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Cross-Cultural Correlates of the Ownership of Private Property: Zelman's Gender Data Revisited

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This is the fourth study of archival data in a program of cross-cultural research to identify the social institutions and behavioral norms that correlate with the practice of private ownership. Zelman's 1974 dissertation presented data on 145 variables for each of 60 societies. From these data, a composite measure of private ownership of productive land and of domestic animals correlated ($p = .00125$) with 22 variables or indices. Cultural characteristics and societal institutions replicating positive correlations with private ownership in all four studies to date include: (a) 12 subsistence variables on grain agriculture and husbandry, (b) 9 stratification and gender role variables on classes, slavery, and work specialization, (c) 10 social control variables on political structure, law, and religious morality, (d) 8 community and architecture variables on populous settlements of substantial houses, (e) 7 marriage and family variables on patriarchal practices, and (f) 9 economic relations variables on commerce, money, war, and inheritance.

In the deep history of political economics, two lines of discourse have continued from Greek antiquity to the present: (a) gender differences in norms of private ownership, and (b) cross-cultural

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comparison of private property regimes. These can be traced back at least to the 6th century B.C. when Pythagoras advocated communal property on the theological grounds that private ownership separates people one from another and deludes them from seeking transcendental unity in common with all humankind (DeVogel, 1966). Pythagoras observed that women were more sharing than were men and thus showed greater harmony and concord among themselves (DeVogel, 1966). The Pythagorean precept, "All is common among friends" (Heninger, 1974, p. 23), was carved in stone and came to influence more than two millennia of political economic debate.

Plato made the first systematic, recorded argument for communal ownership, echoing the Pythagorean claim that private ownership is socially divisive and misdirects human interests away from proper goals (Plato, 1907). Plato argued that societies based on communal ownership entail social and psychological coherence as well as common interest in women and children:

The first-best society, then, that with the best constitution and code of law, is one where the old saying is most universally true of the whole society. I mean the saying that "friends' property is indeed common property." If there is now on earth, or ever should be, such a society—a community in womenfolk, in children, in all possessions whatsoever—if all means have been taken to eliminate everything we mean by the word *ownership* from life; if all possible means have been taken to make even what nature has made our *own* in some sense common property, I mean, if our eyes, ears, and hands seem to see, hear, act in the common service; if, moreover, we all approve and condemn in perfect unison and derive pleasure and pain from the same sources—in a word, when the institutions of a society make it most utterly one, that is a criterion of their excellence than which no truer or better will ever be found. (Plato, 1961, *Laws*, 739c, p. 1324)

Plato was not an empiricist and thus did not present cross-cultural evidence comparing communist and noncommunist societies. But his student, Aristotle, had no such antipathy to data and did survey 158 circum-Mediterranean societies. Aristotle's cross-cultural study is mentioned in his *Ethics* (1985), and selected societies are discussed in his *Politics* (1952), but the study itself remains lost in history (Jaffa, 1963). Aristotle's empiricism and his philosophy of moral development led him to argue for private ownership and against Plato's communism:

When everyone has his own separate sphere of interest, there will not be the same ground for quarrels; and the amount of interest will increase, because each man will feel that he is applying himself to what is his own. And on such a scheme, too, moral goodness and not, as in Plato's scheme, legal compulsion, will ensure that the property of each is made to serve the use of all, in the spirit of the proverb which says "Friends' goods are goods in common." Even now there are some states in which the outlines of such a scheme are so far apparent, as to suggest that it is not impossible. . . . In these states each citizen has his own property; but when it comes to the use of this property, each makes a part of it available to his friends and each devotes still another part to the common enjoyment of all fellow-citizens . . .

The satisfaction of a natural feeling brings pleasure; and it may well be that regard for oneself and, by extension, for what is one's own, is a feeling implanted by nature, and not a mere random impulse. . . . The simple feeling of love for any of these things, self, or property, or money, is more or less universal. We may add that a great pleasure is to be found in doing a kindness and giving some help to friends, or guests, or comrades; and such kindness and help become possible only when property is privately owned. (Aristotle, 1952, pp. 49-50)

Aristotle rejected as impractical and indecent the idea of common wives and children. But he also ridiculed the practice of bride purchase. Rather, the patriarchal family was the natural property-holding unit in society, with the wife subordinate to the husband due to her presumed inferiority in reasoning, and with household slaves even further subordinated due to their presumed lack of self-direction (Aristotle, 1952).

Greek philosophy, particularly Stoic versions of Pythagorean-Platonic idealism, was adopted by the Romans as they became the dominant power in government, law, and commerce. Rome's major contribution to political economic theory was to recognize *all men* to be equal before the law and thus equal in property rights although not in actual property holdings (Schlatter, 1951). This legalistic egalitarianism, in contrast to the inherent classism of Plato and Aristotle, can be traced back to the Pythagorean idea that all humankind share a common, universal, and divine human nature (DeVogel, 1966). But in Roman law, women were excluded, outside the civil law, subject to *alieni juris*, first to their father's *patria potestas* and later as wives to their husband's authority and law (Chevallard & Leconte, 1986).

In the context of a mature legal system encountering and accommodating a diversity of other legal systems within the empire, the Romans also conceived civil law, including property law, to be a social fabrication, overlaid upon the natural human condition, which they believed to be a Pythagorean communal sharing of material resources:

While everything assigned as private property by the states and the civil law shall be held as prescribed by those laws, everything else shall be regarded in the light of the Greek proverb, "Among friends all things are common." (Cicero, quoted by Schlatter, 1951, p. 25)

In a more Romantic rendering, the original and natural society of humankind was seen to be a mythical Golden Age:

No fences parted fields, nor marks nor bounds
Distinguish'd acres of litigious grounds;
But all was common . . .
(Virgil, translated by Dryden, quoted by Schlatter, 1951, p. 26)

This vision of humankind as originally propertyless was akin to the Garden of Eden myth of the early Christian Church and became a fixture of Western thought (Schlatter, 1951; Tawney, 1926). Thus, Pythagorean mysticism became Greek ideal, then Roman myth, then Christian dogma, to the end that political economists began to propose explanations for the transition from natural propertylessness to conventional regimes of private ownership. For example, the early Christian property theorists developed the concept of stewardship: the resources of the material world were common property given by God to all humankind; seemingly wealthy lords, clerics, and civil authorities were stewards of God's largesse (Avila, 1983; Tawney, 1926). Only after Aquinas revived Aristotelian thought did the Scholastics begin arguing that private ownership was natural to humankind and had developed prior to civil law (Rudmin, 1988; Schlatter, 1951).

With the rise of empirical science during the Renaissance, political economic discourse became increasingly psychological and ethnographic. For example, Hobbes sought natural explanations of property in the mechanistic psychology of Descartes: Innate human passions direct us to seek and secure resources for self-preservation, happiness, and superiority (Beaglehole, 1932; Drever, 1917; Moore, 1899). Reason leads us to curb our passions and to

seek social order by giving up natural rights to common ownership of the material world and thereby establishing private property norms and civil authority (Hobbes, 1655/1839).

Locke found the natural explanation of private ownership, not in a mechanistic psychology of motivation, but in his psychology of perception. Just as perceptual properties belong to the object that caused them in the perceiver, so too do economic properties belong to the agent that caused them to be appropriated from the common store of nature (Milam, 1967). In step with his era, Locke (1690/1952) also began to move political economic discourse toward empirical accounts of "natural" people, although such accounts were still conditioned by Roman and Christian preconceptions. During the 17th century, Romantic images of North American native peoples were widespread in Europe (Bilodeau & Gagnon, 1988; Kennedy, 1950; Schlesinger & Stabler, 1987), depicting them sometimes as Golden Age figures draped in togas and sometimes as Adams and Eves, innocent in the midst of natural bounty. Locke illustrated his labor theory of property with such images of North American native peoples:

The fruit or venison which nourishes the wild Indian, who knows no enclosure and is still a tenant in common, must be his, and so his, i.e., a part of him. . . . He that is nourished by the acorns he picked up under an oak, or the apples he gathered from the trees in the wood, has certainly appropriated them to himself. Nobody can deny but the nourishment is his. . . . Thus this law of reason makes the deer that Indian's who has killed it; it is allowed to be his goods who has bestowed his labor upon it, though before it was the common right of every one. (Locke, 1690/1952, pp. 17-19)

The use of ethnographic arguments in political economics was continued by Montesquieu (1748/1900) and Rousseau (1754/1964) in the 18th century and became the norm in the 19th century. Ensor (1844) collected assorted accounts of property practices among primitive peoples. Morgan (1878) organized societies into an historical and cultural progression to show the natural development of private property from primitive tribes to contemporary European civilization. Morgan's scheme strongly influenced Marx and Engels (Averkieva, 1962; Koranashvili, 1980, 1982) and directed Marx (1972) to further study of ethnographic data. The 19th century also saw the revival of gender issues in political economic

theory. Morgan (1878) and Engels (1884/1920) argued that the rise of private ownership was apiece with the subjugation of women, and Veblen (1899) argued that "ownership-marriage seems to be the original both of private property and of the patriarchal household" (p. 364).

