2-2010

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Recommended Citation

Gurven, Michael, Monique Borgerhoff-Mulder, Paul Hooper, Hillard Kaplan, Robert Quinlan, Rebecca Sear, Eric Schniter, et al. 2010. *Domestication alone does not lead to inequality: intergenerational wealth transmission among horticulturalists. Current Anthropology* 51(1):49–64, doi:10.1086/648587.

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Intergenerational Wealth Transmission and Inequality in Premodern Societies

Domestication Alone Does Not Lead to Inequality

Intergenerational Wealth Transmission among Horticulturalists

by Michael Gurven, Monique Borgerhoff Mulder, Paul L. Hooper, Hillard Kaplan, Robert Quinlan, Rebecca Sear, Eric Schniter, Christopher von Rueden, Samuel Bowles, Tom Hertz, and Adrian Bell

CA+ Online-Only Supplement: Estimating the Inheritance of Wealth in Premodern Societies

We present empirical measures of wealth inequality and its intergenerational transmission among four horticulturalist populations. Wealth is construed broadly as embodied somatic and neural capital, including body size, fertility and cultural knowledge, material capital such as land and household wealth, and relational capital in the form of coalitional support and field labor. Wealth inequality is moderate for most forms of wealth, and intergenerational wealth transmission is low for material resources and moderate for embodied and relational wealth. Our analysis suggests that domestication alone does not transform social structure; rather, the presence of scarce, defensible resources may be required before inequality and wealth transmission patterns resemble the familiar pattern in more complex societies. Land ownership based on usufruct and low-intensity cultivation, especially in the context of other economic activities such as hunting and fishing, is associated with more egalitarian wealth distributions as found among hunter-gatherers.

This paper quantifies the level of inequality in the types of wealth common to small-scale horticultural populations and the extent to which wealth is correlated across generations. Knowledge of the variability in each wealth type, how different wealth types combine, and the extent to which wealth is correlated across generations can help us address several important questions concerning the evolution of inequality: (1) Is inequality more common for certain types of wealth? (2) To what extent does inequality in one generation impact the level of inequality in the next? (3) How much socioeconomic status mobility exists across generations? (4) Do different horticul-

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 0011-3204/2010/5101-0006$10.00. DOI: 10.1086/648587

tural populations show similar patterns of inequality within and across generations, such that generalizations about horticultural production systems can be made?

We start by exploring the commonalities among populations that use horticulture as their primary production system, basing our analysis on empirical data collected among extant horticulturalists: Dominicans, Mandinka of Gambia, Pimbwe of Tanzania, and Tsimane of Bolivia.

Horticultural Production System

Horticulture, or "garden cultivation," describes small-scale, low-intensity agricultural production based on human labor inputs and simple tools (Bates 2001). Subsistence is based on modification of plants and their environments in order to increase their productivity and utility to people. Production is aimed at household provisioning rather than cash-cropping or export. Horticulturalists also commonly engage in substantial fishing, hunting, or other extractive foraging activities, but the bulk of the diet comes from domesticated plant species cultivated in garden plots.[1] Unlike many foraging groups, however, horticulturalist households are characterized as relatively self-sufficient. Access to more predictable and storable agricultural produce attenuates interfamily resource sharing and increases sedentism and territoriality. For example, food-sharing networks are more restricted among Ache who live on permanent settlement and grow crops on private plots than among those who forage nomadically in the forest (Gurven, Hill, and Kaplan 2002). Horticulturalists tend to live in aggregations that are larger and more sedentary than those of foragers. Available evidence from precontact societies suggests that raids and intergroup aggression are fairly common among horticulturalists or at least as common as among foragers (Keeley 1996; Wrangham, Wilson, and Muller 2006). Table 1 describes domestic organization, descent patterns, settlement patterns and village size, property right, and wealth stratification among the 83 horticulturalist societies from Murdock and White's (1969) Standard Cross-Cultural Sample (SCCS).

Horticultural production first appeared in Southwest Asia and the Middle East during the Neolithic 9,000–11,000 years ago and in other geographical regions by 3,000–6,000 years ago (Bellwood 2005). Plant domestication and animal domestication have been viewed as watershed processes in the development of human cultures and civilizations. All civilizations have been based on cultivation of one or more of six plant species: wheat, barley, millet, rice, maize, and potatoes. Population pressure, climatic and environmental change, reduced densities of large animals, and cultural transmission have been cited as key ingredients in the adoption of food production (Flannery 1973; Rindos 1987). Variability in the timing and expression of agriculture has been related to local differences in these factors and in the availability of domesticable species and trade networks (Diamond 1999; Harris 1977).

Horticultural societies vary along ecological, social, and political dimensions, but commonalities can be identified (Bates 2001). First, horticulturalist households tend to be relatively independent and make their own decisions in regard to food production without centralized authority. Second, horticulture provides relatively low yield per land area, and so surpluses are unusual. Farming techniques found in many horticultural systems are slash-and-burn and polyculture. Slash-and-burn involves the clearing and burning of trees and brush to reduce competition from wild plants and to add soil nutrients from the ashes. After several cycles, productivity declines as a result of low nitrate and potassium levels, and the cleared areas are left fallow to return to brush or forest. Polyculture involves a mix of crops or varieties interspersed in the same field, including root crops, fruit trees, palms, and cereals (maize, millet, barley, or rice). The mix of crops ensures ground cover for most of the year and helps prevent erosion. A reliance on tree crops is also common. As gardens "age," the combination of trees and crops will vary. Relatively short cropping periods and long fallows mean that new fields may be created frequently. Third, horticulture relies on simple tools such as digging sticks, hoes, machetes, and axes rather than plows, machines, or irrigation. Without irrigation, horticulturalists depend on the seasonal cycle of rainfall. Horticulture is best suited to humid, tropical conditions, where more intensive techniques such as monocropping and clear-cutting, in combination with heavy rainfall, often lead to soil erosion and degradation and fungal infections of crops.

Wealth

For many horticulturalists, wealth is somatic: stored in human bodies and channeled into growth, reproduction, and immune function. Most horticultural populations do not practice efficient birth control, and fertility tends to be relatively high, averaging more than five offspring per woman (Bentley, Jasienska, and Goldberg 1993; Wood 1994). A wealthy horticulturalist is healthy, well fed, and fertile.

Ecological knowledge is important for efficient food production. While several studies emphasize the difficulty of hunting (Gurven, Kaplan, and Gutierrez 2006; Ohtsuka 1989; Walker et al. 2002), horticulture may also require substantial knowledge and skill to learn proper timing for burning, plot rotation, planting techniques, pest control, and soil management (Conklin 1957). Although the bulk of the calories in horticultural groups comes from carbohydrate staples, such as yams, plantains, and rice, much time is spent engaging in other activities that provide important nutrients as well as prestige, such as hunting and spear fishing (Hames 1989). Animal domestication is not uncommon but is usually confined to small animals such as chickens, goats, pigs, and sheep.

Despite the self-reliance of horticultural households, social networks through kinship or alliances are important to insure

1. Because much of the protein and lipids in the diet often come from animal and fish consumption, these groups have often been referred to as horticulturalists-foragers or forager-horticulturalists.

