Why do Cultures Differ? Evidence from Cross-Cultural Data

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ABSTRACT

History, geography, environment, and technology influence the cultural practices and institutions of a society and vice versa. But how strongly do geography, environment, and technology correlate with culture and institutions? To add insight into this question, we use a new methodology which explores the relationship between a variety of bilateral proximity measures developed using the societies in Murdock's (1967) *Ethnographic Atlas*. Specifically, we investigate the correlation between bilateral distance measures reflecting technological, environmental, and cultural differences between all possible pairwise combinations of societies in the *Ethnographic Atlas*. One result of interest is that differences in cultural practices correlate very strongly with differences in language and tend to have the most predictive power in our model. One might take interpret this as evidence for the overriding importance of common history in driving cultural practice. However, measures of technological distance also correlate with measures of cultural distance.

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1 Introduction

Throughout history different societies have exhibited a substantial amount of cultural and technological diversity. Some peoples have relied primarily on hunting, gathering or fishing for subsistence, while others have relied primarily on agriculture for subsistence. Some societies have developed sophisticated methods of production such as agriculture, and some have developed advanced means of technology and complex systems of government. Across this technological spectrum, societies have also exhibited substantial cultural differences. Cultural practices and institutions such as dowry at marriage, primogeniture, polygamy, and slavery appear under a wide variety of differing circumstances. Analysis of such cultural practices constitutes an important part of several disciplines, including anthropology, sociology, and economics. A standard tool of analysis is comparison: that is, the researcher compares and contrasts a subset of cultures in order to draw conclusions about the features of life that led to the development and persistence of cultural practices, customs, and institutions.

To take an example of such a comparison, consider two widely-discussed hunting and gathering peoples: the *!Kung*, who live in the Kalahari Desert in Northwest Botswana, and the *Hadza*, who reside in a similar environment in northern Tanzania.[1] These two peoples are similar in many respects. As Blurton Jones, Hawkes, and O'Connell (year) write: "Both [societies] live in Subsaharan African Savanna, exploiting some of the same plant and animal genera, hunting with bow and poison arrows, and collecting with digging stick and kaross." In spite of being approximately 3000 miles apart, and in spite of being separated by culturally and technologically distinct Bantu-speaking peoples, it is not unlikely that the !Kung and the Hadza share a common history, as both speak languages belonging to the *Khoisan* group.[2]

The !Kung and Hadza cultures are similar in many ways. !Kung and Hadza groups have similar territory sizes (see Kelly (1995, p. 131)), and tend to follow similar practices governing inheritance of land rights and marital residence rules. Among the !Kung, marriage is traditionally associated with bride service (a service rendered by the groom to the bride's family), while among the Hadza,

[1] Lee (1979) is a classic description of the lifestyle of the !Kung. A more general treatment of Kalahari desert foragers is Lee and DeVore (1976). A description of the Hadza is Hawkes (2000) and the citations therein.

[2] See Cavalli-Sforza and Cavalli-Sforza (1996)) on the close relationship between genetic and linguistic histories. Ruhlen (1987) discusses linguistic evidence pertaining to the !Kung and Hadza, and Ruhlen (1994, p. 141) describes a linguistic case for a Hadza and !Kung shared history.

marriage is commonly accompanied with a bride price (a payment in goods or money to the bride's family). Among both peoples, marital residence typically follows an ambilocal (or bilocal) pattern, meaning that newly married couples might reside with either the husband's or wife's family upon marriage, and both peoples tend to follow ambilocal rules in delineating lines of descent.[3] One might attribute these commonalities to common history, environment, or to similarities in the nature of subsistence production. In fact, other peoples in a similar technological situation, but in very different environments, have similar institutions; for example, the Copper Inuit of extreme Northeast Canada/Nunavut, and the Pomo Native Americans of Northern California have similar rules governing marriage and descent. Perhaps just as interesting is the observation that many peoples seemingly similar in environment and technological capability to the !Kung and Hadza follow very different conventions dictating the nature of marriage and descent. Table 1, which is adopted from evidence presented by Marlowe (2004), for additional comparisons.[4]

Returning to the Hadza/Kung comparison, even though the societies are apparently similar in many dimensions, there are some differences. Blurton-Jones, Hawkes and O'Connell (1996) compare the productive roles filled by children in each society. Hadza children engage in foraging, so much so that Hadza children are able to meet as much as a third to a half of their daily caloric needs. In contrast, !Kung children seldom or never forage. Blurton-Jones *et. al* (1996) suggest that this can be attributed to geography and/or environment. It might be easier for children to get lost in the "flat, featureless landscape" (Blurton-Jones *et. al.* 1990, p. 166) of the Kalahari Desert. Second, the !Kung frequently make long trips and gather nuts, which are heavy to carry, and involve significant processing time at home. Thus, !Kung children may just as well stay home and process foods, rather than participate actively in gathering them. While this difference between the two cultures seems small, Blurton-Jones *et. al.* (1996) argue that it is has consequences for other aspects of Kung social organization. They suggest that among the Hadza the survival rate of children is much less sensitive to the performance and presence of the father than the survival rate of children among the !Kung. This difference in sensitivity of the child survival rate to the presence

[3]Contrast ambilocality with patrilocality - customary residence with the husband's family - or matrilocality - customary residence with the wife's family. We discuss marital residence patterns in more detail in the next section of the paper. See Baker and Jacobsen (2007).

[4]Marlowe (2004) describes societies as "multilocal," which we have replaced with "bilocality" to avoid confusion. Additionally, Marlowe (2004) also uses the term "virilocal" instead of patrilocal and "uxorilocal" instead of "matrilocal."

of the father, so the argument goes, has ramifications for the importance of familial structure, divorce rates, and the power relationships between women and men.