In the late 19th century, comparative sociologists began using compilations of selected ethnographies to argue for and against Marxist political economic theory. Among those joining the debate were Fustel de Coulanges (1885, 1891a, 1891b); LaFargue (1895, 1890/1905, 1892/1907), who was Karl Marx's son-in-law; Laveleye (1878, 1891); Letourneau (1892); and Guyot (1895). This continued into the 20th century (e.g., Petrucci, 1905; Westermarck, 1908), but the methodology was eventually challenged by Hobhouse, Wheeler, and Ginsberg (1915) at the London School of Economics:

Theories of social evolution are readily formed with the aid of some preconceived ideas and a few judiciously selected corroborative facts. The data offered to the theorist by the voluminous results of anthropological inquiry on the one hand, and by the immense record of the history of civilization on the other, are so vast and so various that it must be an unskilled selector who is unable, by giving prominence to the instances which agree and by ignoring those which conflict with his views, to make out a plausible case in support of some general notion of human progress. On the other hand, if theories are easily made, they are also easily confuted by a less friendly use of the same data. (p. 1)

Hobhouse et al. argued that large numbers of societies should be sampled, but not preselected, for examination by statistical methods in order to identify and describe the relationships between political economic variables. In their own study, they sampled 642 societies, which they categorized into seven subsistence types, from primitive hunters to advanced agriculturalists. Then using primary and secondary ethnographic sources, they characterized the societies by categorical measures of social order, gender relationships, warfare, and ownership. Hobhouse et al. (1915) analyzed their data by graphic displays of the proportion of each type of society that exhibited a variable of interest. Their data have yet to be examined for reliability or to be analyzed by more appropriate statistical techniques, but several subsequent cross-cultural databases containing measures of ownership practices have been:

1. Simmons (1937) compiled a database of 109 variables tabulated for 71 societies in order to empirically confirm the work of Sumner, Keller, and Davie (1927). Measures were made of the degree to which land and chattel were privately owned. Independence of sampled cultures and reliability of measures were subsequently determined by Rudmin (1992a). Simmons had collapsed his ordinal data to categorical data in order to use the phi coefficient test of correlation. However, using the Kendall test of correlation ($p < .0001$) on the original ordinal data, and seeking replication with two further measures of private ownership from Murdock's (1967) data, 21 cultural practices were identified as correlates of private ownership (Rudmin, 1992a). To this should be added Simmons's variable, Mining and Smelting of Metals, which has been found to meet the significance criteria after a closer matching of Simmons's sample of societies to Murdock's. However, included among these significant correlates were only 2 of 32 gender-specific practices.

2. Swanson (1960/1966) compiled a database of 39 variables tabulated for 50 societies in order to study the cultural roles of religious beliefs. Included was one measure of the private ownership of economically significant property. Independence of sampled societies and reliability of measures were determined by Rudmin (1992b). Using a chi-square test of correlation, Swanson had noted only two correlates of private ownership, but using the Kendall test of correlation ($p < .00028$) and two additional measures of ownership from Murdock's (1967) database, Rudmin (1992b) identified 10 correlates.

3. To maintain the historical sequence here, it should be noted that McClelland's (1961) database of 45 tribal societies is not usable because the measure of individual ownership of capital equipment is of doubtful validity (Rudmin, 1993). It showed near-zero correlations with other established measures of private ownership. Inferences based on McClelland's data (e.g., Textor, 1967) should be cited with caution.

4. Murdock's (1967) database of 44 topics tabulated for 862 societies included measures of the inheritance of land and of movables. Using the Kendall test of correlation and requiring

replication in two independent samples ($p < .0001$), Rudmin (1995) identified 51 correlates of private ownership. The results of all of these studies will be reviewed in more detail later.

One more database fits particularly well into the historical tradition of political economic analysis of cultural and gender issues. Zelman's 1974 dissertation, *Women's Rights and Women's Rites: A Cross-Cultural Study of Womanpower and Reproductive Ritual*, includes a sample of 60 societies described by 145 measures of cultural practices. Many of these are gender specific or gender differentiating. Six measures pertain to private ownership. Zelman's data have the further advantage that the societies sampled are also present in Murdock's 1967 *Ethnographic Atlas*, thus allowing checks for replication between the two databases.

The purpose of the present study is to examine Zelman's (1974) database for independence of sampled societies, for validity of measures, and for correlations between private ownership and measures of other cultural practices. The goal is both to identify new correlates of private ownership and to seek replication of those correlations found in the prior studies. In all sciences, replication is the foundation of confidence. Once it has been determined which cultural practices correlate with private ownership, then political economics will have stronger empirical foundations for challenging existing theory and for developing new theories of the human behavior of private ownership.

METHOD

SAMPLE OF SOCIETIES

Zelman's (1974) sample of 60 societies was drawn from Naroll and Sipes's (1973) *Standard Ethnographic Sample* (SES). This is a list of 273 societies meeting the following four criteria: (a) They lack written language and (b) have been described in ethnographies of more than 40 pages covering a diversity of topics (c) based on at least 1 year of field research (d) by anthropologists with oral proficiency in the native language. Because of these restrictive criteria, and because anthropologists from the Soviet Union, China and Japan failed to respond to inquiries when the list was being compiled (Naroll & Sipes, 1973), the SES is geographically unbal-

anced. For example, only two European societies were included and only five from all of China and the former Soviet Union; but four societies from the island of Madagascar and five from the island of Luzon were included. As shown in Table 1, Zelman's (1974) sample mirrors the geographic distribution of the SES.

One of the problems in cross-cultural research is to avoid including related societies in the same sample. To help assure independence among the sampled societies, Zelman (1974) added the further restrictive criteria that societies must be linguistically and geographical distinct from one another. One of Murdock's (1967, 1981) techniques to assure sample independence was to group world societies into 412 *culture clusters*, each composed of societies related by common derivation or prolonged contact. A sample of cultures should not include more than one society from each cluster. As shown in Table 1, Zelman's (1974) linguistic and geographic criteria satisfied Murdock's culture cluster criterion, that is, no cluster was sampled more than once.

A second technique recommended by Murdock (1967) is the *three-degree rule*, a heuristic that reduces risk of cultural contamination among societies in a sample by stipulating that they be no closer than 3 degrees of latitude and longitude. Distance is presumed to be a barrier to cultural borrowing. Zelman's (1974) sample did violate this heuristic on one occasion: the Kapauku at 4S, 136E and the Waropen at 2S, 137E. However, the three-degree rule was not invoked here because culture clusters already identified societies that had experienced "intimate and prolonged cultural contact" (Murdock, 1981, p. 4) and because societies occupy geographic *area*, sometimes quite vast area, and cannot be accurately represented by *single points* on the globe. (See Rudmin, 1992a, 1992b, 1995, for data and discussion on this.)

Table 1 also lists the amount of missing data for each society based on the variables and criteria used in the present study. Zelman (1974) had deleted the Natchez from all statistical analyses because data for this society were missing for almost half of the coded variables. However, for the present study, the Natchez were retained because they did have data on ownership and could contribute to some correlation computations. Thus, the sample of societies used in this study consisted of 60 preliterate, largely non-Eurasian, societies recommended for the quality of their ethnographic record.

TABLE 1
Zelman's 1974 Sample of Cultures

Zelman's Sample		Murdock's (1967) Ethnographic Atlas Data			
Name	Missing Data	Culture Clusters		Local Societies	
		Code	Name	Name	Code
African Societies					
Nama Hottentot	17	3	Hottentot	Nama	Aa 3
Thonga	9	6	Shona-Thonga	Thonga	Ab 4
Nyakyusa	11	17	Ngonde	Nyakyusa	Ad 6
Ganda	7	28	E. Lacustrine Bantu	Ganda	Ad 7
Fang	5	35	Fang-Dzem	Fang	Af 3
Yoruba	18	43	Yoruba	Oyo Yoruba	Af 6
Bambara	10	53	Nuclear Mande	Bambara	Ag 1
Tallensi	4	59	Grusi	Tallensi	Ag 4
Azande	9	72	Azande	Azande	Ai 3
Nuer	6	78	N. Nilotes	Nuer	Aj 3
Dorobo	19	84	Dorobo	Dorobo	Aa 2
Circum-Mediterranean Societies					
Somali	14	87	Afar-Somali	Somali	Ca 2 ^a
Rwala	34	108	Bedouin Arabs	Rwala	Cj 2
Lapp	39	123	Lapps	Lapps	Cg 4
East Eurasian Societies					
Burusho	15	147	Burusho	Burusho	Ee 2
Monguor	17	149	Mongols	Monguor	Eb 2
Yakut	15	153	Yakut	Yakut	Ec 2
Chukchee	22	155	Paleo-Siberians	Chukchee	Ec 3
Ainu	13	157	Ainu	Ainu	Ec 7 ^a
Bhil	20	175	Bhil	Bhil	Ef 5 ^a
Santal	19	176	Munda	Santal	Ef 1
Coorg	34	179	S.E. India	Coorg	Eg 5
Andaman	19	186	Andaman Islands	Andamanese	Eh 1
Kachin	20	192	Kachin	Kachin	Ei 5
Semang	18	204	Semang	Semang	Ej 3

