse nor a living father playing in a more generous fashion. While suggestive, the overall effect of kin on game play is not robust, which may be a result of the anonymous and uncontextualized nature of these experiments.

Furthermore, in regression analyses of data from the player data sheets, the players' number of offspring and their age were not related to player 1 offers in either the dictator game or the ultimatum game or with player 2 minimum acceptable offers in the ultimatum game. The number of individuals living together (household size) was shown to be a negative factor on offers in the DG and with MinAOs. This result may indicate greater levels of competition over resources in larger households. Overall, the kin effects on game behavior in this set of experiments are minimal.

A second expectation about sharing in the community is that those with resources (the "haves") would make transfers to those who do not have resources (the "have-nots," including the elderly, single mothers, and those who are not good at hunting), as documented in many food-sharing studies. Carrying this idea into the games, one might expect a positive correlation between generosity and economic indicators, such as wealth. In fact, the opposite was demonstrated. Wealth indicators are negatively related to DG offers. It is likely that maintaining wealth items in the community indicates a history of not lending them out, and thus greater concern for self. On the other hand, disposable income is positively related to higher offers in the DG, as predicted.

Considering the hardships of the postsocialist economy, one might expect increased selfishness over limited resources during the transition to a free market. In fact, a frenzy of property acquisitions occurred in central regions of Russia in the 1990s, and the privatization of industry was notoriously corrupt. In the Ust'-Avam community, by contrast, common-pool territorial strategies and nonmarket food-sharing developed to deal with the vagaries of cash payments and the supply of consumer goods. The demographic profile of the community indicates much stress on adults (high mortality rates due largely to binge-drinking), illustrating limited but influential contact with markets—the source of alcohol and other consumer goods. Only a few individual incomes were greater than two standard deviations above the average income, and many individuals received less than the mean because their only source of income was social welfare. A concern for fairness might be expected among those who had greater contact with outside bureaucracy and institutions—such as teachers and other civil service workers—and among those who were better able to make purchases in the market. In addition, I observed that people in Ust'-Avam who had money pooled money with relatives to purchase wealth items, such as new rifles. Similarly, very successful hunters and fishermen in Ust'-Avam were regularly traded surplus with middlemen to acquire fuel and supplies. They were very concerned with the fairness of trades and often discussed unfair traders. In fact, regression analysis indicates that standard-deviation increases in income are strongly related to increased DG offers, but unrelated to UG offers and MinAOs. In the UG, it is likely that potential costly punishment drowned out the income effect on fairness.

Third, one might expect some differences in the game results attributable to the different religious and ethnic backgrounds of the two major indigenous ethnic groups in the community. Interestingly, there were no differences by ethnic group or religion, although frequency of attendance at religious services (indicated by twelve of sixty participants) was marginally related to increased DG offers.

Generosity is encouraged among the Dolgan and Nganasan through kinship, food-sharing, and common-property traditions, including maxims, aphorisms, and cosmological ideas that reward giving and emphasize negative outcomes of selfishness. It appears that these norms of sharing manifest in the pattern of DG offers in Ust'-Avam. In the UG, there were moderate numbers of low offers and moderate levels of punishment, which may reflect the social norms surrounding reciprocal sharing and by-product cooperation in collective procurement events. There was a small level of risk-taking in the community, as exhibited by a low incidence of low UG offers and a complementary moderate level of willingness to punish egoists. Player 2s expressed a willingness to accept what was given in the postgame interviews. The influence of individual income on DG offers also probably reflects individual experiences with exchanges in the larger economy. All of these results are consistent with Ust'-Avam's subsistence hunting-and-gathering lifestyle, common-pool resources, and expectation that all community members are entitled to aid.

NOTES

1. All five groups are considered "small-numbering Northern peoples" (malochislennye narody Severa), following Soviet ethnicity policy for thirty such ethnicities. Larger-numbering native groups, such as Sakha, Tuvan, and Buriat, have greater political autonomy within Russia and the states referred to as "republics."

2. Histories of Siberia (for example, Forsyth 1992) document the presence of Russian trappers, Cossacks, and Orthodox missionaries in the region since the mid-1600s. Russian immigrants were few in number, however, and the colonial relationship stipulated a degree of autonomy to native peoples (inorodetsy, or "Russian people of another faith"), reflected in the ordination of native kings and administrative tribes.

3. There is local debate as to the distinctiveness of the Dolgan language, with some arguing that it is a dialect of Yakut. In fact, there is a Western dialect of Dolgan (farther from Yakutia) and an Eastern style that is more similar to Yakut. I have documented many word substitutions in the Western dialect. For example, in the West they say "tyali," or language of the tundra people, but in the East they say "hakhali," the language of the Hakha people. Ust'-Avam is within the tyali-speaking population.

4. Nganasan is an endangered language, with fewer than one thousand speakers. The Nganasan were earlier known as the Tavgi Samoyed and Vadei Samoyed (Popov 1966), reflecting a similar distinction between Western and Eastern language communities. Nganasan is really a misnomer begun by Soviet ethnographers—it means "man." In Nganasan, they call themselves Nya (people).

5. Archival research (Ziker 2002a) showed that most of the 140 land allotments made from 1992 to 1997 (48 by indigenous people) were located in close proximity to the regional capital (Dudinka), along the Yenesei River or in proximity to Noril'sk.

6. Two player 1s were matched with the same player 2 for the purposes of figuring the final payoff in the UG. This final pair was matched at random.

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