While this argument is compelling, it is not without the difficulties inherent in any comparative analysis of culture, and any attempt to trace cultural practices or institutions back to ecological or technological origins. For one, there is the suggestion that idiosyncratic differences between the situation of two peoples may have important ramifications for their cultural practices. If one looks hard enough, it is probable that one could do this for just about any cultural practice or institution. But how is one to know if the explanation offered by Blurton-Jones *et. al.* (1996) is the "right" one, or how is the hypothesis to be formally tested? How would one know that the cultural differences between Hadza and Kung are not the by-product of some historical accident?[5] While formulating ecological or technological explanations for cultural practices might always be done, testing of explicit theories is more often than not difficult if not impossible, particularly when one tries to test the hypothesis against the alternative that cultural practices are simply the product of history.[6] The obvious problem with formal testing of the Kung/Hadza comparison is that there are only two data points. One could expand the set of societies and develop explicit theories for different cultural practices along the lines of table 1, but there remains the problem of controlling for common history, measuring important differences in environment and resources, and developing a means of characterizing the diversity in cultural practices and institutions.

In this paper, we step back from the idea of forming explicit theories about how individual cultural practices arise as responses to environment and instead ask a complementary question: *what explains the differences between cultures?* Our approach is a derivative of the methods developed by Spolaore and Wacziarg (2008), who ask what explains differences in the levels of development of different countries. Spolaore and Wacziarg (2008) focus on *bilateral* comparisons between countries, how different countries are in various dimensions, and how these differences correlate with differences in levels of development. To them, the question is: do societies that are "far apart"

[5]Blurton-Jones *et. al.* (1996) note that there have been instances of children perishing on foraging expeditions among the !Kung. An alternative explanation of the lack of child participation in child foraging among the !Kung is that after such a chance episode in the past, ideas about participation of children in foraging among the !Kung changed.

[6]That having been said, there are several examples pertaining explicitly to anthropology in the economic literature - see, for example, Baker and Miceli (2005) in reference to land inheritance practices, Baker and Jacobsen (2007) in regards to post-marital residence rules, and Baker (2003) in regards to land tenure practices. The anthropological literature on the determinants of different cultural practices is vast, as is verified by a look at any anthropology text (see, e.g., Harris (1997)), and the economic literature on the origins and evolution of institutions is also immense.

institutionally, or even genetically, tend to be far apart in terms of levels of development?[7] Using a similar methodology, we ask the question: how do societies that differ in terms of technology, environment, and history differ in terms of culture?

There are some advantages to this approach. For one, a rough idea as to how important common history is relative to environment or technological factors in driving cultural differences may be formed. This provides a means of evaluating the overall usefulness of ecological or technological explanations in describing cultural practices. And practically speaking, bilateral comparisons also amplify the number of observations in the data; for example, there are only 35 observations in the data presented on table 1, and this greatly restricts the kind of precise econometric model that one might try to estimate using this data.[8] However, what if one were instead to ask the question: do societies in different environments, with different histories and different technological capabilities, tend to have different marriage customs? While the answers to this question are not informative about exactly how environment and technology cause different types of marriage customs, and are not informative about causality at all, the answers may be suggestive as to whether or not environment or technology is important in driving cultural differences. Exploring correlations between bilateral distance measures has the practical advantage of greatly expanding the sample size: with the sample presented in table 1, after forming all possible bilateral matches in the data, there would be $n(n+1)/2$=630 total observations.

Along these lines, we investigate the joint correlation between bilateral measures of environmental, technological, geographic, and genetic/historic distances and cultural distance between 862 societies described in Murdock's (1967) *Ethnographic Atlas*. We focus our investigation on five different cultural practices which are well-documented in the data: the mode of marriage - the rules governing marital transfers; transfer of residence at marriage - where and with which family newlyweds are expected to locate after marriage, familial structure - how families are composed and whether or not practices such as polygamy occur, land inheritance rules - how land is distributed among potential heirs, and slavery - whether or not slavery occurs.

One of our main findings is that measures of linguistic distance correlate very strongly with

[7] Sploaare and Wacziarg (2008) in fact find that genetic distance is an important determinant of differences in levels of development.

[8] One might try to fit a multinomial logit model with dummy variables capturing different origins of the different peoples, coupled with a vector of measures of technology and environment. It is easy to see how one could easily overwhelm the relatively small sample proceeding in this fashion.

measures of cultural and institutional distance, and tends to be the single best predictor of whether or not two societies will have similar institutions. This is particularly true of familial structure (which includes things such as whether or not polygamy is practiced). However, differences in cultural practices appear to correlate signifcantly with technological distance, and this is correlation is stronger for some cultural practices, such as rules governing the inheritance of land. Perhaps surprisingly, we find that differences in environment have limited explanatory power in and of themselves in explaining differences in cultural practices.

In the next section, we describe the data set and its basic characteristics. Section III discusses our empirical methodology, and section IV describes results. Section V concludes.

2 Data

Murdocks (1967) *Ethnographic Atlas* (henceforth, 'the Atlas') contains information on the environment, culture, and technology of 862 different societies, past and present, from all corners of the world. Of the 862 societies included in the Atlas, 239 societies in the Atlas are situated in sub-Saharan Africa, 95 in the circum-Mediterranean region (encompassing parts of Eastern Asia, the Middle East, Europe, and Northern Africa), 93 in Eurasia, 128 in the Insular Pacific region (Oceania and Southeast Asia), 218 in North America, and 89 in South and Central America. The data includes hunter-gatherer societies, peasant and tribal societies, and even some more modern societies. The geographical distribution of societies in the Atlas is shown on map 1, which we shall discuss in more detail momentarily. The Atlas is essentially a qualitative summary of what is known about past and present cultures of the world. The data set was assembled by Murdock and his colleagues using ethnographic reports from individual societies, mostly dating from the first half of the twentieth century.[9]

The data for the most part consists of dummy variables that indicate basic information about each society; for example, whether or not metalworking is present in a society, whether or not the plow is used in agriculture, and how intensive the practice of agriculture is.[10] The data reports

[9]Murdock's first effort in the 1930's and 1940's resulted in the development of the Human Relations Areas Files. Murdock (1957) introduced the World Ethnographic Sample, which was subsequently honed into the Ethnographic Atlas (Murdock, 1967). Subsequent honing of this data resulted in the Standard Cross Cultural Sample, as initially described in Murdock and White (1969).