(continued)

DATA EDITING

Zelman's data consist of 145 measures grouped into 12 general categories:

- 1 - 10 Menstrual seclusion and puberty celebrations
 11 - 21 Pregnancy and related taboos
 22 - 28 Birthing practices, participants, and celebrations

TABLE 1: Continued

Zelman's Sample		Murdock's (1967) Ethnographic Atlas Data			
Name	Missing Data	Culture Clusters		Local Societies	
		Code	Name	Name	Code
Insular Pacific Societies					
Ifugao	8	209	Highland Luzon	Ifugao	Ia 3
Iban	16	212	Borneo	Iban	Ib 1
Alor	13	223	Alor-Sol	Alorese	Ic 2
Murngin	13	229	N.W. Australia	Murngin	Id 2
Kiwai	12	235	Gulf of Papua	Kiwai	Ie 13
Kapauku	9	238	W. New Guinea Highland	Kapauku	Ie 1
Waropen	15	242	New Guinea Melanesians	Waropen	Ie 6
Truk	6	247	Central Caroline Is.	Trukese	If 2 ^a
Manus	12	253	Admiralty Islands	Manus	Ig 9
Siuai	10	259	Bougainville	Siuai	Ig 1
Lau	12	269	Fiji	Lau Fijians	Ih 4
Tikopia	11	273	Polynesian Outliers	Tikopia	Ii 2
Marquesan	13	276	E. Polynesians	Marquesans	Ij 3 ^a
North American Societies					
Aleutian	27	277	W. Eskimo	Aleut	Na 9
Polar Eskimo	20	279	Central & E. Eskimo	Polar Eskimo	Na 14
Micmac	16	281	Maritime Algonkians	Micmac	Na 41 ^a
Tlingit	25	288	Tlingit-Haida	Tlingit	Nb 22
Eastern Pomo	35	298	Pomo-Yuki	Eastern Pomo	Nc 18
Thompson	24	311	N. Plateau	Thompson	Nd 10
Crow	18	315	Upper Missouri	Crow	Ne 4
Winnebago	40	319	Prairie Siouans	Winnebago	Nf 2
Fox	19	320	Central Algonkians	Fox	Nf 7
Natchez	62	325	Lower Mississippi	Natchez	Ng 7
Navajo	4	331	Navaho	Navaho	Nh 3
Papago	9	333	Pima-Papago	Papago	Ni 2
South American Societies					
Chorti	17	346	Lowland Maya	Chorti	Sa 3
Yanomamo	12	364	Yanoama	Yanomamo	Sd 9 ^a
Warao	23	367	Orinoco	Warao	Se 1 ^a
Siriono	8	373	Siriono-Guarayua	Siriono	Se 1
Jivaro	18	380	Jivaro	Jivaro	Se 3
Inca	23	386	Highland Peru	Inca	Sf 1
Araucanian	3	388	Araucanians	Mapuche	Sg 2
Yahgan	9	390	Yahgan	Yahgan	Sg 1
Nambicuara	11	399	Nambicuara	Nambicuara	Si 4
Timbira	13	408	Timbira	Ramcocreca	Sj 4

a. Data from journal *Ethnology* (1962-1971).

29	-	42	Postpartal seclusion, taboos, and female pollution
43	-	49	Female/male relations and evaluations of females
50	-	54	Work and punishments for girls and boys
55	-	69	Gender differences in child care
70	-	79	Community social and political structure
80	-	96	Conflicts, including divorce, war, and religion
97	-	128	Economic activities and roles, including ownership
129	-	134	Marriage and kinship practices
135	-	145	Indices computed by summing related variables

For most of the variables, Zelman used the Human Relations Areas Files to locate information in the ethnographies and to thus assign original coded values to the societies in the sample. However, for 24 of the coded variables (48, 70 to 75, 97 to 107, and 129 to 134), data were taken from the data tables in Murdock's (1967) *Ethnographic Atlas*. No demonstration or discussion of the validity of the new codings or of the transcribed codings was presented. Zelman's (1974) appendices tabled: (a) descriptions of the variables and value codes, (b) raw data, and (c) frequency distributions.

There were a number of discrepancies in the appended tables that required data editing. First, the raw data and the frequency distributions for several variables (33, 112, and 128) showed undefined values at the top ends of their scales. However, presuming parallel construction with adjacent related variables, the meanings of these undefined values were discernible. For example, Variable 33 is a measure of the duration of taboo on sexual intercourse following the birth of a child. Zelman defined four ordinal values, ranging from 1 = *none* to 4 = *1 year or more*. The raw data and the frequency distribution, however, show two societies with a value of 5 on Variable 33. By parallel construction with Variables 35 and 37, which are also measures of the duration of postpartal taboos, it is evident that 5 = *unspecified period of time*.

A second problem was that Zelman's frequency distributions for Variables 38, 39, and 40 match the raw data distributions for Variables 40, 38, and 39 respectively. These variables all pertain to postpartal taboos for the father. Because they were destined to be summed along with other related variables for a composite index of Father's Postpartal Taboos, it was unnecessary to determine whether the data or the frequency distributions had the correct labels.

A third problem was that for seven variables pertaining to gender roles in economic activity (103, 108, and 110 to 114),

Zelman's appended frequency distributions show discrepancies of one value from frequency distributions made from the appended raw data. For example, Variable 103 is a measure of the Role of Females in Gathering. The appended frequency distribution shows 11 societies with a value of 1 = *activity absent* and 5 societies with a value of 4 = *females do approximately half*, but the raw data show 10 societies with a value of 1 and 6 societies with a value of 4. Fortunately, this is one of the measures taken from Murdock's (1967) *Ethnographic Atlas*, specifically from his data column 54, coding gender specialization in gathering. Cross-checking the two data sets shows the Tikopia to be the only society with the two confounded values. Zelman's data table assigns value 4 to the Tikopia, but Murdock's data table assigns value 0 = *activity is absent*, equivalent to value 1 in Zelman's codings. Thus, the appended frequency distribution is correct, the appended raw data wrong. Apparently, an error in the transcoding of Murdock's data had been discovered late and corrected after Zelman's raw data table had been prepared for the appendix. The other six discrepancies between raw data and the appended frequency distributions are all consistent with late corrections to the data for the Jivaro. On the presumption that the frequency distributions are correct, data for the Jivaro were changed for Variables 108 and 110 to 114 to make them consistent with the appended frequency distributions.

A fourth problem was that Zelman's variables based on Murdock's data sometimes showed values that were not confirmed when checked against Murdock's data tables. The bulk of these discrepancies arise from Zelman's apparent reliance on Murdock's bound (1967) *Ethnographic Atlas* and failure to incorporate subsequent corrections published by Murdock in the journal *Ethnology*. The *Atlas* was based on 21 installments published in *Ethnology* between 1962 and 1967. Murdock had been soliciting corrections from the anthropological community and published these corrigenda as they became available. Between 1967 and 1971, after publication of the *Ethnographic Atlas*, Murdock continued to publish coding corrections and completions of missing values in installments XXIII to XXVII in *Ethnology*. Eight of Zelman's sampled societies (Somali, Ainu, Bhil, Trukese, Marquesan, Micmac, Yanomamo, Warao) appeared in these later installments, and corrections to their data were not incorporated into Zelman's database.

However, for the remaining 1,248 points of data (52 societies \times 24 variables) copied from the tabulated columns in Murdock's (1967) *Atlas*, there were seven further discrepancies. These seem to be transcription errors. For example, on Variable 134, Cognatic Kin Groups, Zelman reports the Aleut (Na 9) to have a value of 1 = *no cognatic kin groups*, corresponding to Murdock's value code of 0 in his data column 24. However, Murdock's *Atlas* records a value of Q = *bilateral descent* for the Aleut. Apparently, the Q had been misread as an O. For another example, on Variable 107, Role of Females in Agriculture, Zelman reports the Kachin (Ei 5) to have a value of 4 = *females do approximately half of the activity*, corresponding to Murdock's value codes of D or E in his data column 62. But, Murdock's *Atlas* records a value of N for the Kachin (Ei 5) in column 62. Apparently, Zelman had misrecorded an E from the data for the Lakler (Ei 4) on the data line immediately above the Kachin (Ei 5) or from the Purum (Ei 6) immediately below. Similar errors were found with the Natchez and Pomo on Variable 48, the Natchez on Variable 103, the Timbira on Variable 132, and the Tallensi on Variable 133. For the present study, all measures based on Murdock's data were checked and corrected if discrepant from Murdock's most recent reliable report.