Table 1. Geographic, social, and inheritance characteristics of $n = 83$ horticultural societies

Characteristics	Percentage (%)
Region:[a]	
Africa	18.1
Circum-Mediterranean	3.6
East Eurasia	12.0
Insular Pacific	28.9
North America	9.6
South America	27.7
Domestic organization:	
Independent nuclear families, monogamous	3.6
Independent nuclear families, occasional polygyny	26.5
Polygyny	16.9
Minimal (stem) extended families	6.0
Small extended families	16.9
Large extended families	28.9
Descent:	
Patrilineal	34.9
Duolateral/bilineal	7.2
Matrilineal	22.9
Quasi lineages	4.8
Ambilineal	3.6
Bilateral	26.5
Mean size of local villages:	
<50	13.3
50–99	18.1
100–199	14.5
200–399	12.0
400–1,000	12.0
1,000–5,000	1.2
5,000+	2.4
Settlement patterns:	
Migratory or nomadic	7.2
Seminomadic	8.4
Semisedentary	6.0
Compact impermanent settlements	3.6
Dispersed family homesteads/separated hamlets	27.7
Compact, permanent settlements	43.4
Complex settlements	3.6
Inheritance of real property:	
Absence of property rights or inheritance rules	31.3
Matrilineal (sister's sons)	3.6
Other matrilineal heirs (e.g., younger brother)	7.2
Children (with daughters receiving less)	4.8
Children (equally for both sexes)	2.4
Other patrilineal heirs (e.g., younger brothers)	6.0
Patrilineal (sons)	20.5
Distribution of property among individuals of same category:	
Real property:	
Equal or relatively equal	24.1
Exclusively or predominantly to the one adjudged best qualified	.0
Ultimogeniture (to the junior individual)	1.2
Primogeniture (to the senior individual)	15.7
No rules or insufficient information	57.8
Movable property:	
Equal or relatively equal	44.6
Exclusively or predominantly to the one adjudged best qualified	1.2
Ultimogeniture (to the junior individual)	2.4
Primogeniture (to the senior individual)	13.3
No rules or insufficient information	38.6
Class stratification (prevailing type):	
Absence among freemen	45.8
Wealth distinctions	24.1
Elite (control of land, etc.)	2.4
Dual (hereditary aristocracy)	25.3
Complex (social classes)	2.4

Note. The 83 societies were defined by groups showing "casual agriculture," "extensive or shifting agriculture," and "horticulture," from the 186 societies comprising the Standard Cross-Cultural Sample (Murdock and White 1969).
[a]Percent of 83 societies.

long-term livelihood (Hadley, Borgerhoff Mulder, and Fitzherbert 2007; Patton 2005). Networks are vital for soliciting aid during episodes of sickness or disability (Sugiyama and Chacon 2000), crop failure (Hadley 2004), and recruiting allies during conflict (Patton 2005). Indeed, many horticulturalists in the Amazon and New Guinea were involved in frequent raiding of their neighbors (Keeley 1996). Physical size and muscular strength are associated with others' perceptions of dominance. Prestige and leadership are based largely on behavioral attributes, such as intelligence, charisma, and oratory skill, and are achieved and maintained through social support (Henrich and Gil-White 2001; von Rueden, Gurven, and Kaplan 2008).

Numerous studies examine status differentials among horticulturalists (mostly men) and link these to favorable cultural outcomes. Owners of more land and with resident parents show higher reproductive success (RS) in the Caribbean (Flinn 1986; Quinlan and Hagen 2008). High-status Ifalukese men marry at younger ages, and their wives have higher fertility because of smaller interbirth intervals (Turke and Betzig 1985). Yanomamö with *unokai* status for killing other men have more wives and more surviving children (Chagnon 1988). Better Tsimane and Piro hunters show greater fertility and RS (Gurven and von Rueden 2006). Healthier and taller adults also show higher fitness among rural Kavango in Namibia (Kirchengast and Winkler 1995, 1996) and rural Gambians (Sear 2006; Sear, Allal, and Mace 2004). Polygyny is fairly common among horticulturalist societies, where men compete to obtain multiple wives.

As among foragers, material wealth is limited among most horticulturalists. Food is often used as a currency for exchange, recruitment, and signaling, beyond immediate consumption. Other rare and valued materials may signal wealth, such as shells, carved stone, ivory, bone, ceramics, tools, and decorative objects. In resource- or land-limited regions, however, access to land, water, fish, or game may be restricted, and so access to territories and farming land may be controlled and transmitted through lineages.

Few studies have measured variability in wealth holdings among horticulturalists. An analysis of rice holdings, cash income, and household assets among 511 households from 59 Tsimane villages revealed Gini coefficients ranging from 0.28 for household wealth to 0.54 for cash income (Godoy et al. 2004). Interestingly, there was little increase or decrease in inequality among villages that varied by level of acculturation. In two villages, Gini coefficients of 0.31 and 0.38 were calculated for number of close kin, a form of relational wealth (von Rueden, Gurven, and Kaplan 2008).

Equality and Inequality

Sexual Division of Labor

Sexual divisions of labor are present in horticultural societies. Men's activities sometimes receive higher public recognition than do women's, although men's work and women's work have also been viewed as "separate but equal" spheres (Collier 1988; Sanday 1981). There may be less division of labor among horticulturalists than among foragers because both men and women contribute to horticulture. Some notable exceptions to sexual egalitarianism exist, from common menstrual taboos to punishment of female disobedience by group rape among the Mundurucu (Murphy and Murphy 1974). Some societies that engage in frequent warfare (e.g., Gebusi, Mehinaku) have men's houses, where socialization of boys occurs separately from that of girls (Knauft 1985).

Status Differentiation

Not all horticulturalists fit the same traditional labels popularized by Service (1962; e.g., band, tribe, or chiefdom) or those popularized by Fried (1967; egalitarian, ranked, and stratified societies). Many horticultural groups are fairly egalitarian and autonomous but show more status differentiation than foragers. Village leaders or headmen are often older charismatic adult men with many kin ties and allies (Arhem 1981; Kracke 1978; Maybury-Lewis 1974; Mindlin 1985; von Rueden, Gurven, and Kaplan 2008); they often carry no real authority or power to reward and punish but instead may coordinate activities, host events, and negotiate relationships with outsiders. Horticulturalists characterized by high mobility, little storage, small group size, and interdependence are more likely to be egalitarian, similar to foraging groups, whereas horticulturalists that differ along these dimensions tend to display greater levels of inequality, as found among complex hunter-gatherers (Testart 1982). Property ownership and territoriality are more culturally explicit among horticulturalists than among many foragers, while leveling mechanisms designed to maintain egalitarianism (Wiessner 1996) are less evident but not absent. Accusations of witchcraft or sorcery among aggrandizers are common in horticulturalist societies (Hill and Gurven 2004; Paciotti and Hadley 2003). Extensive wealth accumulation and self-aggrandizing are atypical among egalitarian horticulturalists. Craft and ritual specialists, politicians, and formal leaders are not uncommon (Chagnon 1968; Johnson and Earle 1987). In the past, when skirmishes over arable land were likely less of a problem than today, competition may have been greater over labor to work fields and generate surplus. The need for labor sometimes was reflected in a formal or legal possession of slaves (Koptyoff and Miers 1977). Slavery is rare among ethnographically present societies, although several horticulturalist populations traditionally had slaves (Colson 1960; Stearman 1988); 21 out of the 83 horticulturalist societies from the SCCS show former presence of slavery.