[10]The variable 'intensity of agriculture' is a six-point scale variable taking on following values: 1=No agriculture; 2=Casual, incidental agriculture; 3=Extensive or shifting agriculture; 4=Horticulture; 5=Intensive agriculture;

the shares of subsistence each society receives from hunting, gathering, fishing, agriculture, and animal husbandry, and also information on the language, geographical location, and climate of the society.[11]

The data summarizes a variety of basic cultural practices - the mode of marriage, rules governing transfer of residence after marriage, land inheritance, familial structure. We present summary statistics for the data used in this paper on table 2. Tables 2 summarizes information in the Atlas on technology and production, including the average percentage reliance on different means of production for subsistence, along with whether or not some key types of technology are available in each society and the summary measure of the intensity of agriculture. Table 2 continues with some information on climate type, language families, and also describes some of what is known about cultural practice among societies in the Atlas. The nature of many of these cultural practices can be intuited from the descriptions on the table.[12]

To create bilateral distance measures from the data summarized on table 2, we first formed all possible two-by-two combinations of societies in the Atlas. We then define societies as following a different cultural practice if one society in the bilateral match fell into one category, and the other society fell into a different category. For example, if in society A the rule governing land inheritance is primogeniture, while in society B, the rule governing land inheritance is that land is passed to the heir deemed best-qualified, we awarded the data point corresponding to the match between societies A and B a score of one in the "difference in land inheritance" rule scale, indicating that these two societies had different rules governing land inheritance. If both societies practice the same rule, the data point corresponding to the bilateral pairing of the two societies received a score of zero, indicating that the two societies had the same land inheritance rule. We proceeded in this fashion for each of the cultural practices documented on tables 5 through 8.

By way of clarifying ideas and also introducing the reader to the data, consider map 1. This map shows the geographic location of each society in the Atlas, superimposed on some basic information about the environment (clines indicating soil quality and average yearly precipitation). The vertical bars marking the position of each society are color coded according to the nature of food production

6=Intensive irrigated agriculture.

[11] In fact, climate types for societies in the Atlas were coded by Frank Moore, using Phillips' Comparative Atlas.

[12] The reader may not be familiar with what is meant by 'sororal.' This is a term for 'sister,' so 'sororal polygamny' refers to the tendency for men to have multiple wives with a preference for these wives being sisters.

in each society, as indicated in the key to the figure. Appended to the figure are some basic summary statistics about the nature of technology and production across the sample - including the first principal component of each of these things (we shall use this in the empirical analysis). One can see from map 1 that there are definite geographic patterns in subsistence practice among societies in the Atlas. To cite one example, there is a cluster of hunting and gathering societies in western North America, and these societies also gain a large amount of subsistence from fishing the closer they are to the pacific coast.

Compare the information on map 1 to the information displayed on map 2, which shows the nature of rules governing transfer of residence at marriage among societies in the Atlas - i.e., whether or not newly constituted families reside with the wife's or the husband's family upon marriage. One can see that there are also definite patterns to these sorts of institutions. The transfer of residence rule specifying that newlyweds reside with the wife's family seems to be more widespread among North American hunter-gatherers than among other peoples of the world. Why is this the case - is it because these societies have similar means of production, because they are close together, or is it that they owe their cultural practices to cultural inheritance from a parent culture?

3 Estimation Results

We now present some results from estimation of some empirical models of cultural differences. We rely on logistic regressions for which we report exponentiated coefficients (our final estimated model - which uses a comprehensive measure of cultural distance - is fitted as an ordered logistic model). We rely on this functional form for estimation for the obvious reason that much of our data is dichotomous in nature (e.g., whether or not any pair of societies has the same or differing cultural practices), and also because estimating logistic models eases interpretation of results. Exponentiated estimated coefficients can be interpreted as the odds of observing cultural differences between any pair of societies conditional on observing a difference in technology, nature of subsistence, or physical distance between the two societies.[13].

Table 4 reports results when we treat differences in the mode of marriage between each pair

[13] An alternative empirical strategy is to arrange the data in matrix form and analyze matrix correlation coefficients as is done, for example, in Eff's (2004) analysis of spatial correlation in U. S. county-level data. We have not done this because it is difficult to develop conditional correlations between variables using matrix correlations, and because results are difficult to interpret

of societies (see table 3) as the dependent variable. The first model is a base logistic model with difference in language family, agricultural production technology, means of subsistence, available technology, location (measured as great circle distance in miles), time of observation, climate, and whether or not the societies are on a different continent as explanatory variables.

The base logistic model - model I of table 3 - indicates a strong relationship between differences in language group and differences in the mode of marriage. From model I, if it is known that two societies are of a different language group, this increases the chances (according to the estimated coefficient/odds ratio) the societies have different marriage modes by approximately 129 percent. Contrast this with physical distance. The estimated coefficient from model I of table 10 suggests that moving societies 3000 miles further apart (roughly, a one standard deviation increase in physical distance) increases the chances that the modes of marriage between the two societies differs by about $13 * 3 = 29$ percent. Increasing the technological difference between a pair of societies increases the chance of a different marriage mode between any two societies by about 5 percent. A roughly one-standard deviation increase in difference in the means of subsistence increases the likelihood of different modes of marriage by approximately $2.8 * 7.4 = 20$ percent. While we have estimated this model in terms of distances, one interpretation of these results is that a shared common history is orders of magnitude more important in predicting similarities in modes of marriage than geographical proximity or similarities in technology.

Some of the results of table 4 are anomalous. The results suggest that societies in *different* climates types seem to have a greater chance of having *similar* institutional differences. One possible explanation is that our measure of climate is too coarse to detect finer aspects of climate variation and may be capturing some other aspect of geography. Another possibility is that our difference measures cannot be cleanly separated. That is, the predictions generated by our models are conditional, and it might be hard to vary differences in climate while at the same time holding language, continent, and physical distance constant, which is what is assumed in the estimation. A third possibility is that the relationship between our various measures of distance is nonlinear and a more sophisticated model is needed.