DATA TRANSFORMATIONS

Most of Zelman's (1974) measures were clearly ordinal in scale, meaning that a higher number indicates a greater amount of the phenomenon being examined. However, 21 variables were ordinal except for one coding category, usually something indicating *other* (Variable 22), or *activity absent* (Variables 69, 84, 85, 87, 95, and 103 to 107, 120, and 121) or *amount unspecified* (Variables 29, 33, 35, 37, 39, 80, and 88). To maintain ordinality, these troublesome categories were all designated as *missing data*.

For a few variables, ordinality was more complicated. Variable 26, Position of Parturient at Birth, had code categories for *squatting*, *kneeling*, *sitting*, *lying*, and combinations of *squatting or kneeling*, *squatting or sitting*, and *squatting or lying*. To make an ordinal progression from most upright and active to most prone and passive, the combination codings were ranked in value between Squatting and Kneeling. Variables 58, 62, and 66 coded the role of women and men in educating sons and included a nonordi-

nal category designating *boys left to themselves, given little or no education in everyday activities*. This was defined as *missing data* for these three variables, but, as shown in Table 2, the *boys left to themselves* categories were also summed to create a separate, new measure. For Variable 80, Physical Coercion of Wives by Husbands, values 5 and 6 were reversed to indicate that a limited *general beating* of a wife is less violent than a socially acceptable *maiming* of her.

Fifteen variables (9, 28, 74, 86, 89, 122 to 127, and 130 to 133) were categorical in scale, meaning that a number labels a group rather than an amount. These were made ordinal by data transformations. For Variables 9, 28, 74, 122, 123, and 124, the categories were collapsed to a single binary 0, 1 ordinal scale by defining the absence of the phenomenon to be value 0 and the presence of the phenomenon in any form to be value 1. For Variables 126, 127, 130, 132, and 133 as shown in Table 2, each category became its own binary 0, 1 ordinal variable. Such measures derived from the same categorical variable are ipsative (negatively correlated) with one another and cannot be entered into multivariate algorithms.

Variables 86 and 87, pertaining to marriage gifts and repayment after divorce, were each made into *two* binary 0, 1 ordinal measures, one coding bride price practices and the other measuring bride price repayment. These were then summed separately. Variable 89, Purpose of Warfare, had eight categories, three of which coded compound purposes. For example, value 5 designated *mainly booty and women* and value 6 designated *booty and land*. As shown in Table 2, this variable was decomposed into *four* ordinal measures with the compound categories transformed to intermediate values between presence and absence of the practices.

The remaining two of Zelman's categorical variables were deleted from this analysis. Variable 125, Ownership of Land (If Not Pastoralist) or Animals (If Pastoralist), had two sets of category codes: the land categories to be used if 50% or more of a society's subsistence came from agriculture and the animal categories to be used if 36% or more of a society's subsistence came from husbandry. Unfortunately, these criteria are not mutually exclusive. For example, Zelman's data on Variable 101, Importance of Agriculture, show the Burushu get 56% of their subsistence from agriculture and on Variable 100, Importance of Animal Husbandry, get 36% of their subsistence from husbandry. Furthermore, the categories for

TABLE 2
Reliability and Validity of Indices and Variables

Descriptive Labels of Indices and Variables	Variables Included	Reliability Correlations (average r, n)		Validity Correlations (re Simmons)	
		r	n	r	n
Menstrual Pollution	1-8	.60*	57	.39*	16
Celebration of Menarche	9-10	-.20 ^a	58		
Pregnancy Contact Taboos	11-13	.43*	58		
Pregnancy Taboos for Women	14-15	.80*	59		
Pregnancy Taboos for Men	16-19	.72*	59		
Pregnancy Celebration	20-21	.95*	59		
Midwifery by Female Relative	22				
Secluded Birthing	23-25	.24*	48		
Passive Birthing Position	26				
Celebration of Birth	27-28	.86*	59		
Postpartal Seclusion	29-34	.29*	53		
Mother's Postpartal Taboos	35-36	.95*	59		
Father's Postpartal Taboos	37-40	.78*	57		
Female Pollution Affects Behavior	41				
Class Differences in Taboos	42				
Wife Blamed for Childlessness	43-44	.58*	36		
Societal Valuation of Women	45			.68*	16
Preference for Female Children	46			.37	10
Women's Sexual Enjoyment	47				
Women's Premarital Sexuality (M)	48				
Wives More Fidelity Than Husbands	49				
Child Labor	50-51	.21*	52		
Girls Work More Than Boys	52				
Frequency of Child Punishment	53				
Girls Punished More Than Boys	54				
Infant Care: Females > Males	55,59,63	.57*	49		
Child Care: Females > Males	56,60,64	.54*	49		
Educate Daughters: Females > Males	57,61,65	.38*	46		
Educate Sons: Females > Males	58,62,66	.29*	39		
Sons Given Little or No Education	58,62,66	1.00*	43		
Children Care for Infants	67-68	.30*	34		
Infant Care: Girls > Boys	69				
Societal Complexity (M)	70-75	.33*	54	.72*	11
Women's Community Power	76-79	.37*	51	.52*	14
Physical Abuse of Wives	80				
Frequency and Ease of Divorce	81-83	.38*	39	.53*	16
Women's Advantage in Divorce	84-85	.35*	36		
Bride Price	86-87	.83*	47	.68*	13
Return Marital Gifts if Divorce	86-87	.79*	47		
Frequency of War	88			.78*	15
Purpose of War: Booty	89				

TABLE 2: Continued

Descriptive Labels of Indices and Variables	Variables Included	Reliability Correlations (average r, n)		Validity Correlations (re Simmons)	
		r	n	r	n
Purpose of War: Women	89				
Purpose of War: Land	89				
Purpose of War: Prestige	89				
Military Culture	90-93	.36*	47		
Women Perform Rituals	94-96	.30*	51	.42*	11
Importance of Gathering (M)	97			.50*	15
Importance of Hunting (M)	98			.58*	19
Importance of Fishing (M)	99			.46*	17
Importance of Husbandry (M)	100			.82*	18
Importance of Agriculture (M)	101			.91*	19
Intensity of Agriculture (M)	102				
Women Do Most Gathering (M)	103				
Women Do Most Hunting (M)	104				
Women Do Most Fishing (M)	105				
Women Do Most Husbandry (M)	106				
Women Do Most Agriculture (M)	107				
Women Do Most Domestic Work	108-110	.30*	48		
Amount of Women's Work	111				
Value Placed on Women's Work	112				
Grouped Women Subsistence Work	113				
Grouped Women Nonsubsistence Work	114				
Grouped Men's Work	115-116	.28*	51		
Mixed Group Subsistence Work	117				
Mixed Group Nonsubsistence Work	118				
Women Distribute Food	119				
Marital Gifts Are Female Goods	120				
Women Do Most Trading	121				
No Female Chattels	126				
Women Cannot Inherit Female Chattels	126				
Male Kin Inherit Female Chattels	126				
Both Sexes Inherit Female Chattels	126				
Women Inherit Female Chattels	126				
Female Chattels Distributed to Women	126				
No Male Chattels	127				
No Inheritance of Male Chattels	127				
Male Chattels Distributed to Men	127				
Sons Inherit Male Chattels	127				
Brothers Inherit Male Chattels	127				
Sons and Brothers Inherit Male Chattels	127				
Sisters' Sons Inherit Male Chattels	127				

(continued)

TABLE 2: Continued

Descriptive Labels of Indices and Variables	Variables Included	Reliability Correlations (average r, n)		Validity Correlations (re Simmons)	
		r	n	r	n
Sons and Daughters Inherit Male					
Chattels	127				
Women Own More Than Men	128				
Large Extended Families (M)	129				
Monogamy (M)	130			.38	16
Limited Polygyny (M)	130			b	
Sororal Polygyny, Shared Room (M)	130			b	
Nonsororal Polygyny, Shared Room (M)	130			.61 ^{a,b}	18
Sororal Polygyny, Separate Room (M)	130			b	
Nonsororal Polygyny, Separate Room (M)	130			b	
Polyandry (M)	130			.67 ^{*c}	12
Neolocal Marital Residence (M)	132				
Ambilocal Marital Residence (M)	132				
Patrilocal Marital Residence (M)	132			.33	18
Virilocal Marital Residence (M)	132				
Avunculocal Marital Residence (M)	132				
Uxorilocal Marital Residence (M)	132				
Matrilocal Marital Residence (M)	132			.42	12
No Unilineal Descent Groups (M)	133			.56 [*]	11
Patrilineal Descent Groups (M)	133			.74 [*]	12
Matrilineal Descent Groups (M)	133			.44 [*]	13
Both Types of Descent Groups (M)	133				
Bilateral Descent (M)	134				

NOTE: (M) Data transcribed from Murdock's *Ethnographic Atlas* (1967).

a. Individual celebration of menarche and collective celebration may be mutually exclusive categories and should show negative correlation.

b. Correlation is with Simmons's measure of undifferentiated polygyny.

c. Correlation is with Swanson's measure of polyandry.

