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Regions Based on Social Structure¹

by Michael L. Burton,
Carmella C. Moore,
John W. M. Whiting, and
A. Kimball Romney

Boas argued that anthropologists should make historical comparisons within well-defined regional contexts. A century later, we have many improvements in the statistical methodologies for comparative research, yet most of our regional constructs remain without a valid empirical basis. We present a new method for developing and testing regions. The method takes into account older anthropological concerns with relationships between culture history and the environment, embodied in the culture-area concept, as well as contemporary concerns with historical linkages of societies into world systems. We develop nine new regions based on social structural data and test them using data on 351 societies. We compare the new regions with Murdock's regional constructs and find that our regional classification is a strong improvement over Murdock's. In so doing we obtain evidence for the cross-cultural importance of gender and descent systems, for the importance of constraint relationships upon socio-cultural systems, for the historical importance of two precapitalist world systems, and for strikingly different geographical alignments of cultural systems in the Old World and the Americas.

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ton, and Douglas R. White) "A Cross-cultural Historical Analysis of Subsistence Change" (*American Anthropologist* 92:447-56).

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The concept of the region has been important to anthropology in several ways. Anthropologists concerned with culture history have studied the development of cultures within regions, traditionally called culture areas (Sapir 1916). This concern can be traced to Boas, who said that historical studies should be limited to a "cultural area" (Boas 1896:905-6). In attempting to define culture areas, anthropologists have been concerned to understand the separate influences of shared history and the environment. Kroeber (1939:6), building upon Wissler's work, combined these two perspectives: "environment does not produce a culture, but stabilizes it. . . . Cultures therefore incline to change slowly once they have fitted themselves to a setting, and to enter a new environment with more difficulty than to spread over the whole of the natural area in which their form was worked out." Many other scholars have taken the same position as Wissler and Kroeber—that the environment limits, or constrains possibilities, rather than being a strict determinant of culture. This approach seems to us to be the most productive way to think about the combination of culture history and ecology.

Applying constraint thinking to the relationship between climate and prehistoric migrations, Whiting, Sodergren, and Stigler (1982) hypothesized that cold climates require special adaptations and therefore prehistoric migrations were constrained by the boundary between warm and cold climate zones. Using language-family membership as an index of culture history, they found a strong constraint pattern, with one exception (Indo-European), language families tend not to cross the climate boundary defined by a mean winter temperature of 10° C. Constraint relationships are not adequately represented with conventional correlational models but can be represented via other statistical models (White, Burton, and Brudner 1977). While correla-

tional models assume a direct, linear relationship between two variables, the constraint model assumes no relationship except for the constraint boundary. For example, in the case of the climate and migration study just described, winter temperature has no effect on migration patterns within either the cold-winter zone or the warm-winter zone, acting only as a barrier to migration between the two zones.

Regions have also played an important role in formal cross-cultural research, where they have been used in three ways:

First, cross-cultural samples are often stratified by region (Murdock 1967, Murdock and White 1969). Stratification increases statistical power, provided that the strata have low variance with respect to the variables being studied (Kish 1987).

Second, cross-cultural researchers often make comparisons between regions, either to study the replication of findings across regions (Sawyer and Levine 1966, Driver and Schuessler 1967, Smith and Crano 1977, White and Pesner 1983) or to examine differences between regions. For example, Goody (1976, 1982, 1993) has written extensively about differences between Eurasia and Africa in explaining differential locations of female farming and polygyny, high cuisine, and the cultural elaboration of flowers.

Third, comparisons within regions have been popular, perhaps because they allow an approximation to the method of controlled comparison. Important comparative work has been done within North America (Driver and Massey 1957; Driver and Coffin 1975; Jorgensen 1969, 1980, 1983; Kroeber 1939; Steward 1955), Africa (Baumann 1928; Murdock 1959; Ericksen 1989a, b; White, Burton, and Dow 1981; Schneider 1979), New Guinea (Brown 1978), and Polynesia (Goldman 1970, Ortner 1981, Sahlins 1958).