As alluded to in the previous paragraph, the conditional nature of our estimates make interpretation difficult. Consider another anomalous result in the estimates in table 1. Apparently, *differences* in agricultural technology apparently lead to a greater likelihood of *similarity* in the

mode of marriage. But how does one hold subsistence shares and overall technological differences constant yet simultaneously increase the intensity of agriculture? To combat this difficulty, we created the first principal component of the subsistence measures, our measure of technology, and the agricultural scale variable, and then calculated differences in this measure of technology.[14] A summary statistic for the principal component appears on table 2, and in model II on table 4, we replace our measures of differences in subsistence, intensity of agriculture intensity, and technology with this first principal component. From the Pseudo-R^2, this does not appear to harm the fit of the model. Now, we can say that if we increase this first principal component by one standard deviation (2.2 units), the result is, roughly, a $2.2 * 12.5 = 27.5$ percent increase in the chances that the mode of marriage between any two societies will be different.

Models III and IV of table 10 repeat estimation of models I and II, but this time with dummy variables for continents.[15] The idea is to control for potential heteroscedasticity and societal fixed effects.[16] The inclusion of this series of dummy variables reduces the magnitude of some coefficients; namely, the coefficient on the measures of linguistic difference. Other estimated coefficients remain more or less the same, and it appears in models III and IV that increases in technological differences impact the likelihood of differences in mode of marriage at about the same order of magnitude as differences in language family. The climatic difference variable also retains its (anomalous) coefficient from the earlier models.

Table 5 shows the results of estimating a model with the same independent variables, but now employing cultural difference in the transfer of residence after marriage as the dependent variable. Results are similar, but are across the board weaker. The sharpest result of table 5 is that there is some increase in the odds of observing different transfer-of-residence practices for societies on different continents, which perhaps indicates that an alternative measure of physical proximity is important in determining customary practices governing the transfer of residence after marriage.

Table 6 presents estimates in which the dependent variable is whether or not there are pairwise

[14] To be clear, we created the first principal component, and then compute the distance measure, not the other way around.

[15] That is, a dummy variable takes on a value of one each time a society on a given continent appears in a bilateral match.

[16] A better idea would be to include a dummy variable each time a particular *society* appears in a bilateral match, but this has turned out to be infeasible. Spolaore and Wacziarg (2008) have pursued similar approaches. In an earlier version of their paper, they use what would amount to society-level dummies in their analysis. In the forthcoming version of their paper, they employ 'multi-level clustering' of standard errors, an econometric approach developed by Cameron, Gelbach, and Miller (2006). We are currently working on integrating this approach into this paper.

differences in familial structure. The most interesting aspect of the results presented on table 8 is the overwhelming magnitude of the odds ratio for the language group variable for all of the fitted models. That is, if we know that two societies come from different language families, this increases the likelihood that the predominant familial structures between the two societies differ is somewhere between 184 (model I) to 640 (model IV) percent. One might interpret this result to mean that common cultural ancestry is far and away the most important determinant of commonality in familial structure.

While the results do not seem very supportive yet of the contention that cultural practices are strongly influenced by environment and/or technology, this assessment changes when bilateral difference in land inheritance rules is investigated. Estimation results are presented on table 7. While language difference is a strong predictor of difference in land inheritance, we see that technology and subsistence methods exert a comparatively large impact on institutional distance. The estimated odd ratios from model IV of table 7 suggest a 91 percent increase in the likelihood of a difference in land inheritance rules if the pair of societies belong to different language groups. Alternatively, a one-standard deviation increase in the principal component of the technology, agricultural, and subsistence variables, results in approximately a 77 percent increase (35*2.2) in the chances that the land inheritance rules of the pair of societies differs. The last set of results pertain to slavery, presented on table 8. These results once again illustrate the overall importance of commonality of language. According to model IV of table 14, the likelihood that two societies differ in disposition towards slavery increases 56 percent if the two societies are from different language families.

As a final test, we collect all pairwise differences in cultural practice into a composite measure of cultural distance. This exercise may be important because it might be the case that if two societies differ in one dimension, they are more likely to differ in another, and this should be reflected in a more comprehensive measure of distance. We proceeded simply by we reward a bilateral match one unit on a five-point scale if their cultural practices differ for each of the five cultural practices described previously. The resulting bilateral index of cultural differences between any two societies runs from zero to five. Using the same set of explanatory variables in previous estimation, we estimate an ordered logistic model. The results of this estimation are displayed on table 15. Not surprisingly, the results of this experiment essentially confirm what was said above; while technological differences are statistically significant in describing differences in culture, the

single most important predictor seems to be difference in language group.

4 Concluding Remarks

While technology and means of subsistence influence culture, our results tend to suggest that common history is of primary empirical importance in driving commonalities in culture. In virtually every case considered in this paper, differences in language are the single best predictor of whether or not societies follow different cultural practices.

One might consider this a very negative result for those who seek to explain cultural practice and institutions using technology or differences in the means of production. Even if one were to accept the proposition that history is of overwhelming importance, this position still invites the question: what set the institutions, such as they are, in motion in the first place? That is, why did the common ancestor originally adopt the cultural practices it did?