*Kendall correlation significant, $p < .05$.

land and animal ownership are clearly not comparable. For example, for nonpastoralist societies, value 5 = *land belongs about equally to individual males and individual females OR land is held commonly and is available to everyone, male or female, residing in the area*; whereas, for pastoralist societies, value 5 = *there are no or few domesticated animals*. Hence, Variable 125 was judged to be multiply confounded and was deleted from the analysis.

Zelman's Variable 132, Permanent Marital Residence Pattern, was derived from Murdock's (1967) main measure of "the prevail-

ing profile of marital residence" (p. 48) found in his data column 17, which was mislabeled in the 1967 *Atlas* as column 16. Murdock prefixed to this column some supplemental codes for "the existence of a different rule or profile for the first years or so of marriage" (p. 48). Zelman's Variable 131, Initial Marital Residence Pattern, carries a note indicating that it was derived from data in Murdock's prefixed column, and if those data had missing values, then from his main measure. Understandably, Zelman misidentified these as data columns 15 and 16 respectively. In any case, for 46 of Zelman's 60 societies, there were missing values for this prefixed measure, indicating that initial marital residence practices are generally not different from permanent marital residence practices, at least for this sample of societies. Variable 131 was thus largely redundant of Variable 132 and was therefore deleted from the present analysis.

INDICES OF GROUPED VARIABLES

Zelman (1974) operationalized the variables, where possible, as explicit and precise ordinal measures. For example, Variable 1, Frequency of Menstrual Seclusion, has values 1 = *none*, 2 = *first menses only*, 3 = *all menses*, and 9 = *no information*. Variable 2, Seclusion of New Menstruant: Duration, has values 1 = *none*, 2 = *one week or less*, 3 = *more than one week, less than one month*, 4 = *more than one month, less than three months*, 5 = *more than three months, less than one year*, and 9 = *no information*. Variable 3, Seclusion of Experienced Menstruant: Duration, Variable 4, Seclusion of New Menstruant: Place, Variable 5, Seclusion of Experienced Menstruant: Place, and so forth, all have similarly precise ordinal values. The intent was to combine such clearly defined measures into larger indices, in the present example, into an index of Female Pollution. Exact and explicit measures have the advantage of making the meaning of a measure clear. Multiple measures summed into indices have the advantage of enhanced reliability. Furthermore, by summing variables into indices, the total number of measures to be examined decreases and the number of possible ordinal values in each measure increases, both of which are advantageous in correlational studies (Rudmin, 1992a, 1992b). Finally, the use of indices results in fewer missing cases during statistical analyses, because indices can be calculated even when some of the contributing variables have missing data.

However, several problems are evident in the indices developed and computed by Zelman (1984). First, only five indices were created incorporating a total of only 49 variables, leaving 85 variables to stand alone, forfeiting the advantages that might have been gained had they been summed into indices. Zelman's five indices are:

- 1 Work Taboos for Husbands of Pregnant and/or Parturient Women
- 2 Female Power
- 3 Female Pollution
- 4 Societal Complexity
- 5 Female Role in Subsistence

Three of these each had a second version with larger intervals and thus a smaller ordinal range. For Female Power, four versions were created by computing large and small interval versions with Variable 126, Inheritance of Female Chattels, included and by computing large and small interval versions with it excluded.

A second problem is that some relevant variables were omitted from these indices, usually without any explanation. For example, Female Pollution included seven of the eight menstrual seclusion measures, but not Variable 1, Frequency of Menstrual Seclusion. A third and perhaps related problem is that no statistical inclusion criteria were used. Correlation matrices tabled by Zelman (1974, pp. 151-153, 156-158) show that variables contributing to the indices had many negative correlations, some at the extreme of $r = -1.00$.

A fourth problem is that variables contributing to an index were simply summed, thus allowing a variable with a coincidentally larger ordinal range to have a corresponding greater weight in the index. For example, in the index Societal Complexity, Variable 71, Mean Size of Local Community, has an ordinal range from 1 = *fewer than 50 persons* to 8 = *cities with more than 50,000 inhabitants*. Variable 75, Slavery, has a much smaller ordinal range, from 1 = *no or insignificant slavery* to 4 = *hereditary slavery*. If both variables had maximum values, they would sum to an index value of 12. Two thirds of this index value would have been contributed by Variable 71, and only one third by Variable 75.

For the present study, as shown in Table 2, as many of the variables as possible were grouped into indices. Variables were

grouped together according to Zelman's (1984) descriptive labels and tabular organization but constrained by the statistical criteria that Kendall correlations among all variables contributing to the same index must be positive and that the mean of these correlations must be statistically significant ($p < .05$). As will be illustrated, it was necessary to transform 10 variables (23, 55 to 58, 63 to 66, and 96) by inverting the ordinal order of assigned values in order to reverse their meaning and thus make them comparable with other variables in their indices.

Before summation, the variables had 1 subtracted from their values in order to set the ordinal scales to an initial value of 0. Each rescaled variable was then divided by its new ordinal range so that a value signifies the proportion of the available range achieved by a society on that variable. The transformations for the summation into indices can be illustrated with Variable 63, Relative Importance of Females and Males in Baby Care, which was inverted to create a measure of female contribution to infant care so that it would be compatible with Variable 55 (inverted) and Variable 59 in an index of Infant Care: Females > Males. The transformations of Variable 63 were:

Original Scale	Inverted	Rescaled	Proportioned
1 = <i>females almost entirely</i>	→ 5	→ 4	→ 1.00
2 = <i>females more than males</i>	→ 4	→ 3	→ 0.75
3 = <i>females and males equally</i>	→ 3	→ 2	→ 0.50
4 = <i>males more than females</i>	→ 2	→ 1	→ 0.25
5 = <i>males almost entirely</i>	→ 1	→ 0	→ 0.00

By summing proportioned measures into an index, and dividing the total by the number of measures contributing to the index, the index value indicates the proportion of the index range achieved by a society. Furthermore, no variable has a disproportionately greater weight or contribution to the index.

As shown in Table 2, all indices computed for this study met the statistical inclusion criteria with the one exception of Celebration of Menarche. This index was the summation of measures of private celebration and of collective celebration, which logically are disjunctive with one another and thus should be expected to show negative correlation.

VALIDITY

The far right column of Table 2 shows Kendall correlations between Zelman's (1974) measures and 22 comparable measures, most from Simmons's (1937) database. These were all positive and in most instances statistically significant ($p < .05$). Zelman's five categories of different forms of polygyny in Variable 130 were combined for comparison with Simmons's single, undifferentiated measure of polygyny. Zelman's measure of polyandry from Variable 130 was positively correlated with Swanson's (1960/1966) measure of polyandry. These positive correlations all attest to the validity of Zelman's assignment of data values for the societies and variables in this database. The other of Zelman's variables are unique and without comparable measures in other available databases, but there is no reason to presume that these would not also be of good validity.

The validity of Zelman's ownership measures and the computation of an index of ownership require further explanation. Zelman (1974) tabulated data for six categorical measures of ownership:

- Variable 122 Ownership of Land of the Type That Provides 50% or More of the Society's Subsistence
- Variable 123 Inheritance of Agricultural Plots
- Variable 124 Ownership of Domesticated Animals
- Variable 125 Ownership of Land (If Not Pastoralist) or Animals (If Pastoralist)
- Variable 126 Inheritance of Female Chattels (Including Animals)
- Variable 127 Inheritance of Male Chattels (Including Animals)

Of these, Variable 125 was deleted, as explained earlier, because it was confounded. Variables 126 and 127 could not be successfully transformed into measures of ownership per se, either individually, jointly, or in an index with other ownership variables. As explained earlier, and as shown in Table 2, these two variables were decomposed into 14 binary 0, 1 measures of specific inheritance practices.

Variables 122, 123, and 124 were each transformed to a single binary 0, 1 ordinal measure of private ownership. The two measures of land ownership (Variables 122 and 123) were summed and averaged to an index of land ownership, which showed positive Kendall correlations with measures of land ownership by Simmons ($r = .43, n = 13, p = .05$) and by Murdock ($r = .57, n = 47, p < .001$). Zelman's measure of ownership of chattels (Variable 124) showed

positive Kendall correlations with measures of object ownership by Simmons ($r = .37, n = 16, p = .07$) and by Murdock ($r = .38, n = 41, p < .01$). Zelman's measure of ownership of chattels was also positively correlated with Swanson's measure of Individually Owned Property ($r = .49, n = 11, p = .05$), suggesting that the latter may be more of a measure of ownership of chattels than of land.