In contrast to Amazonians and several African farmers, island horticulturalists such as those in Oceania show greater status and wealth differentiation. Big-men and great-men leaders typical of these societies possess greater political influence, larger gardens, and more material wealth than do other group members (Turke and Betzig 1985). These societies are found where resources are densely concentrated, predictable, and defendable

and where surpluses are created. Surpluses are generated by labor recruitment efforts, competitive feasting, and redistribution of prestige items such as shell bands and domesticated pigs (Hayden 1996). Classic ethnographies of Trobriand Islanders (Malinowski 1922; Weiner 1976), Samoans (Gilson 1970), and Enga (Wiessner 2002) describe big men, the privileges that accrue to chiefly lineages, and competitive yam exchanges and feasts. For example, residential and yam houses belonging to Trobriander chiefs are larger and more ornately decorated than commoner houses. Chiefly status permits the right to have multiple wives, engage in kula exchanges, and avoid certain food prohibitions (Weiner 1988).

Other groups show a mixed egalitarian and ranked stratification social structure, such as the Dani of Western Papua, where leaders accumulate wealth and prestige but inequality does not carry over to land ownership and farming. Instead, Dani big men largely help organize rituals and war parties (Heider 1990). Evidence for highly complex horticulturalist societies is scant (but see Erickson 2000). Several kingdoms in Africa were highly structured and prestige based, such as the Asante of southern Ghana, a conquest state with kings and chiefs who had lavish courts maintained by the trading with Europeans of gold, kola nuts, and slaves (Fortes 1969). But even among the Asante, land was held by matrilineages for group members to farm as needed.

Sedentism, resource concentration and predictability, surplus production and storage, and higher population density have all been linked to greater inequality in subsistence populations (Carneiro 1970; Hayden 1995; Testart 1982; Upham 1990). An often-cited but incomplete idea is that agriculture permits a surplus sufficient to maintain nonproductive classes such as warriors, priests, and politicians (Childe 1954) and inequalities beyond those due to age, sex, and abilities. Surplus production, however, is likely an endogenous outcome of other inequality-generating factors, such as differential access to patchy, predictable, and accumulable resources. When territorial resources are concentrated in dense, high-quality patches, they become "economically defensible," leading to monopolization by emergent elites (Boone 1992; Brown 1964; Dyson-Hudson and Smith 1978). Storage and accumulation of material resources over time can lead to greater disparities in wealth than exist when resources are transient. Leaders or "managers" may arise to organize raiding parties, redistribute resources, or deal with localized resource stress (Flannery 1972; Smith and Choi 2007). According to the "agency" approach to inequality emergence (Wiessner 2002), upstarts or "aggrandizers" strive for influence by controlling access to resources or by extracting labor from others through debt cycles or coercion (Arnold 1995; Boone 1992). Nonelites, however, are not necessarily deprived of resources. In a system of "managerial mutualism," subordinates may also benefit when provided goods by elites who compete for prestige and supporters (Boone 1992, 1998).

Intergenerational Transmission

Kinship is the basis for navigating social life and the flow of goods and services in horticultural societies. One-third of horticultural societies in the SCCS show patrilineal inheritance, one-fourth show matrilineal inheritance, and one-fourth show bilateral inheritance (table 1). More egalitarian horticulturalists tend to show bilateral descent, such as among the Gainj (Johnson 1982). One-third of societies show no formal property rights or inheritance rules; among those that do, the most common pattern is for property to be distributed relatively equally among sons (table 1). Among more egalitarian horticultural societies, there is very little wealth to inherit, except perhaps land in more circumscribed areas and occasional wealth items. Personal items may be burned or buried with the deceased, while large or expensive items, such as canoes, knives, and shotguns, are usually divided among surviving family members (Murphy and Murphy 1974). Inheritance of these items may be sex biased (Crocker 1990), although women's items may also pass to daughters-in-law instead of daughters (Bohannan and Bohannan 1953). Land privileges are often granted through usufruct. As long as crops are growing in a field, permission must often be asked before others may use the field (Bergman 1980). In the nonegalitarian Polynesian horticultural societies, property and land rights are often organized strictly along descent group lines. When land is continuously rotated with long fallow periods, individual private ownership and land inheritance may not be sensible. Instead, descent groups often own communal land, and distribution of access rights to member households is coordinated by lineage heads (Bohannan and Bohannan 1953; Holmes 1974).

Ethnographies report that sons and sometimes daughters benefit from the social position of parents, particularly fathers (Heider 1990). Leadership positions, however, are not usually strictly heritable but remain in part dependent on individual skills and personality (Wiessner 2002). Positions, however, may be held by other family members. It is important to acknowledge that traditional structures of horticulturalist societies with a history of chiefly lineages and kingdoms, such as the Asanti, Ganda, and Shambala, are no longer intact. It is possible that remaining horticulturalist societies, especially those represented here, show less inheritance of individual-level privilege and rights. However, even among the African kingdoms mentioned above and the Classic Maya (Edmonson 1979), land was not held privately and most inhabitants were commoners with communal access to farm land through their lineages.

Sample and Methods

Overview

We present data from four horticultural populations: rural Dominicans, Mandinka, Pimbwe, and Tsimane. Dominicans are rural peasants of Dominica in the Caribbean. The Man-

dinka and Pimbwe are dry-land farmers from the Gambia and Tanzania, respectively, and the Tsimane are Amazonian rain forest horticulturalist-foragers from Bolivia. Our reliance on only four groups means that our sample cannot be representative of horticulturalists either today or from the past. The majority of the societies from the SCCS in table 1 come from the insular Pacific (29%), Africa (18%), and South America (28%). Today, many horticultural groups occupy marginalized areas in the humid tropics and arid regions where prospects for intensive agriculture are poor. Availability of wealth data varies among our sample populations, as do the levels of market integration and other indicators of acculturation during the study periods. The largest number of wealth measures exists for Pimbwe and Tsimane, and so we devote more attention to these societies.

Rural Dominicans

Ethnographic background. Bwa Mawego, one of the least developed villages on the windward side of Dominica, contains about 700 full- and part-time residents of mixed African, European, and island-Carib descent (Quinlan 2005). Economic activities include subsistence taro-based horticulture, fishing, bay leaf oil production, banana production, shopkeeping, and limited wage labor. Average annual household income in Bwa Mawego is currently about EC$5,000 (US$1,850). Opportunities for education are limited. About 30% of villagers born between 1955 and 1986 have attended "high school" equivalent to ninth and tenth grade in the United States; older adults have less education. The population is relatively healthy for the Caribbean region. Kinship and family are the foundation of economic, social, and reproductive behavior, with almost everyone in the village related by blood or marriage. Many households consist of several women and their children; conjugal, single-mother, and other alternative styles are also common (Quinlan and Flinn 2005). Several households of closely related kin often live together in a family compound. There are several large patrilineages and many small lineages; matrilineages are not recognized. Patrilineal descent provides individuals with access to ancestral family lands through usufruct, which can be advantageous to individuals whose immediate family does not own land.