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Table 1 - Marriage and Descent in a sample of Hunter-Gatherers

Society	Region	Marriage	Descent	Residence
Kung	Africa	Bride Service	Bilateral	Ambilocal
Hadza	Africa	Bride Price	Bilateral	Ambilocal
Mbuti	Africa	Female Kin Exchange/Bride Price	Bilateral	Patrilocal
Semang	East Eurasia	Absence of Consideration	Bilateral	Ambilocal
Andaman	East Eurasia	Absence of Consideration	Bilateral	Ambilocal
Vedda	East Eurasia	Token Bride Price	Matrilineal	Matrilocal
Badjau	Insular Pacific	Bride Price	Bilateral	Ambilocal
Tiwi	Insular Pacific	Bride Price/Service	Double	Patrilocal
Aranda	Insular Pacific	Dowry	Double	Patrilocal
Ainu	East Eurasia	Absence of Consideration	Double	Patrilocal
Gilyak	East Eurasia	Bride Price	Patrilineal	Patrilocal
Ingalik	North America	Bride Service/Female Kin Exchange	Bilateral	Ambilocal
Aleut	North America	Bride Service	Patrilineal	Matrilocal
C. Eskimo	North America	Bride Service	Bilateral	Ambilocal
Montagais	North America	Bride Service	Bilateral	Patrilocal
Micmac	North America	Bride Service	Bilateral	Ambilocal
Saulteaux	North America	Absence of Consideration	Patrilineal	Patrilocal
Slave	North America	Bride Service	Bilateral	Ambilocal
Kaska	North America	Bride Service	Matrilineal	Matrilocal
Eyak	North America	Bride Service	Matrilineal	Ambilocal
Haida	North America	Bride Service	Matrilineal	Ambilocal
Bellacoola	North America	Gift Exchange	Ambilineal	Ambilocal
Twana	North America	Gift Exchange/Bride Price	Bilateral	Patrilocal
Yurok	North America	Bride Price	Bilateral	1
Pomo	North America	Absence of Consideration	Bilateral	Ambilocal
Yokuts	North America	Absence of Consideration	Patrilineal	Ambilocal
Paiute	North America	Absence of Consideration	Bilateral	Ambilocal
Klamath	North America	Gift Exchange/Bride Price	Bilateral	Patrilocal
Kutenai	North America	Absence of Consideration	Bilateral	Ambilocal
Warrau	South America	Bride Service	Bilateral	Matrilocal
Siriono	South America	Absence of Consideration	Bilateral	Ambilocal
Botocudo	South America	Absence of Consideration	Bilateral	-
Shavante	South America	Bride Service	Patrilineal	Matrilocal
Aweikoma	South America	Absence of Consideration	Bilateral	Ambilocal
Yahgan	South America	Bride Service/Token Bride Price	Bilateral	Patrilocal

Table 2 - Summary Statistics - Ethnographic Atlas

Variable	Mean	Std. Dev.	Min.	Max.	N
Production and Technology					
Percent Gathering	1.106	1.546	0	8	862
Percent Hunting	1.593	1.661	0	9	862
Percent Fishing	1.704	1.765	0	9	862
Percent Husbandry	1.406	1.696	0	9	862
Percent Agriculture	4.189	2.698	0	9	862
Pottery Present	0.655	0.476	0	1	725
Weaving Present	0.457	0.498	0	1	709
Metal Working Present	0.461	0.499	0	1	816
Plow Cultivation Present	0.15	0.357	0	1	862
Intensity of Agriculture	3.297	1.607	1	6	862
1st PC, Agriculture, Subsistence, and Technology	0	2.184	-3.333	3.999	645
Time of Observation					
Time of Observation	1897.503	112.769	-800	2000	862
Climate Type					
Tundra (Northern areas)	0.013	0.112	0	1	862
Northern Coniferous Forest	0.021	0.143	0	1	862
High Plateau Steps	0.009	0.096	0	1	862
Temperate Forest (Mountainous)	0.021	0.143	0	1	862
Desert	0.003	0.059	0	1	862
Desert Grasses and Shrubs	0.042	0.2	0	1	862
Temperate Grasslands	0.028	0.165	0	1	862
Mediterranean	0.009	0.096	0	1	862
Temperate Woodland	0.017	0.131	0	1	862
Oases and Certain Restricted River Valleys	0.005	0.068	0	1	862
Sub-tropical Bush	0.024	0.154	0	1	862
Sub-tropical Rain Forest	0.031	0.174	0	1	862
Tropical Grassland	0.065	0.247	0	1	862
Monsoon Forest	0.015	0.122	0	1	862
Tropical Rain Forest	0.124	0.33	0	1	862
Language Families					
Niger-Congo	0.219	0.414	0	1	862
Chari-Nile	0.046	0.21	0	1	862
Afro-Asiatic	0.065	0.247	0	1	862
Mon-Khmer	0.015	0.122	0	1	862
Indo-European	0.044	0.205	0	1	862
Uralic	0.006	0.076	0	1	862
Altaic	0.013	0.112	0	1	862
Athapaskan	0.031	0.174	0	1	862
Penutian	0.013	0.112	0	1	862
Sahaptin	0.006	0.076	0	1	862
Hokan	0.023	0.151	0	1	862
Tanoan	0.007	0.083	0	1	862

- Continued -

- Continued -

Other Language Family	0.512	0.5	0	1	862
Mode of Marriage					
Bride Price	0.47	0.499	0	1	862
Bride Service	0.11	0.313	0	1	862
Token Bride Price	0.056	0.229	0	1	862
Gift Exchange	0.063	0.242	0	1	862
Female Kin Exchange	0.031	0.174	0	1	862
Absence of Consideration	0.239	0.427	0	1	862
Transfer of Residence at Marriage					
Wife to Husband's Group	0.686	0.464	0	1	858
Couple to Either Group or Neolocal	0.133	0.34	0	1	858
Husband to Wife's Group	0.171	0.377	0	1	858
No Common Residence	0.009	0.096	0	1	858
Familial Structure					
Independent Nuclear, Monogamous	0.157	0.364	0	1	862
Independent Nuclear, Occasional Polygamy	0.39	0.488	0	1	862
Preferentially Sororal, Cowives in Same Dwelling	0.072	0.259	0	1	862
Preferentially Sororal, Cowives in Separate Dwellings	0.015	0.122	0	1	862
Non-sororal, cowives in Separate Dwellings	0.241	0.428	0	1	862
Non-sororal, cowives in Same Dwellings	0.11	0.313	0	1	862
Independent Polyandrous families	0.005	0.068	0	1	862
Land Inheritance - Distribution of Real Property					
Equal or Relatively Equal	0.258	0.438	0	1	862
Best Qualified	0.015	0.122	0	1	862
Ultimogeniture	0.019	0.135	0	1	862
Primogeniture	0.188	0.391	0	1	862
Absence of Inheritance of Real Property	0.212	0.409	0	1	862
Slavery					
Absence or near Absence	0.522	0.5	0	1	807
Incipient or nonhereditary	0.14	0.347	0	1	807
Reported	0.133	0.339	0	1	807
Hereditary and Socially Significant	0.206	0.404	0	1	807