As shown in Table 3, the index of land ownership from Zelman's Variables 122 and 123 was averaged with Variable 124 to create an index of private ownership. This met the statistical criteria for indices, that is, all intercorrelations were positive, and the average correlation was statistically significant ($p < .05$). The validity of this index is attested to by positive and statistically significant correlations with comparable indices of ownership computed from Simmons's and Murdock's data. The correlation with Swanson's single measure of ownership of economic property was positive, but not statistically significant because so few societies were shared by the two studies.

RESULTS

Because all 60 of Zelman's (1974) sampled societies were also included in Murdock's (1967) *Ethnographic Atlas* database, Murdock's index of private ownership was also available for this study. Thus, two indices of the private ownership of land and chattels could be examined for correlation with 103 variables and indices from Zelman's database.

In accord with earlier studies, conjunctive criteria were required for a variable or index to be claimed a significant correlate of private ownership: (a) correlation with Zelman's (1974) index of private ownership must have the same sign as the correlation with Murdock's (1967) index of private ownership, and (b) both of these correlations must have a null probability of $p < .05$.

The binomial probability of two correlation coefficients having the same sign is $p = .5$, and their joint null probability by the criteria set here is $p = .05 \times .05 = .0025$. Because the sign of a correlation is independent of its magnitude, the statistical significance level using the two conjunctive criteria is $p = .5 \times .0025 = .00125$.

TABLE 3
Validity and Reliability of Private Property Measures

Ownership Measures and Samples Used	Kendall Correlations of Variables and Indices			
	Zelman (1974)	Murdock (1967)	Swanson (1960/1966)	Simmons (1937)
Simmons (1937):	$r = .38$	$r = .49$	$r = .25$	$Mr = .45$
Land +	$n = 17$	$n = 56$	$n = 7$	$n = 51$
Objects	$p = .04$	$p < .001$	$p = .24$	$p < .001$
Swanson (1960/1966):	$r = .22$	$r = .46$	(n.a.)	
Economic property	$n = 12$	$n = 43$		
	$p = .20$	$p = .001$		
Murdock (1967):	$r = .61$	$Mr = .57$		
Land inheritance +	$n = 52$	$n = 403$		
Moveables inheritance	$p < .001$	$p < .001$		
Zelman (1974):	$Mr = .26$			
(Economic land +	$n = 50$			
Land inheritance)/2 +	$p = .02$			
Domestic animals				

NOTE: Mr = Mean correlation between variables summed.

Because the data were ordinal, the Kendall correlation was preferred to the Pearson correlation. Because the study is descriptive, without a priori hypotheses concerning the signs of the correlations, two-tailed probability estimates were used to test significance of the correlations with Zelman's (1974) measure of ownership. However, because of expectations of replication, one-tailed probability estimates were used to test significance of the correlations with Murdock's measure of ownership. Multivariate analyses were not pursued because many of the measures were derived from common categorical variables and were thus ipsative with one another. That is, assignment to one category precludes assignment to another category, resulting in expectations under the null hypothesis of negative correlations between categories, which would confound most multivariate algorithms.

The significant correlates of private ownership identified by the criteria set here are listed in Table 4, ordered by magnitude of correlation. Of the 103 variables and indices examined, 22 correlations showed a null probability of $p < .05$ with both indices of private ownership. With 103 variables and indices being examined

TABLE 4
Cultural Correlates of Private Ownership: Rank-Ordered

Zelman's Measures Correlating With Private Ownership	Zelman's (1974) Ownership of Land and Animals		Murdock's (1967) Inheritance of Land and Moveables	
	r	n	r	n
Female Chattels Distributed to Women	-.49	38	-.51	34
Bride Price	.53	52	.44	45
Return Marital Gifts If Divorce	.49	52	.42	45
Importance of Husbandry	.52	60	.39	52
Patrilineal Descent Groups Only	.48	60	.43	52
Importance of Hunting	-.44	60	-.45	52
Importance of Agriculture	.46	60	.41	52
Intensity of Agriculture	.40	60	.45	52
No Unilateral Descent Groups	-.41	60	-.42	52
Sons Inherit Most Male Chattels	.41	54	.42	48
Importance of Gathering	-.42	60	-.39	52
Frequency of Child Punishment	.42	53	.35	46
Women Own More Than Men	-.48	45	-.28	40
Sororal Polygyny, Shared Rooms	-.31	60	-.42	52
Societal Complexity	.31	60	.37	52
Grouped Women Nonsubsistence Work	.24	58	.43	50
No Inheritance of Male Chattels	-.35	54	-.32	48
Patrilocal Marital Residence	.38	60	.28	52
Nonsororal Polygyny, Separate Rooms	.32	60	.32	52
Father's Postpartal Taboos	-.26	59	-.35	52
Educate Sons: Females > Males	.35	42	.26	36
Children Care for Infants	.29	35	.31	31

NOTE: Kendall correlations, all significant at $p < .05$.

with a statistical criterion of $p = .00125$, random patterns in the data or luck of the draw in the sampling would not be expected to falsely identify even one correlate.

REPLICATION

In science, confidence arises from replication, and the present program of research has been largely directed by this principle. Table 5 shows the original sample size (N) for each of the four studies to date as well as the effective sample size (n) after the elimination of societies that had missing data on the property measures or that overrepresented culture clusters. In total, 510 societies have contributed to these studies. However, the samples

TABLE 5
Summary of Overlap in Samples in Four Studies

	Simmons N = 71	Swanson N = 50	Murdock N = 459	Zelman N = 60
Simmons (1937): (Rudmin, 1992a)	n = 63			Grand n = 510
Swanson (1966): (Rudmin, 1992b)	(7)	n = 48		
Murdock (1967): (Rudmin, 1995)	(38)	(31)	n = 459	
Zelman (1974): (this study)	(17)	(12)	(43)	n = 60

NOTE: N = Number of societies in database. n = Number of sampled societies with property measures. () = Number of societies with property measures in both samples. Grand n = Number of societies used in all studies.

for each study have not been exclusive of one another. Least overlapping are Simmons's (1937) and Swanson's (1960/1966) samples, with only seven societies having property measures in both samples. Substantial numbers of societies from Murdock's (1967) large samples were also used in the other studies.

Because Murdock's measures, including the measures of private ownership, can thus be cross-correlated with the measures from the other databases, and because the study of Murdock's data (Rudmin, 1995) employed two very large and completely exclusive samples of societies ($n = 147$, $n = 312$), the Murdock data are central to replication efforts. The 51 variables identified as correlates of private ownership in that study are listed on the left in Table 6. For each of these correlates, the table shows the Kendall correlations with the property measures from Simmons's, Swanson's, and Zelman's databases. As shown in Table 6 by the hatchmark (#) on the left, only 14 of the 51 variables examined failed to replicate the sign of correlation. Of the 111 correlation values computed for the 37 variables replicating the sign with the three different property measures, 61 were statistically significant ($p < .05$).

Table 7 summarizes the cross-correlations of the property measures from Simmons's (1937), Swanson's (1960/1966), Murdock's (1967), and Zelman's (1974) databases for all variables identified to date as correlates of private property. Each study not only examined a different sample of societies but also required correlation with several measures of private ownership. The study of Simmons's data required replicated correlations by two measures of property from Simmons's data and two measures of property

TABLE 6
Replication Correlations of Measures of Ownership
with Murdock's Variables of Cultural Characteristics