Wealth measures. Land is the basis of economic production in Bwa Mawego. *Bwa den* (bay leaf *Pimenta racemosa* L.) is the primary source of cash. Villagers extract bay oil from *bwa den* and then sell it to a cooperative that in turn sells the oil to global distributors as an ingredient in soap and perfume. Most villagers either own or work *bwa den* for income. *Bwa den* field sizes (in acres) owned by living and recently dead residents of the village who were aged 25+ in 2005 were estimated on the basis of interviews with two groups of locals (Quinlan and Hagen 2008). Interrater reliability across the two groups was moderate (Cronbach's $\alpha = .68$), and reliability tests based on kinship and sex suggest little bias in field size estimation. Although women can and do own *bwa den*, interrater reliability scores suggest that women's claims to land are somewhat ambiguous.

Mandinka

Ethnographic background. Four villages in the West Kiang district of the Gambia were first studied by physician Ian McGregor in 1950, chosen because of their remote location and poor health profile (McGregor 1991). The residents are mostly Mandinka, though the samples also include a minority of Jola, former slaves of Mandinka. During the study period, all villages practiced horticulture, with rice as the main subsistence crop by the end of the study period. Additionally, groundnuts were grown as a cash crop. Rights to land use reside largely with men, and these rights are inherited patrilineally; however, women do the bulk of the subsistence farming and may occasionally own their own rice fields and pass them to their daughters. Residence patterns are patrilocal, but mobility is low so that most women marry within their natal village. Transport links to other regions of the Gambia were relatively poor during McGregor's observation period, though they have improved considerably over the past few decades. Few individuals were educated until the late 1970s, when a primary school was established in Keneba. Before the primary school, only a few boys would have been sent away to receive an Islamic education. In 1975, the Dunn Nutrition Unit (DNU) set up a permanent research station and medical clinic in Keneba, the largest village. The clinic had an immediate effect on child mortality rates, while morbidity was less affected (Rayco-Solon et al. 2004). Fertility, however, has only recently started to decline, despite the availability of contraception at the clinic. Before 1975, both fertility and mortality were high: women averaged seven children, and more than 40% died by age 5 (Billewicz and McGregor 1981). Polygyny was high, with most men acquiring more than one wife by the time they reached late middle age. Men married much later than women (mean age at first birth was 18 for women but 31 for men) and therefore reproduced until much older ages.

Wealth measures. Given the exclusive focus of McGregor and the DNU on health and mortality, data exist for only two forms of embodied wealth: anthropometric status and fertility/RS. We use data only from individuals who were alive and reproduced in the pre-DNU period because of the substantial influence of the DNU clinic. Anthropometric data were collected between 1950 and 1980. Only individuals who reached the age of 18 years were included in the analysis; average weights were calculated for each person on the basis of repeated measurements. RS data are based on births occurring before 1975 and calculated for only those individuals who reached the age of 15 years before 1975. Age controls were included for individuals to account for those who died or

were censored before the end of their reproductive period, as was a control for birth cohort. RS was defined as the number of children surviving to age 5, and children censored before the age of 5 were discounted according to their age-specific probability of surviving to 5 years. Fertility and mortality data were available from the demographic surveillance system, which has recorded all births and deaths since 1950, supplemented by birth histories collected from those who began reproducing before 1950. Only two of the four villages were included in the RS analysis because demographic data were thought to be underreported in the other two villages in the early years of the study.

Pimbwe

Ethnographic background. The Pimbwe of the Rukwa Valley (Tanzania) are mostly subsistence farmers who also seasonally hunt, fish, and collect honey (Borgerhoff Mulder 2009). Until Tanzanian independence (1963), the Pimbwe were subject to internecine war and a chiefly system. Chiefly and other high-ranking positions were transmitted to a sister's son, although inheritance sparked bitter disputes (Willis 1966). Below the chiefly levels, Pimbwe society is eminently egalitarian, with a virulent system of witchcraft accusations and counteraccusations serving to dissuade anyone from rising above the crowd (Paciotti and Hadley 2003) and with social order now maintained at least in part by a local vigilante organization (Paciotti and Borgerhoff Mulder 2004) and in part by the organs of a modernizing state.

Pimbwe have no electricity and limited access to clean water, all-weather roads, and (since 2006) mobile phones (Paciotti et al. 2005). Primary schooling has been available in almost all villages since the early 1970s, although schools are not well maintained or funded. The Pimwbe have little accumulated wealth. Less than 10% of the population own smallstock (goats), which are generally used as cash savings and sold only in times of need; the same is true for the more commonly raised poultry. Families have rights to land through cultivation, but land is largely freely available. Production is limited by the availability of family labor and the health of adult household members. Family illness is cited by Pimbwe as one of the primary reasons for deficits in food production.

One source of cash among the Pimbwe is the sale of maize and other cash crops such as sunflower, rice, and peanuts. Average earnings from cash crops are very low and show high interannual variation due to vagaries of weather and crop damage by wildlife and pests. Some men earn income from a seasonal craft or trade, such as fishing, hunting, honey production, carpentry, dispensing traditional medicine, providing witch doctor services, trading old clothes, and manual labor. The primary source of women's additional income is brewing and distilling of maize, products sold either privately or in one of the village bars.

Wealth measures. Analyses based on six surveys from 1995 to 2006 are focused on the villagers of Mirumba. The sample includes all individuals aged 15+ ever interviewed. Given the lack of privately owned material wealth such as land, the vagaries of livestock raising, and the near-complete erosion of the traditional chiefly statuses, wealth in Mpimbwe is best thought of as deriving from health, strength, fertility, and control of (children's) labor. Intergenerational transmission is therefore investigated for weight, RS, household wealth, and farming skill. RS is defined as the number of offspring surviving to age 5 among women aged 45+ and men aged 55+. Children who had not yet reached 5 years of age were weighted according to their probability of surviving this period (.82). Household wealth is measured as the currency value of the sum total of household items, including the materials of the house itself. Farming skill is measured as the number of months a house was with maize in its granary. Land is freely available and not strictly heritable, and so a household's success in providing food throughout the year is due not to differential land ownership (although cultivated land was controlled for in the measure) but rather to skills in farming, storage, and resource management; dependency ratios are closely correlated with land under cultivation. Maize production and annual availability are subject to stochastic shocks, such as inclement weather, changing river courses, elephants, insect pests, and theft. Although not all of these shocks can be directly countered, skill, foresight, knowledge, wise planning, hard work, and good social relations with neighbors and kin can help reduce the risks of spending many months without food in the granary.