Contemporary anthropologists have become concerned with the ways in which the location of field research has shaped anthropological problems. One concern is that societies have been described as being isolated when they are, in fact, connected within larger systems (Skinner 1964, Wolf 1982). A second concern is that locations have come to be associated with certain problems, such as bridewealth and age-sets in East Africa, caste in India, and big men in the Pacific. Writing about the literature on the Indian caste system, Appadurai criticizes the tendency to overemphasize salient traits, calling this "totalizing"—"making specific features of a society's thought or practice not only its essence but also its totality" (Appadurai 1988:41). In its place Appadurai recommends emphasis upon "the diversity of themes that can fruitfully be pursued in any place" and study of "family resemblances between places involving overlaps between not one but many characteristics" (1988:46).

The scientific validity of regional studies is dependent upon the validity of the regional constructs. There has been little research on the empirical basis for regional constructs other than the work of Driver and his colleagues on North American Indians (Driver 1956, 1961,

1973; Driver and Massey 1957; Driver et al. 1972; Driver and Coffin 1975; Jorgensen 1980). Hence much work in anthropology is based on regions of questionable validity. Research on the validity of regions should be based on hypotheses formulated in terms of social processes and tested against empirical data. No single definition of "region" can serve all purposes. How closely regions defined in terms of different criteria, such as history, ecology, language, social structure, climate, etc., would correspond to each other is an empirical question.

The aim of this paper is to present a regional classification of societies based upon social structure data. The classification is based upon a new methodology applicable to any substantive domain (e.g., political system, social structure, beliefs about illness, subsistence system). This approach is intended to provide an advance over regional constructs that are not based upon systematic data analysis. To illustrate its advantages, we will compare our regional classification with Murdock's (1957) regions.

Defining Regions

We use three criteria here to define regions:

1. *Level of aggregation.* We seek a relatively small number of regions, measured at the highest level of aggregation within the world. We do not deal with finer-grained subdivisions of regions. This criterion is not part of our general methodology for developing regions, but it is a necessary limitation upon the scope of the present paper.

2. *Historical and physical contiguity.* We require regions to contain societies that are geographically contiguous. Societies from different regions should not be mixed together in the same area, and it should be possible to travel within a region without crossing other regions.

Our concept of contiguity is social-historical. We pay attention to physical features, such as oceans and mountain ranges, that may have facilitated or impeded travel, given the social processes and transportation technology of the time. Because of the dates of observation for our sample, we are primarily concerned with factors that hindered or facilitated travel before the development of motorized transport. We place special emphasis on social processes that linked societies together. These include evidence for travel, trade, migration, or political linkages within the region. We include shared language-family membership as an index of historical connections among cultures, as well as knowledge about the historical political and economic linkages that are now called "world systems"—trade and market linkages, large-scale political systems, colonizations, and world religions such as Islam.

3. *Homogeneity and pattern.* We here develop regions based on homogeneity and pattern in social structure. We have chosen social structure because of its central importance to anthropological theory. Many other types of data could be used including the ones used by Jorgen-

sen (1980) to develop alternative subregions among Western Indians.

The Social Structure Data

We used Murdock's coded data on variables that were originally defined for his monograph *Social Structure* (Murdock 1949) and published later for subsamples of the *Ethnographic Atlas* (1967). These data include enough cases and variables to make our project feasible. Murdock's variables fall into two domains—social organization (Murdock 1967) and kinship terminology (Murdock 1970). Merging these two data sets gave us a sample of 351 societies with complete data (Whiting et al. 1988).

Our statistical model required us to dichotomize each variable to produce a set of traits measured as presence or absence. For example, Murdock's residence variable was split into several dichotomous variables measuring the presence or absence of patrilocal residence, virilocal residence, matrilineal residence, etc. We also had to delete traits that occurred infrequently, such as avunculocal residence. These transformations produced 63 social structural traits, coded for 351 societies (tables 1 and 2), the data base for testing our regional analysis. These data were used in Whiting et al. (1988) for an analysis of social structure.

The social structure variables provide criteria for testing regions independent from the macroscopic processes used to formulate hypothesized regions. Although some definitions of social structure would include these larger-scale processes, our definition does not, since it would be circular to use them both to define regions and to test the regions.