Data Column	Murdock's Variables	Simmons's Property Measures		Swanson's Property Measures		Zelman's Property Measures	
		r	n	r	n	r	n
7.	Gathering	-.38*	62	-.24*	47	-.42*	60
8.	Hunting	-.29*	62	-.30*	47	-.44*	60
9.	Fishing	-.18*	62	-.22*	47	-.42*	60
10.	Husbandry	.28*	62	.48*	47	.52*	60
11.	Agriculture	.33*	62	.21*	47	.46*	60
12.	Bride Price	.21*	62	.23	47	.58*	60
12.#	Bride Service	.03	62	-.10	47	-.28*	60
14.#	Nonsororal Polygyny, Separate Rooms	.09	62	-.02	47	.16	60
17.	Ambilocal Residence	-.09	61	-.02	47	-.14	60
17.	Patrilocal Residence	.10	61	.16	47	.38*	60
17.	Uxorilocal Residence	-.18	61	-.06	47	-.21*	60
17.	Virilocal Residence	-.05	61	-.09	47	-.28*	60
19.#	Local Exogamy	-.10	61	.09	46	.13	60
19.#	Segmented Communities	.20*	61	-.25*	46	-.11	60
20.	Patrilineal Kin Groups	.07	61	.15	47	.45*	60
20.	Patrilineal Sibs or Clans	.10	61	.12	47	.46*	60
24.	Bilateral Descent	-.37*	61	-.12	47	-.44*	60
27.#	Descriptive Cousin Terms	-.07	52	.01	44	.20	59
28.	Intensive Cultivation	.29*	62	.20	47	.40*	60
29.	Cereal Grain Crops	.11	43	.26	35	.26*	45
29.	Root Crops	-.16	43	-.14	35	-.17	45
29.#	Vegetable Crops		43		35		45
30.	Permanent Settlements	.37*	62	.14	47	.34*	60
30.	Dense Settlements	.17	62	.03	47	.06	60
--	Large Population	.16	45	.46*	35	.53*	50
31.	Populous Communities	.27*	40	.20	36	.28*	45
33.	Local Jurisdictions	.13	62	.13	47	.13	60
33.	Higher Jurisdictions	.08	62	.23*	47	.25*	60
34.	Judgmental High Gods	.04	53	.17	42	.15	54
35.#	Games of Strategy	-.07	41	.08	33	.35*	43
37.#	Male Genital Mutilations	.04	62	-.10	45	.18	59
38.	Plow Cultivation	.30*	63	.27*	48	.35*	60
40.	Bovine Husbandry	.32*	62	.45*	47	.57*	60
40.#	Equine Husbandry	-.06	62	.12	47	-.08	60
40.	Large Domestic Animals	.36*	62	.51*	47	.57*	60
41.	Milk Livestock	.01	34	.20	22	.33*	25
48.	Male Dominance in Pottery	.32*	32	.20	24	.26	25

(continued)

TABLE 6
Replication Correlations of Measures of Ownership
with Murdock's Variables of Cultural Characteristics

Data Column	Murdock's Variables	Simmons's Property Measures		Swanson's Property Measures		Zelman's Property Measures	
		r	n	r	n	r	n
52.	Male Dominance in House Building	.18	42	.09	36	.10	51
42-62.	Craft Specialization	.21*	63	.20	48	.52*	60
67.	Stratification by Occupation	.05	59	.08	45	.24*	60
67.	Dual Class Stratification	.20*	59	.07	45	.23*	60
67.	Social Classes	.27*	59	.33*	45	.36*	60
69.#	Despised Occupational Groups	-.08	59		44	.16	59
69.#	Castes	-.18	59	.12	44	.21*	59
71.	Slavery	.07	61	.35*	47	.16	58
73.#	Headman by Consensus	-.13	53	.05	43	-.25*	54
73.#	Headman Elected	-.02	53	-.01	43	.16	54
80.#	Angular Ground Plans	.07	58	.08	46	-.08	60
81.	Raised Floors	.40*	56	.19	46	.11	58
82.	Substantial Walls	.31*	57	.23*	45	.32*	56
83.	Rounded Roof	-.20*	57	-.06	45	-.06	55

NOTE: # = Failure to replicate sign of correlation in all three studies.

*Kendall correlations significant at $p < .05$.

from Murdock's data, resulting in a significance criterion of $p = .00006$ (Rudmin, 1992a). The study of Swanson's data required replicated correlations by one measure of property from Swanson's data and two measures of property from Murdock's data, resulting in a significance criterion of $p = .00028$ (Rudmin, 1992b). The study of Murdock's data required replicated correlations by two measures of property from Murdock for two independent samples of societies, resulting in a significance criterion of $p < .00006$ (Rudmin, 1995). The present study of Zelman's data requires replicated correlations by one index of ownership from Zelman's data and one index of ownership from Murdock's data, resulting in a significance criterion of $p = .00125$. Table 7 includes only variables that have been identified as correlates of private ownership by at least one of these studies.

Swanson (1960/1966) had coded only a single measure of private ownership, and Zelman's (1974) three available measures had been

summed into a single measure. For the replications in Table 7, Simmons's (1937) measures of ownership of land and of objects were also summed to a single index of private ownership, as were Murdock's measures of ownership of land and objects. In Table 7, the variables that had been identified as negative correlates of private ownership have been reversed in meaning by the insertion of *NOT* so that the table can be read as a list of those societal norms and characteristics that coincide with the practice of private ownership. A large *C* indicates a replicated and statistically significant correlation ($p < .05$), and a small *c* indicates a replicated sign of correlation but not of sufficient magnitude to reach this statistical criterion. Where Murdock's index of private ownership correlates with Murdock's other variables, two independent and exclusive samples ($n = 147$, $n = 312$) had to be examined, and statistical significance ($p < .05$) had to be achieved in both samples for a large *C* to be recorded. In Table 7, a question mark (?) indicates that 10 or fewer societies were available for the computation, and the data were either invariate or split exactly to cause an indeterminate correlation of $r = 0.00$.

To illustrate, consider Hunting in Table 7. It had been coded as a societal practice by Simmons (S), Swanson (SW), and Murdock (M). Hunting is included in Table 7 because it had been identified as a negative correlate of private ownership in Swanson's data ($p = .00028$), in Murdock's data ($p = .00006$) and in Zelman's data ($p < .00125$). Therefore, *NOT* Hunting coincides with practices of private ownership. The first set of *Cs* shows that the index of property from Simmons's data was a significant correlate of *NOT* Hunting as coded by Simmons ($r = .29$, $n = 62$, $p < .05$) and by Murdock ($r = .29$, $n = 62$, $p < .05$). For the few societies common to Simmons's and Swanson's samples, the data were invariate, and a correlation could not be computed. The second set of *Cs* summarizes correlations of Swanson's measure of private ownership with *NOT* Hunting as coded by Simmons ($r = .69$, $n = 9$, $p < .05$), by Swanson ($r = .18$, $n = 48$, $p = .09$), and by Murdock ($r = .30$, $n = 47$, $p < .05$). The third set of *Cs* summarizes correlations of Murdock's index of private ownership with *NOT* Hunting as coded by Simmons ($r = .35$, $n = 40$, $p < .05$), by Swanson ($r = .29$, $n = 31$, $p < .05$), and by Murdock ($r = .54$, $n = 147$, $p < .05$ and $r = .48$, $n = 312$, $p < .05$). The final set of *cs* summarizes correlations of Zelman's index of private ownership with *NOT* Hunting as coded by Simmons ($r = .49$, $n = 19$, $p < .05$), by Swanson ($r = .43$, $n = 12$, $p = .06$), and by Murdock

TABLE 7
Summary of Robust Correlates of Private Ownership

Replicated Correlates	Measures of Private Ownership of Property			
	Simmons (1937) n = 63	Swanson (1960/1966) n = 48	Murdock (1967) n = 459	Zelman (1974) n = 60
Subsistence Practices				
Agriculture (S,SW,M)	C C C	c C C	C C C	c c C
Grain Agriculture (S,SW,M)	C C c	c C c	C C C	C c C
NOT Collecting (S,SW,M)	C ? C	C C C	C C C	C c C
NOT Hunting (S,SW,M)	C ? C	C c C	C C C	C c C
Large Domestic Animals (S,M)	C C	c C	C C	C C
NOT Root Crops (SW,M)	c c	c c	c C	c c
Plow Cultivation (M)	C	C	C	C
Bovine Husbandry (M)	C	C	C	C
NOT Communal Food Sharing (S)	C	C	C	c
Intensive Cultivation (M)	C	c	C	C
Milking Livestock (M)	c	c	C	C
Constancy of Food Supply (S)	c	c	C	c
Stratification and Gender Roles				
Classes (S,SW,M)	C c C	c C C	C C C	C C C
Slavery (S,M)	C c	c C	C C	C c
Craft Specialization (M)	C	c	C	C
Stratification by Occupation (M)	c	c	C	C
Dual Class Stratification (M)	C	c	c	C
Grouped Women Nonsubsistence				
Work (Z)	c	c	C	C
Educate Sons: Females > Males (Z)	c	c	c	C
Male Dominance: Pottery (M)	C	c	C	c
Male Dominance: House Building (M)	c	c	C	c
Children Care for Infants (Z)	?	C	C	C
Social Control				
Supernatural Sanctions on				
Morality (SW)	C	C	C	c
Higher Jurisdictions (M)	c	C	C	C
Ceremony and Ritual (S)	C	c	C	c
Plutocracy (S)	C	c	C	c
Sovereign Organization (SW)	c	c	C	C
Active Ancestral Spirits (SW)	c	c	C	C
Codified Laws (S)	C	c	C	c
Authority of Judges (S)	C	c	C	c
Government by Council (S)	c	c	C	c
Local Jurisdictions (M)	c	c	C	c