Tsimane

Ethnographic background. Tsimane are a subsistence-based society of more than 8,000 forager-horticulturalists living in more than 50 villages with fairly minimal external market interactions. Horticultural fields containing a mixture of plantains, rice, corn, and sweet manioc are fairly small (<1 ha) and are left to fallow after several years of use, with new fields created based on availability and ownership based on usufruct. In more acculturated villages, fields are often larger because rice is also sold as a cash crop. Fishing is common in all Tsimane villages located near water rivers, oxbow lakes, or lagoons. Hunting with shotguns, rifles, and bow and arrow is common in interfluvial villages. Mobility was more common a generation ago, and with high fertility (total fertility rate = 9), extended families are often spread across numerous communities. Villages are composed of clusters of related households who often pool resources and labor.

Traditionally, there were no official leaders; older men and shamans wielded community-wide influence (Daillant 1994; von Rueden, Gurven, and Kaplan 2008). Very few shamans remain today. In recent decades, Tsimane villages have adopted a system of elected chiefs (*corregidores*) and other officials in larger villages for representation purposes and interaction with outside interests. Chiefs wield no real power;

their main tasks are to hold and conduct meetings in the event of conflicts, help organize community labor events, and represent village interests in transactions with outsiders. They are usually young or middle-aged men fluent in Spanish and with some experience dealing with Bolivian nationals. In villages where loggers make deals with Tsimane, chiefs and their families benefit more than other families. There is little accumulated wealth among Tsimane, and no consistent, robust associations between market access and wealth inequality have been demonstrated (Godoy et al. 2004). Items of value include shotguns and rifles used for hunting, axes, radios, watches, bicycles, and dugout canoes. Income is earned through sporadic wage labor opportunities with loggers, merchants, and ranchers, while a small number of mostly men have been trained as bilingual elementary education teachers. Another source of wealth includes domesticated animals such as chickens, ducks, and, in some rare cases, pigs and cows. Chickens are often raised for consumption and sometimes for trade. Pigs and cows are used for barter and also for consumption during festivals. After death, a person's belongings are usually burned or buried with the person, although expensive durable items such as shotguns are passed down to a relative (usually a son).

Wealth measures. Data exist for eight types of wealth covering the somatic-knowledge, material, and social domains that comprise key components of Tsimane production and cultural success. These include RS, body size, cultural knowledge, hunting success, household wealth, field labor networks, and alliances. Measures are constructed from data collected from ongoing fieldwork as part of the Tsimane Health and Life History Project (2002–2008). RS includes number of children surviving to age 5 among women age 40+ and men age 45+, with right-censored cases discounted by the average probability of surviving to age 5. Body size is measured as body weight wearing light clothing taken during medical visits using a portable weigh scale. Cultural knowledge is measured from self-reported possession of a large number of sex-specific cultural skills covering economic production, tool and craft manufacture, song and story repertoire, and sociality. Each person's score is the proportion of sex-specific skills held (total 53 for women, 67 for men). Hunting success, measured by the average number of calories gained per hour spent hunting, is based on a combination of focal follows and interviews of hunters and is reported in Smith et al. (2010, this issue). Household wealth describes the sum monetary value (based on the buying price in the nearest town) of shotguns, rifles, watches, radios, bicycles, and domesticated animals among all nuclear family members.

Cooperative labor partnerships are measured as the number of helpers in horticultural tasks during the previous year, based on interviews in 11 remote villages. Larger communities that engage in more cash-cropping (mostly rice) were excluded from the sample. People paid in money, goods, or farm product for their labor were not included in the tally. Only father-son dyads were considered here. Alliances were measured according to a ranking procedure where local raters ranked sets of eight photos of their peers on the basis of who would have more allies help them in the event of a conflict (von Rueden, Gurven, and Kaplan 2008). A block design insured that no two photos appeared together in the same array more than once. The range of possible scores was 8–64.

Methodological Limitations

Table 4 presents the sample size of parent (F_1) and offspring (F_2) dyads by wealth type for each of the four populations. Sample sizes vary substantially and tend to be larger for more easily measured variables, ranging from 41 for hunting skill among Tsimane to 1,274 for weight among Mandinka.

Values for several F_2 wealth measures are paired with the midpoint value of their biological parents. This does not mean that children consistently coresided with both of their biological parents. Our choice for F_1 and F_2, however, is the best metric for capturing intergenerational transmission in social systems where children may live with one, the other, or both parents for at least the majority of their period of dependence, in which there are no strict rules of intergenerational transmission, and in which children learn primarily from the adults in their household.

The reliance on F_1-F_2 dyads requires information on two generations. For many individuals, death before study and residence in a nonstudy village leave many unpaired individuals. These are probably the largest possible sources of bias. Trait values for complete F_1 and F_2 generations were compared with those remaining after removing unpaired individuals. The most common bias favors stable group members and disfavors immigrants or highly mobile individuals; the repeated panel design of the Mandinka, Pimbwe, and Tsimane studies helps to reduce this bias.

While the four populations lived fairly traditional lifestyles during the data collection periods, each has had a history of interaction with other populations, national society, and increasing integration to the market. Traditional subsistence activities occur in the context of increasing formal education of the current generation, cash-cropping, and wage labor. Novel wealth types, such as competency in the national language or years of formal schooling, were not analyzed here because of the rapid pace of change. To some extent, we attempted to control for some of the effects of acculturation. Among Tsimane, where economic activities can vary in different parts of their territory, we added a "region" variable to regressions to help control for both environmental variation and acculturation. Statistical methods for computing wealth elasticity (β) for each wealth type and population are described in the CA+ online supplement "Estimating the Inheritance of Wealth in Premodern Societies" in the online edition of *Current Anthropology*.

Table 2. Judgments of α exponents for horticulture societies in the Cobb-Douglas production function of household well-being

	Wealth type				
Population	Somatic	Knowledge	Embodied[a]	Material	Relational
Dominica	.30	.20	.50	.20	.30
Mandinka	.40	.15	.55	.20	.25
Pimbwe	.40	.20	.60	.30	.10
Tsimane	.25	.20	.45	.15	.40
Average	.34	.19	.53	.21	.26
Standard deviation	.07	.03	.06	.06	.13

[a]Embodied wealth combines somatic wealth and knowledge-based wealth.

Results

Alphas (α's) from Production Function

Table 2 presents each researcher's judgment of the relative importance of somatic (s), knowledge (k), material (m), and relational (r) capital for overall production or cultural success, hereafter referred to as "household well-being" (w; see Borgerhoff Mulder et al. 2009). For comparability across the production systems and to reduce ambiguity, we combine somatic and knowledge wealth as embodied (e) wealth (Kaplan 1996). The relative importance of different types of capital is described by the α's (alphas) from the Cobb-Douglas production equation $w = A \times E^{\alpha_e} M^{\alpha_m} R^{\alpha_r} + \delta$, where $\alpha_e + \alpha_m + \alpha_r = 1$ (see Borgerhoff Mulder et al. 2009).[2] Given the impressionistic nature of these judgments, we do not attempt to explain small differences in α but instead highlight several general patterns. Consistent with the typological descriptions of wealth outlined in "Wealth," material wealth does not appear to be a substantial component of household well-being, contributing an average of only one-fifth (0.21) of total wealth importance. Material wealth was judged to be the least important wealth type among all four populations. Embodied wealth accounts for a substantial one-half (0.53) of well-being. Two-thirds of this is somatic capital, and the remaining third is knowledge. Finally, the α for relational social capital, constitutes, on average, one-fourth (0.26) of the total wealth input exponents. Table 2 reflects our impressions from "Wealth" that emphasized the importance of relational capital for cultural success, even (or especially) among egalitarian horticulturalists, and the lower importance of material capital. Only hunter-gatherers show a higher mean α for relational capital and a lower α for material capital (see Smith et al. 2010). Figure 1 illustrates the α's for all horticultural populations in a ternary plot. Despite the geographic, ecological, and cultural variation in our sample, there was a fairly low amount of variation in our judgments for somatic and knowledge-based α's.[3]

2. A is a positive constant; E, M, and R are a household's embodied, material, and relational wealth, respectively; and δ represents exogenous shocks to a household's wealth.