Table 3 - Summary Statistics - Distance Measures

Variable	Mean	Std. Dev.	Min.	Max.	N
Different Mode of Marriage	0.700	0.458	0	1	368511
Difference in Transfer of Residence at Marriage	0.482	0.5	0	1	367653
Different Family Structure	0.743	0.437	0	1	363378
Different Land Inheritance Rule	0.693	0.461	0	1	177310
Different in the practice of Slavery	0.381	0.486	0	1	325221
Total Cultural-Institutional Distance.	2.996	1.142	0	5	154290
Great Circle Distance (Miles)	5655.238	2945.488	0	12450.128	371091
Different Continent	0.804	0.397	0	1	371091
Subsistence Distance	5.364	2.841	0	12.806	371091
Technological Distance	1.162	0.581	0	2	207046
Agricultural Distance	1.783	1.409	0	5	371091
PC Technological Distance	2.509	1.803	0	7.333	207046
Different Climate Type	0.863	0.344	0	1	67896
Different Language Group	0.942	0.234	0	1	371091
Time of Observation Distance	58.591	148.327	0	2800	371091

Table 4 - Logit models for differences in the Mode of Marriage

	Dep. Var. = Difference in Mode of Marriage			
	I	II	III	IV
Different Language Group	2.288***	2.368***	1.313***	1.347***
	(12.723)	(13.372)	(3.820)	(4.224)
Agricultural Distance	0.957***		0.970**	
	(-4.539)		(-3.056)	
Subsistence Distance	1.073***		1.054***	
	(14.322)		(10.625)	
Technological Distance	1.052*		1.131***	
	(2.422)		(5.800)	
PC Technological Distance		1.114***		1.114***
		(14.843)		(14.731)
Great Circle Dist. (1000's of miles)	1.125***	1.126***	1.118***	1.119***
	(22.006)	(22.215)	(19.853)	(19.985)
Time of Observation Distance	1.000	1.000*	1.000**	1.000***
	(-1.709)	(-2.382)	(-3.118)	(-3.305)
Different Climate Type	0.856***	0.864***	0.861***	0.863***
	(-4.501)	(-4.308)	(-4.203)	(-4.182)
Different Continent	0.929	0.890**	1.061	1.047
	(-1.932)	(-3.027)	(1.466)	(1.139)
Controls			Continent Dummies	Continent Dummies
Obs.	42486.000	42486.000	42486.000	42486.000
Psuedo-R2	0.033	0.033	0.047	0.048

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99%

Table 5 - Logit models for differences in Transfer of Residence After Marriage

Dep. Var. = Difference in Transfer of Res. After Marriage				
	I	II	III	IV
Different Language Group	2.018***	2.021***	0.989	1.011
	(10.576)	(10.632)	(-0.151)	(0.154)
Agricultural Distance	0.975**		0.993	
	(-3.053)		(-0.813)	
Subsistence Distance	1.005		0.984***	
	(1.174)		(-3.763)	
Technological Distance	1.001		1.123***	
	(0.073)		(6.124)	
PC Technological Distance		0.996		0.998
		(-0.676)		(-0.279)
Great Circle Dist. (1000's of miles)	1.022***	1.023***	1.010*	1.012*
	(4.977)	(5.110)	(2.041)	(2.542)
Time of Observation Distance	1.000***	1.000***	1.000***	1.000***
	(-4.630)	(-4.707)	(-7.563)	(-7.373)
Different Climate Type	0.875***	0.868***	0.931*	0.913**
	(-4.571)	(-4.881)	(-2.334)	(-2.997)
Different Continent	0.961	0.957	1.141***	1.151***
	(-1.144)	(-1.266)	(3.590)	(3.831)
Controls			Continent Dummies	Continent Dummies
Obs.	42778.000	42778.000	42778.000	42778.000
Psuedo-R2	0.004	0.004	0.030	0.030

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99%

Table 6 - Logit models for differences in Familial Structure

	Dep. Var. = Difference in Familial Structure			
	I	II	III	IV
Different Language Group	2.836***	3.004***	7.071***	7.375***
	(15.959)	(16.882)	(21.492)	(21.797)
Agricultural Distance	0.915***		0.925***	
	(-9.315)		(-7.933)	
Subsistence Distance	1.063***		1.061***	
	(13.360)		(12.064)	
Technological Distance	1.054*		1.072**	
	(2.456)		(3.206)	
PC Technological Distance		1.031***		1.044***
		(4.487)		(6.069)
Great Circle Dist. (1000's of miles)	0.985**	0.989*	0.993	0.995
	(-2.871)	(-2.155)	(-1.314)	(-0.843)
Time of Observation Distance	1.000***	1.000***	1.000***	1.000***
	(-5.889)	(-6.506)	(-4.890)	(-5.346)
Different Climate Type	1.071*	1.083*	1.093**	1.105**
	(2.114)	(2.506)	(2.626)	(2.985)
Different Continent	1.612***	1.576***	1.381***	1.369***
	(12.144)	(11.609)	(7.629)	(7.434)
Controls			Continent Dummies	Continent Dummies
Obs.	42778.000	42778.000	42778.000	42778.000
Psuedo-R2	0.020	0.017	0.045	0.042