TABLE 7: Continued

Replicated Correlates	Measures of Private Ownership of Property			
	Simmons (1937) n = 63	Swanson (1960/1966) n = 48	Murdock (1967) n = 459	Zelman (1974) n = 60
Community and Architecture				
Large Population (SW,M)	C c	c C	C C	C C
Durable Walls (S,M)	C C	c C	C C	c C
Permanent Settlements (S,M)	C C	c c	C C	c C
Populous Communities (M)	C	c	C	C
NOT Abandon Homes of Dead (S)	C	C	C	c
Raised House Floors (M)	C	c	C	c
NOT Rounded Roofs (M)	C	c	C	c
Dense Settlements (M)	c	c	C	c
Marriage and Family Practices				
Patrilocal Residence (S,M)	C c	c c	c C	c C
NOT Bilateral Descent (M)	C	c	C	C
Patrilineal Sibs or Clans (M)	c	c	C	C
NOT Virilocal Residence (M)	c	c	C	C
NOT Uxorilocal Residence (M)	c	c	C	C
NOT Outgroup Intimacy (SW)	c	c	C	c
NOT Ambilocal Residence (M)	c	c	C	c
Economic Relations				
Debt-Relations (S,SW)	C c	C c	C C	C c
Warfare (S,Z)	c C	c c	C C	C c
Trade (S)	C	C	C	C
Metals Imported (S)	C	c	C	C
Money or Exchange Medium (S)	C	c	C	C
Inheritance of Male Chattels (Z)	c	c	C	C
NOT Female Chattels Distributed				
to Females (Z)	c	c	C	C
Patrilineal Inheritance (S)	C	c	c	c
Mining and Smelting of Metals (S)	c	C	c	c

NOTE: Source of Variables: S = Simmons, SW = Swanson, M = Murdock, Z = Zelman. Correlations: C = (+sign) and ($p < .05$); c = (+sign); ? = ($n < 10$) and (indeterminate).

($r = .44, n = 60, p < .05$). Independent of test-by-test probability levels, replication of the sign of correlation can be statistically significant: the binomial probability of observing 11 correlations all with the same sign is $p = .0001$.

Table 7 presents robust correlates of private ownership. *Robust* here means that the correlations, at least the signs of the correla-

tions, were replicated in all instances in which they could be computed. That is, regardless of how ownership is operationalized and measured, regardless of who does the data coding, for whatever purposes, and regardless of how small and unrepresentative the sample of cultures used in the computations, the correlation is still evident. The goal is to establish "facts," to the extent that it is possible by social science methodologies, facts around which theory and discussion might develop.

Table 7 thus displays a readiness to eliminate variables from the discussion, even at the risk of eliminating variables that might eventually prove to be true correlates of ownership. For example, Bride Price was defined and coded independently in all four studies to date. It was a positive correlate of private ownership in 15 of the cross-correlations and reached statistical significance nine times. Yet, it was a negative correlate in two tests of the relationship: Swanson's measure of ownership with Simmons's measure of Bride Price ($r = -.06, n = 8, p = .44$) and Zelman's index of ownership with Swanson's measure of Bride Price ($r = -.05, n = 8, p = .44$). Thus, Bride Price does not appear in Table 7. Similarly, Husbandry was coded in three studies and was a positive correlate of private ownership on 11 tests. But it was a negative correlate in two tests of the relationship: Simmons's index of ownership with Swanson's measure of Husbandry ($r = -.45, n = 7, p = .11$) and Murdock's index of ownership with Swanson's measure of Husbandry ($r = -.16, n = 31, p = .19$). Bride Price, Husbandry, and many other variables are not robust correlates of private ownership.

DISCUSSION

The present program of research on the cross-cultural correlates of the ownership of private property has sought to exploit existing cross-cultural databases before proposing specific hypotheses and coding new data for new samples of societies to test those hypotheses. That is, the four studies to date, including this one, examined databases that had not been compiled with property theory in mind. Rather, private ownership has been just one among many other social institutions and cultural norms that particular authors examined for their own purposes: Simmons (1937) and Murdock (1967) to display holocultural methodology, Swanson (1960/1966)

to study the original functions of religion and morality, and Zelman (1974) to explore the gender politics of reproduction. Because the variables in these databases were not picked for theorized relations with private ownership, the identification or rejection of these variables as correlates of private ownership may not answer a priori questions about property theory. Rather, the correlations of private ownership, as summarized in Table 7, should be conceived to be confident cross-cultural observations, or facts, with which specific theories of property should be compatible.

For example, the present results weigh strongly against the labor theory of property. This is a natural rights explanation and justification of private property, arguing that, because people own their own bodies, they own the products of their bodies' labors. This idea was first developed within Scholastic philosophy by John of Paris, who argued that property rights arise from individual labor in appropriating resources from the common bounty of nature, and by John Fortescue, who argued that labor depletes a person's sweat and blood such that property rights in the products of labor are compensation for the loss of bodily integrity (Schlatter, 1951). The most renowned advocate of the labor theory of property is John Locke (1690/1952), who, as discussed earlier, made specific references to the hunting and gathering practices of North American native peoples as archetypal examples of how labor transmutes common bounty to private wealth. However, cross-cultural data show the contrary: Where people do get their food by hunting and gathering, private property tends not to be the norm. Thus it is not a universal principle that private labor results in private property. The labor theory of property is further challenged by the cross-cultural observation that hereditary slavery is a positive correlate of private ownership. Some people do not naturally own their own bodies nor their bodies' labor, and that is the case especially where private ownership is the norm.

In a reformulation of labor theory, Jeremy Bentham (1802/1990) theorized that it is not labor per se, but the psychological expectations motivating labor, that are the foundation of private ownership. This explanation, unlike Locke's, is consistent with the cross-cultural data. Bentham's theory, subsequently elaborated by Litwinski (Rudmin, 1990), argues that possession is a cognitive projection into the future of an imagined utility, and that property is possession secured by law:

The idea of property consists in an established expectation; in the persuasion of being able to draw such or such an advantage from the thing possessed, according to the nature of the case. Now this expectation, this persuasion, can only be the work of law. I cannot count upon the enjoyment of that which I regard as mine, except through the promise of the law which guarantees it to me. It is law alone which permits me to forget my natural weakness. It is only through the protection of law that I am able to inclose a field, and to give myself up to its cultivation with the sure though distant hope of harvest. . . . If we suppose the least agreement among savages to respect the acquisitions of each other, we see the introduction of a principle to which no name can be given but that of law. . . . Property and law are born together, and die together. (Bentham, 1802/1990, pp. 53-54)

Furthermore, Bentham argued that inequality of possessions was inevitable but less painful to the general good than insecurity of possessions.

Many of the correlates of private property listed in Table 7 do concur with Bentham's theory of property. Certainly, a predictable food supply based on grain agriculture and animal husbandry requires intensive labor, which presumes expectations of future return. Hunting and gathering, on the other hand, are more opportunistic, and the rewards more immediate although less certain. Among hunter gatherers, surety of subsistence comes not from norms of private possession but from norms of sharing and rightful access to other's windfall bounty (Gould, 1982; Hayden, 1992a, 1992b). Bentham had emphasized the close relationship of law to property, and this is affirmed by the positive correlations of private ownership with Codified Law and Authority of Judges, as well as with Supernatural Sanctions on Morality and Active Ancestral Spirits. Finally, Bentham's predicted inequalities are evident: Classes, Dual Class Stratification, Debt Relations.

However, the evidence from the cross-cultural data is not similarly clear on issues of gender. Although private ownership is not a misogynous social institution, it certainly appears to be sexist. Where private property is the norm, women serve as a labor pool, although perhaps not to the degree argued by Chevillard and Leconte (1986). Furthermore, where private property is the norm, there too women go to their father-in-law's community.

This is rather specific, considering that Virilocal Residence, Uxorilocal Residence, and Ambilocal Residence all stand as nega-

tive correlates of private ownership. That is, where private property is the norm, new couples do not move near just any of the husband's relatives, do not move near the wife's relatives, and do not move to a new locale. They move specifically to the community of the husband's father, and this within the context of Patrilineal Sibs or Clans and the avoidance of contact with outgroups. Thus, private property seems to be part of a tight, controlling, and inward-turned, father-dominated social order.

Male domination also appears in practices of inheritance of personal property. Where private property is the norm, chattels are gender differentiated, and men's chattels are subject to bequest whereas women's chattels are not. To be more specific, women's chattels are not inherited and are not distributed to other women. Where private property is the norm, men tend to accumulate moveable property.

Most generally, Table 7 shows that private ownership is not a universal and therefore not a "natural" social practice. It tends to be most evident in settled agricultural societies with substantial populations, social stratification including division of labor, and developed mechanisms of religious, legal, and jurisdictional controls. Furthermore, private ownership is apiece with outgroup hostility, frequent war, and patriarchy. These societal characteristics may be necessary or causal preconditions for private ownership. However, they may equally well be consequences of private ownership. From the facts of correlation, it is not possible to tell. But any existing or future explanations of private property should be able to account for such correlations as these.

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