Wealth Inequality

Table 3 provides several common measures of inequality for each population-specific wealth type. These include the standard deviation, the coefficient of variation, and the Gini coefficient. We focus attention on the Gini coefficient because of its unit-free properties and wide usage. The Gini coeffi-

3. We briefly speculate on a few notable differences in α: Pimbwe scored the highest for material wealth and the lowest for relational wealth, perhaps owing to the highly uneven pace of integration and accumulation of human capital. While strong, healthy bodies are critical for successful food production and mate selection among Tsimane, their somatic wealth α scored the lowest; overall well-being, especially during critical times of need, may be affected more by variability in social networks than by differences in somatic or knowledge-based wealth.

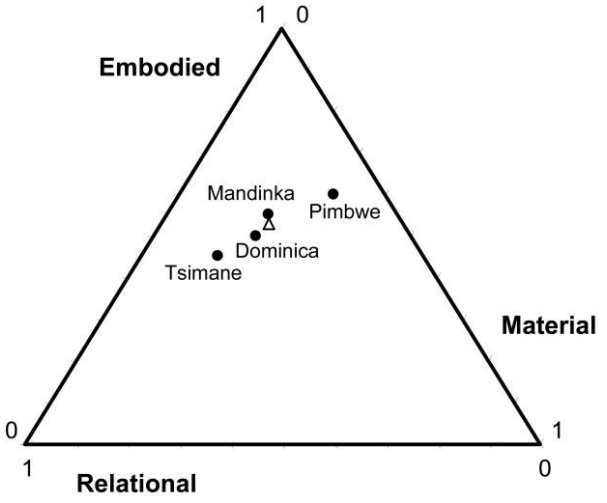

Figure 1. Ternary plot of $\alpha = \{e, m, n)$ for embodied, material, and relational wealth. The α's describe the proportion of overall household well-being due to each type of wealth. Circles refer to horticultural populations, and the triangle represents the average for all four populations.

Table 3. Mean level of each wealth variable and intrapopulation age-adjusted inequality as measured by standard deviation (SD), coefficient of variation (CV), and Gini coefficient

Wealth class, group, and wealth type	Mean	Inequality measure			*N*	Mean age
		SD	CV	Gini		
Embodied wealth:						
Mandinka:						
Weight	54.4	7.1	.13	.073	2,355	34
Reproductive success	3.7	2.3	.62	.328	1,935	43
Pimbwe:						
Weight	56.7	8.2	.14	.079	395	33
Farming skill	4.4	2.4	.55	.308	507	43
Reproductive success	5.63	1.94	.34	.190	1,041	38
Tsimane:						
Hunting returns	1,190.2	877.0	.74	.371	40	37
Cultural knowledge	.7	.1	.14	.076	265	35
Weight	59.0	9.2	.15	.087	1,033	36
Grip strength	172.0	79.6	.46	.263	1,249	36
Reproductive success	7.09	2.5	.35	.190	1,288	38
Average			.36	.196		
Material wealth:						
Dominicans:						
Land	.3	.4	1.56	.671	315	. . .
Pimbwe:						
Household wealth	176.5	212.4	1.20	.563	614	40
Tsimane:						
Household wealth	4,424	3,328	.75	.326	361	39
Average			1.17	.520		
Relational wealth:						
Tsimane:						
Field labor partners	3.7	2.2	.58	.315	234	38
Alliances	38.1	9.4	.25	.141	130	38
Average			.42	.228		

cients for the 15 horticulturalist wealth measures range from near 0 to more than 0.6, with a mean of 0.265 ($e = 0.20$, $m = 0.52$, $r = 0.23$). When weighted by the importance of each wealth type to population-specific wealth (based on the α's), as well as by the inverse of their estimated variances (to account for the differing degrees of precision of the various estimates), the mean Gini across wealth classes dropped to 0.21. Material wealth consistently shows the highest levels of inequality, on par with income inequality in the United States (0.463 in 2007). We highlight some notable patterns by wealth type. Material wealth has the highest average Gini (0.52), while body weight has the lowest (0.08). Ginis for RS (0.24) and skill/productivity (0.25) are intermediate. We hesitate to compare inequality levels among societies, given the variable number of wealth categories for each population. Only among the Tsimane do wealth data exist for all categories, resulting in an α-weighted Gini of 0.17.

Intergenerational Wealth Elasticity (β)

Table 4 summarizes the estimate, the standard error, and the statistical significance of the transmission coefficient between parental wealth and offspring wealth (hereafter referred to as β) by wealth type and population, as determined from multiple regression analyses described in the introductory paper in this special section (Bowles, Smith, and Borgerhoff Mulder 2010, in this issue). Figure 2 illustrates several examples. Embodied wealth is based on 10 measures from three societies, material wealth is based on three measures from three societies, and relational wealth is based on two measures from only one society. The overall β for horticulturalists, weighted by the importance (α) of each wealth type in promoting household well-being, is 0.18.

Embodied wealth. The mean β for embodied wealth for horticulturalists is 0.17 (table 4). Measures include body weight, grip strength, RS, and hunting performance. Parent-offspring elasticities for body weight are the strongest of all β's, varying from 0.25 to 0.39. Given the relatively large β's for weight, it is surprising that the β for grip strength is very small. Grip strength is correlated with weight, given Tsimane leanness (mean adult body mass index = 23). A similar high β for weight but low β for grip strength was also observed among the Hadza (Smith et al. 2010).