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99%

Table 7 - Logit models for differences in Land Inheritance

	Dep. Var. = Difference in Land Inheritance			
	I	II	III	IV
Different Language Group	0.881	0.902	1.831***	1.911***
	(-1.639)	(-1.369)	(6.942)	(7.644)
Agricultural Distance	1.360***		1.360***	
	(26.291)		(25.768)	
Subsistence Distance	1.019***		1.041***	
	(3.370)		(6.763)	
Technological Distance	1.346***		1.291***	
	(11.958)		(10.030)	
PC Technological Distance		1.309***		1.351***
		(32.354)		(34.336)
Great Circle Dist. (1000's of miles)	0.973***	0.963***	0.976***	0.967***
	(-4.227)	(-5.840)	(-3.529)	(-4.876)
Time of Observation Distance	1.000*	1.000**	1.000***	1.000***
	(2.383)	(2.824)	(4.226)	(4.692)
Different Climate Type	0.770***	0.830***	0.840***	0.915*
	(-5.874)	(-4.288)	(-3.821)	(-1.963)
Different Continent	1.615***	1.664***	1.464***	1.474***
	(9.777)	(10.564)	(7.357)	(7.610)
Controls			Continent Dummies	Continent Dummies
Obs.	25425.000	25425.000	25425.000	25425.000
Psuedo-R2	0.052	0.042	0.072	0.065

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99%

Table 8 - Logit models for differences in the Practice of Slavery

	Dep. Var. = Difference in Practice of Slavery			
	I	II	III	IV
Different Language Group	0.615***	0.599***	1.524***	1.582***
	(-7.162)	(-7.662)	(5.695)	(6.278)
Agricultural Distance	1.040***		1.032***	
	(4.483)		(3.428)	
Subsistence Distance	0.954***		0.961***	
	(-10.844)		(-8.917)	
Technological Distance	1.553***		1.450***	
	(22.463)		(18.314)	
PC Technological Distance		1.071***		1.069***
		(11.363)		(10.478)
Great Circle Dist. (1000's of miles)	0.992	0.996	1.013**	1.016**
	(-1.770)	(-0.907)	(2.673)	(3.254)
Time of Observation Distance	1.000***	1.000***	1.000***	1.000***
	(-7.385)	(-6.655)	(-6.755)	(-6.256)
Different Climate Type	1.187***	1.105***	1.085**	1.030
	(5.649)	(3.331)	(2.578)	(0.947)
Different Continent	1.304***	1.373***	1.052	1.074
	(7.156)	(8.553)	(1.289)	(1.820)
Controls			Continent Dummies	Continent Dummies
Obs.	40470.000	40470.000	40470.000	40470.000
Psuedo-R2	0.016	0.007	0.042	0.037

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99%

Table 9 - Logit models for overall Cultural-Institutional Distance

Dep. Var. = Index of Cultural-Institutional Difference				
	I	II	III	IV
Different Language Group	2.462***	2.519***	3.159***	3.366***
	(11.821)	(12.203)	(13.518)	(14.351)
Agricultural Distance	1.069***		1.081***	
	(7.079)		(8.130)	
Subsistence Distance	1.031***		1.033***	
	(6.622)		(6.758)	
Technological Distance	1.346***		1.368***	
	(14.078)		(14.469)	
Great Circle Dist. (1000's of miles)	1.034***	1.032***	1.029***	1.027***
	(6.295)	(5.878)	(5.225)	(4.861)
PC Technological Distance		1.180***		1.197***
		(25.532)		(26.907)
Time of Observation Distance	1.000***	1.000***	1.000***	1.000***
	(-8.707)	(-8.617)	(-8.751)	(-8.438)
Different Climate Type	0.873***	0.877***	0.913*	0.924*
	(-3.633)	(-3.563)	(-2.410)	(-2.102)
Different Continent	1.407***	1.415***	1.393***	1.391***
	(7.857)	(8.049)	(7.295)	(7.269)
Controls			Continent Dummies	Continent Dummies
Obs.	24090.000	24090.000	24090.000	24090.000
Psuedo-R2	0.021	0.023	0.024	0.026

Note: All estimates reported as odds ratios. Z-statistics in parentheses. *** Denotes significance at 99% Fitted Model is an ordered logit model