The β's for RS were low, consistently <0.13. Additional analysis by child (F_2) sex, however, revealed consistently larger β's for sons than for daughters (parent-son vs. parent-daugh-

Table 4. Wealth elasticities (β) for different wealth types among four horticultural populations

Wealth class, population, and wealth type	Transmission (β)	SE	*P*	*N* pairs (F_2)
Embodied wealth:				
Mandinka:				
Weight	.391	.041	.000	1,274
Reproductive success	.088	.086	.309	967
Pimbwe:				
Farming skill	−.015	.097	.875	217
Weight	.377	.096	.000	148
Reproductive success	−.057	.107	.592	599
Tsimane:				
Hunting returns	.384	.130	.003	26
Cultural knowledge	.111	.094	.240	181
Weight	.253	.069	.000	383
Grip strength	.070	.042	.094	490
Reproductive success	.128	.073	.079	849
Average	.173	.047	.001	568
Material wealth:				
Dominicans:				
Land	.137	.140	.327	62
Pimbwe:				
Household wealth	.107	.318	.735	283
Tsimane:				
Household wealth	.024	.071	.731	110
Average	.090	.087	.309	152
Relational wealth:				
Tsimane:				
Field labor partners	.181	.106	.086	67
Alliances	.338	.103	.001	45
Average	.260	.106	.020	56.0

Note. Averages are arithmetic. *P* values were calculated from two-tailed tests of hypothesis that true β for a given row equals 0.

ter $\beta \pm$ SE: Mandinka, 0.093 ± 0.083 vs. 0.033 ± 0.046; Pimbwe, 0.182 ± 0.349 vs. -0.042 ± 0.133; Tsimane, 0.225 ± 0.115 vs. 0.064 ± 0.047). Given the lower variance in RS among females than males in the mildly polygynous Mandinka, Pimbwe, and Tsimane, women may find it easier to obtain mates and support offspring, regardless of parental RS. Although it might be expected that increased competition with more siblings might reduce sons' RS, larger kin groups, especially of older sibs, might provide additional critical support in finding mates. A variety of alternative caretakers may also help improve child survivorship relatively cheaply because of depreciating costs of babysitting and other care activities. Parents with greater RS may themselves come from larger sibships, which will provide a larger set of available cross-cousins to marry in societies, such as Tsimane, where the ideal mate is a cross-cousin.

Unlike the case for Tsimane hunting (discussed in Smith et al. 2010), there is no intergenerational transmission for Pimbwe farming skill. Even though farming production was averaged across multiple years to reduce the effects of annual variability, it is possible that stochastic factors in an unpredictable and pest-ridden environment overwhelm heritably transmitted knowledge. The farming skill measure also combines knowledge with planning and work effort. Each of these may be transmitted differently, and farming knowledge itself might be widely available. Tsimane cultural knowledge shows low intergenerational transmission, with $\beta = 0.11$. Many common skills are readily obtained by Tsimane during development and early adulthood; individual abilities and experience may swamp the effects of informal parent-offspring social transmission.

Material wealth. The overall β for material wealth in this sample is 0.09 (table 4). Data exist only for household wealth and land. Household wealth showed no relationship. Among Pimbwe and Tsimane, there is little household property transmitted directly between parent and offspring households, especially because most household items last for only a few years. Houses themselves survive for only about a decade. Among Pimbwe, a fierce ideology of self-reliance limits interhousehold sharing and kin support. When asked about support received by others for food, school fees, and medical bills, Pimbwe react with disgust, insisting on their independence. Fear of sharing and dependence stems from deep concerns with witchcraft that pervade all aspects of Pimbwe social life. Help among households is somewhat low but more forth-

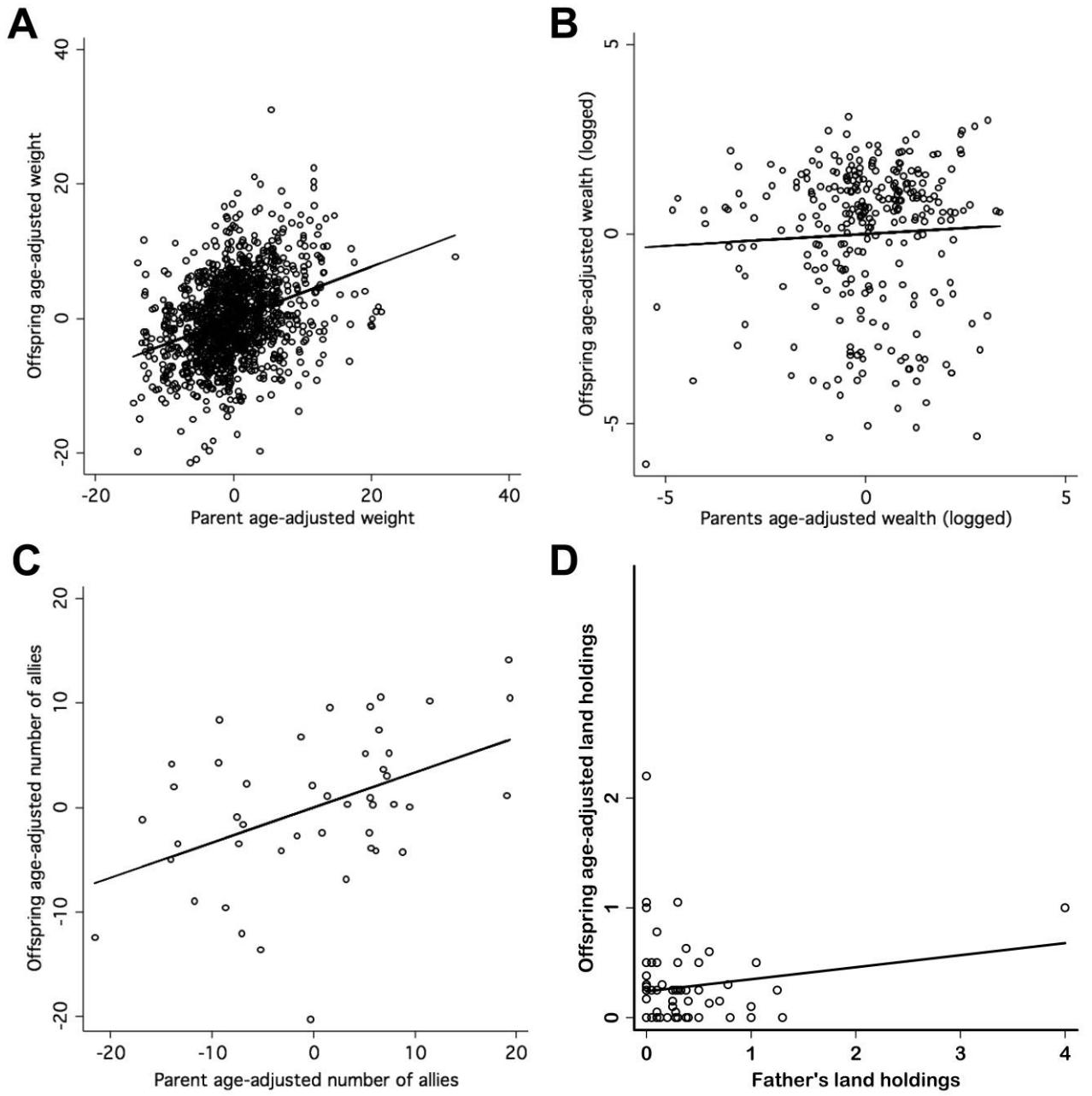

Figure 2. Offspring (F_2) and parental (F_1) wealth, adjusted for age. *A*, Weight among Mandinka ($\beta = 0.391$). *B*, Household wealth among Pimbwe ($\beta = 0.107$). *C*, Allies among Tsimane ($\beta = 0.338$). *D*, Land holdings among Dominicans ($\beta = 0.137$). Fathers' age controls had no effect on the elasticity estimates for land holding in Dominica and were dropped to improve statistical precision.

coming among Tsimane. While complaints about the inadequacy of help received from others are common, there is no similar ideology or concern about witchcraft. Tsimane accusations of sorcery are usually directed toward outgroup members and, if anything, are more common when people refuse to share.