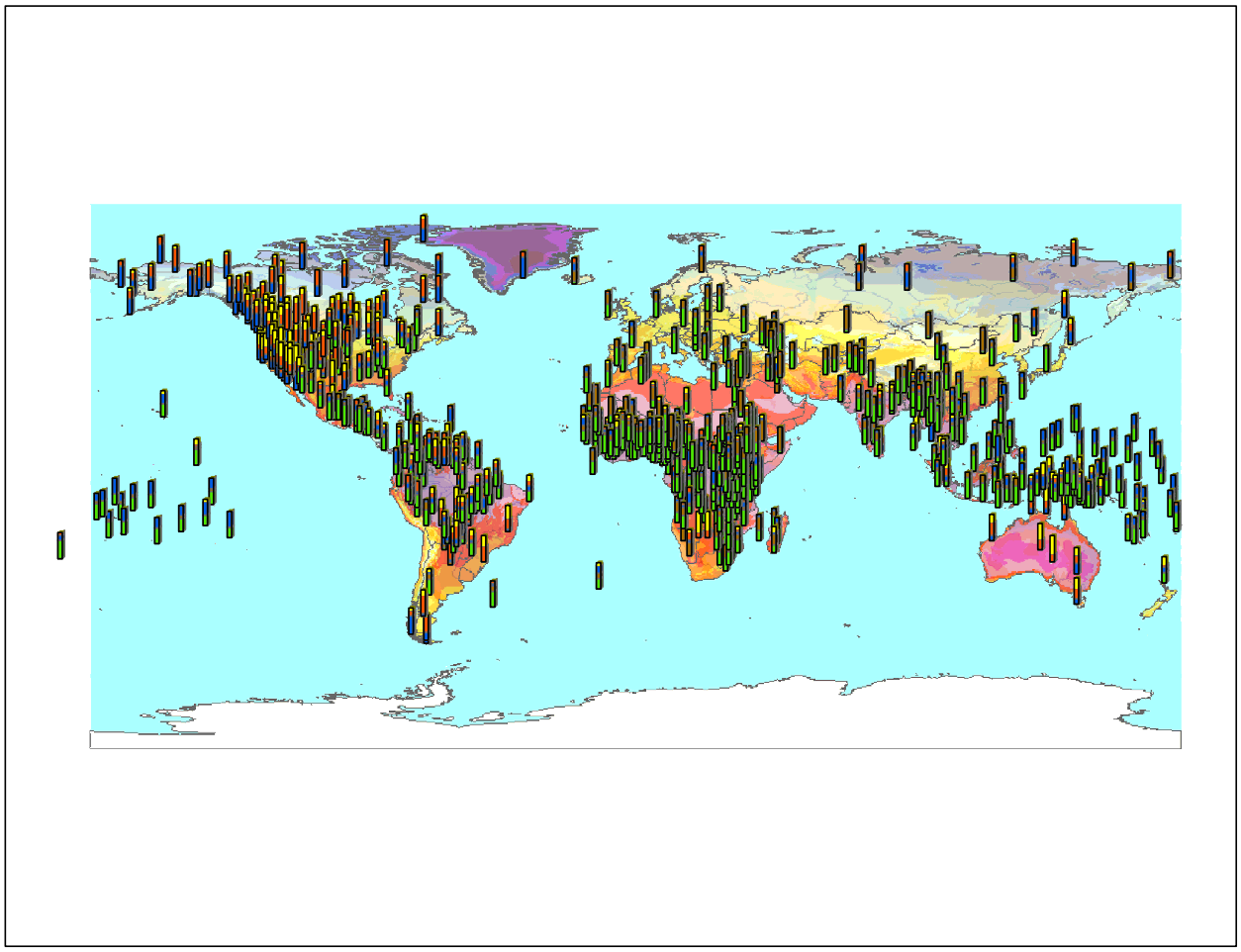

Figure 1 - Distribution of societies and subsistence characteristics among societies in the Ethnographic Atlas. The columns marking the geographic position of each society is color-coded according to the fraction of subsistence obtained from gathering (■), hunting (■), fishing (■), animal husbandry (■), and agriculture (■). Background shading is constructed using information on yearly average temperature and precipitation.

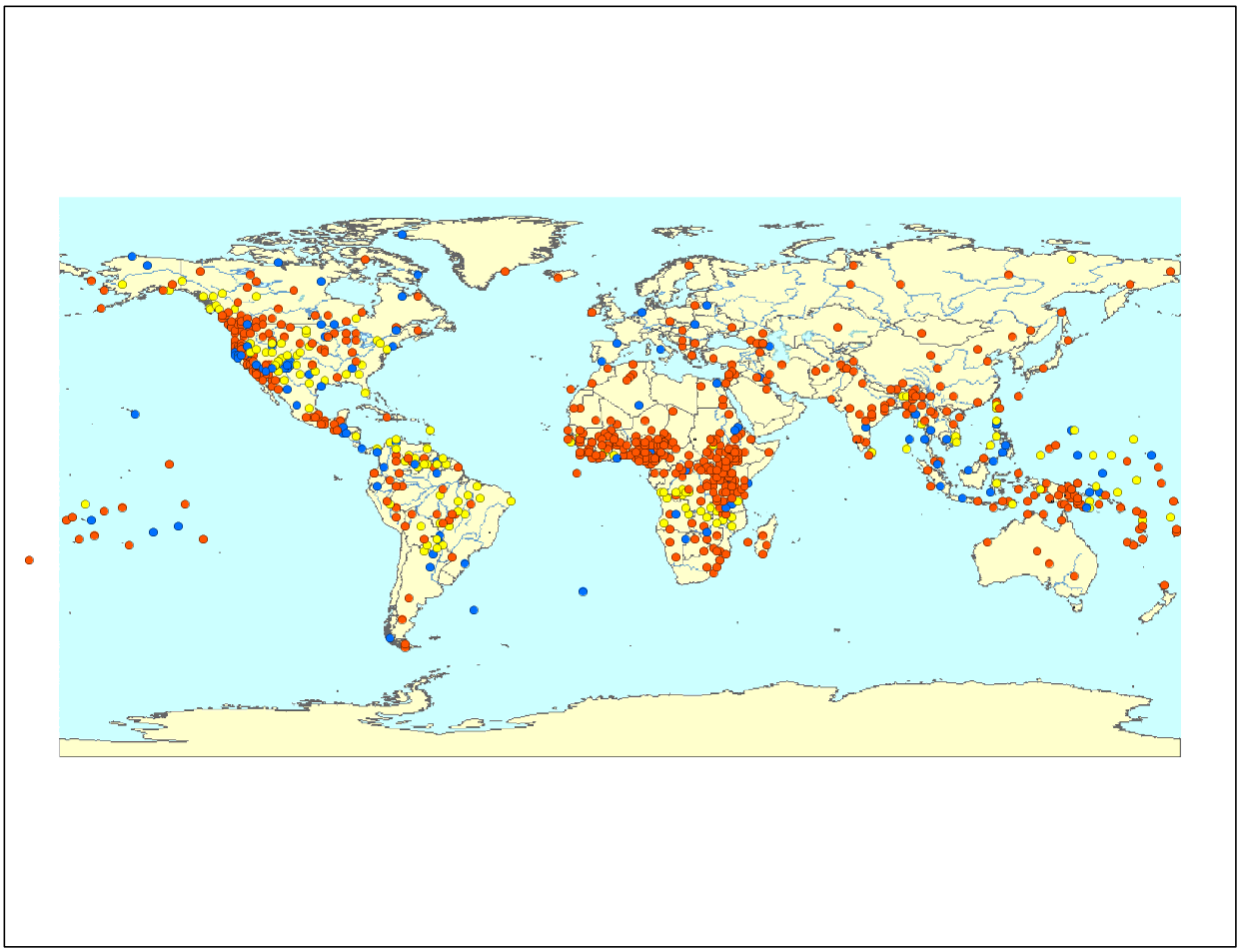

Figure 2 - Distribution of Post Marital Residence Rules among Ethnographic Atlas Societies. ● indicates wife resides with husband's family, ● indicates husband resides with wife's family, and ● indicates the couple may go to either group or is neolocal.