We expected that transmission of material wealth to Dominican sons would be more substantial because of loose patrilineal inheritance norms (Quinlan and Flinn 2005). However, we found little evidence of intergenerational inheritance of land among Dominicans, with $\beta = 0.14$. Sons are often viewed as risky investments, and relatives other than

children usually contribute many years of agricultural labor to these plots. It is possible that these other relatives may inherit land through oblique transmission. Parents sell bay leaves and use the cash to finance children's education and migration. Bay leaf farming is recognized as difficult work, so productive parents may use their profits to provide other opportunities for children, although parents' *bwa den* plot size is not significantly associated with the probability of children's migration.

Relational wealth. Our only measures of relational wealth are for the Tsimane: number of helpers assisting in agricultural field activities and number of male alliances during conflicts. Fathers with more helpers were somewhat more likely to have sons with more helpers ($\beta = 0.18$). While this relationship is not driven by the set of data points represented by parents and offspring with no helpers, it is weakened by excluding either shared individuals who help both F_1 and F_2 or help exchanged between F_1 and F_2.

Allies are an important resource during interpersonal conflicts with other Tsimane and with Bolivian colonists, merchants, or loggers. The number of named allies in the event of a conflict is highly correlated with several measures of social status and respect (von Rueden, Gurven, and Kaplan 2008). The relationship between the number of parental and offspring allies was stronger than that found among labor partners ($\beta = 0.34$). This result was not driven by parents and offspring naming each other.

Discussion

Material wealth was considered the least important contributor of household well-being across the four horticultural societies in our study, while embodied and relational wealth were considered the most important (table 2). On average, intergenerational transmission of material wealth was low, even though inequality was relatively high (table 3). Embodied and relational wealth are both important determinants of well-being among horticulturalists. Physically robust and healthy bodies are needed to produce and defend resources, acquire the repertoire of cultural skills, and attract mates and allies. Higher transmission coefficients were found for somatic wealth (except RS) than for knowledge or skill. Cultural knowledge and information may be easily obtainable from a wide variety of kin, peers, and others, and/or individual experience and abilities may trump the value of any specialized traditions or knowledge passed from parents to children. Social networks are also important to horticulturalist household well-being. The number and quality of kin and allies mediate access to resources and mates and to support when conflicts erupt or when one is disabled. Although based on data from only one population, the level of intergenerational transmission for relational capital is nontrivial, with transmission coefficients averaging 0.26. A similar level of wealth elasticity is found for embodied capital (average = 0.17).

Despite the implication that intergenerational wealth elasticities are higher for the types of wealth that are more important in each society, we found no significant correlation between our set of 15 α's and β's ($r = 0.12$, $P = .662$); this contrasts with the significant correlation reported for the larger sample of hunter-gatherers, horticulturalists, pastoralists, and intensive farmers (Borgerhoff Mulder et al. 2009; Smith et al. 2010). However, the relationship for horticulturalists improves after eliminating RS measures, which showed consistently very low β's ($r = 0.38$, $P = .217$).

The nontrivial β's and measured inequality are remarkable, given the roughly egalitarian nature of these four horticultural societies. Overall wealth transmission (mean β weighted by α) for horticulturalists is low (0.18), very close to that calculated for hunter-gatherers (0.19), and about half of that reported for pastoralists and intensive farmers (see Borgerhoff Mulder et al. 2010, in this issue; Shenk et al. 2010, in this issue; Smith et al. 2010). The importance of such low β's, however, should not be underestimated: a β of 0.2 implies that a child born into the top wealth decile of the population is 3.6 times more likely to remain in the top decile than is a child whose parents were in the bottom decile (as discussed in Bowles, Smith, and Borgerhoff Mulder 2010). The wealth elasticities for each of the three wealth classes are also similar among horticulturalists and hunter-gatherers, as is the overall α-weighted Gini index measuring wealth inequality (0.27 for horticulturalists vs. 0.25 for hunter-gatherers).

Given the β's in table 4, we can say that the steady state levels of variance in logarithm of wealth (a standard unit-free measure of inequality) range from $1.004 \times \sigma_\lambda^2$ (material wealth) to $1.034 \times \sigma_\lambda^2$ (relational wealth), where σ_λ^2 is a measure of the variance in wealth shocks in one generation and the coefficient multiplier is $(1 - \beta^2)^{-1}$ (see Borgerhoff Mulder et al. 2009). Thus, at equilibrium, there is greater inequality in the wealth measures that are of greater utility to horticulturalists, that is, relational and embodied. Thus, not all types of wealth are equally distributed and inherited across generations. Another important conclusion here is that the domestication of plants alone does not lead to greater inequality. Limited access to storable or defendable resources such as land, technology, or animals is a necessary ingredient for high levels of inequality to emerge. Such limitation is minimal in our sample but is common among intensive agriculturalists and pastoralists.

Although our inferences here refer to intact horticultural societies, our four societies vary in their degree of acculturation and market integration. Each has a history of contact, conquest, and, to some extent, marginalization. It remains to be seen how integration into the market economy has and will continue to impact inequality. Production functions may include a greater reliance on material wealth and new forms of human capital, such as formal schooling, proficiency in national language, and local politics. Relational capital may include important contacts in distant locations for the purpose of trade, cash-cropping, and wage labor opportunities.

It is likely that novel forms of wealth show greater inequality than traditional forms expressed in this paper, and so overall inequality in extant horticultural societies may be more exaggerated than the portrait given here.

The Kuznets hypothesis, proposed to explain differences in inequality among nations, suggests an inverted U-shaped relationship between economic development and inequality (Kuznets 1955). At low levels of development, most work in subsistence agriculture and land rights is based on usufruct. With increasing market integration, economic inequalities increase as subgroups selectively opt to obtain formal education, sell produce, trade, and engage in wage labor or service occupations. At high levels of development, few practice subsistence agriculture, and most, if not all, work for wages. Presumably, income inequality decreases at higher levels of economic development, accentuated by social welfare programs that promote redistribution. The only empirical test of the Kuznets hypothesis in a small-scale society was done among the Tsimane and did not lead to consistent, conclusive results across wealth types or econometric specifications (Godoy et al. 2004). Greater inequality requires greater reliance on limited, predictable, and monopolizable resources, particularly material wealth. Deliberate social norms that promote economic redistribution will also dampen inequality. It is noteworthy that the average Gini index of inequality from our four populations is similar to that of Scandinavian countries that employ strong social welfare programs. Sharing norms based on a risk-sharing foraging economy often remain, even if somewhat modified, following economic change.

Acknowledgments

M. Gurven and H. Kaplan thank the National Science Foundation (NSF; BCS-0422690) and National Institutes of Health/National Institute on Aging (NIH/NIA; R01AG024119-01) for funding of Tsimane research. R. Sear would like to thank the Gambia Scientific Coordinating and Ethical Committees for access to their data. E. Schniter thanks NSF (0612903) for a doctoral dissertation grant. R. Quinlan thanks the NSF Cultural Anthropology Program (0650317) for funding Dominica research. P. Hooper was supported by Howard Hughes Medical Institute through the Program in Interdisciplinary Biological and Biomedical Sciences at the University of New Mexico.

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