Statistical Criteria

Hays (1993) describes regions as being like fuzzy sets, with considerable overlap at their boundaries, and this property makes a typological approach inappropriate to regional classification. Statistics is the appropriate language for representing the kind of variability that Hays describes. The statistical test should be based on a representative sample of societies, all compared on the same variables. Formal cross-cultural data sets have these properties.

The regional classification should have both convergent and discriminant validity (Campbell and Fiske 1959). The former is obtained by providing a reliable description of the social structural characteristics of each region, the latter by showing that regions can be distinguished from one another statistically.

The first criterion requires that regions be homogeneous in social structure. This criterion is often stated statistically in terms of variance—societies within a region should have less variance on the variables of interest than societies worldwide. We require the regions to have a clearly interpretable social structural pattern, ei-

TABLE 1
Social Organization Traits

Trait	N
Mode of marriage	
Bridewealth	135
No exchange	87
Bride service	50
Family type	
Independent	166
Small extended	108
Large extended	57
Marriage type	
Monogamy	71
Limited polygyny	68
Nonsororal polygyny	141
Sororal polygyny	68
Marital residence	
Patrilocal	123
Virilocal	94
Matri- or uxorilocal	61
Bilocal	33
Community organization	
Agamous	133
Clan communities	58
Endogamous demes	35
Exogamous communities	46
Segmented communities	75
Patrilineal kin groups	
Localized kin groups	68
Dispersed sibs	77
Matrilineal kin groups	
Localized kin groups	38
Dispersed sibs	37
Bilateral descent groups	
No descent groups or bilateral groups only	74
Ego-centered kindred	59
Cousin marriage	
Permitted	81
Prohibited	105
No first-cousin marriage	63
Settlement patterns	
Nomadic or seminomadic	87
Transhumance	36
Villages	148
Neighborhoods or hamlets	62

SOURCE: Whiting et al. (1988).

ther in terms of the presence of certain attributes or in terms of the exclusion of other possibilities.

The second requirement is that there be a statistically significant difference between the social structural patterns of contiguous regions and that the regionalization have a strong fit with the data. For these statistical tests we use the quadratic assignment procedure.

Measurement Model

These statistical criteria require that a measurement model be applied to the social structure data set. We use

TABLE 2
Kinterm Traits

Trait	N
Grandparents	
Bisexual	188
Merging	71
Bifurcate bisexual	58
Grandchildren	
Merging	184
Bisexual	49
Uncles	
Bifurcate merging	106
Bifurcate collateral	95
Skewed bifurcate collateral	58
Lineal	51
Aunts	
Bifurcate collateral	93
Bifurcate merging	97
Lineal	51
Generational	39
Skewed bifurcate collateral	45
Siblings	
Dravidian	88
European	39
Yoruban	34
Algonkian	31
Kordofanian	26
Nieces and nephews (male speaker)	
Bifurcate merging	99
Sex different bifurcate merging	41
Bifurcate collateral	43
Lineal	39
Generational	28
Sex different lineal	32
Sex different bifurcate collateral	25
Cousins	
Hawaiian	106
Iroquois	120
Eskimo	35
Omaha	29
Crow	30

SOURCE: Whiting et al. (1988).

correspondence analysis to produce a representation of societies and their traits within a conjoint social structure as a framework for the regional analyses.

In their studies of North American Indians, Driver and his students used classification methods computed directly from the data (Driver 1973, Jorgensen 1980, Kenny 1974). Our approach is different. We know of no way to program a computer to classify societies into contiguous regions while simultaneously considering complex historical information about trade routes, migration paths, and large-scale social systems. Rather than using a single computer analysis we used an iterative method. We developed regions and tested them against the social structural data, then gradually improved the regions by testing a series of hypotheses about proposed modifications. The project required use

of more information about individual societies, or groups of societies, than we can report here.²

Correspondence analysis (Greenacre 1984, Weller and Romney 1990) allows us to examine the relationships among all variables and societies.³ It produces a representation of societies and their traits in a common multidimensional space. In the correspondence model societies are located near traits that characterize them. Societies are close to each other to the extent that they share many traits; traits are close to each other to the extent that they are found within the same societies.⁴ The method is well-suited to the analysis of cross-cultural data sets (Whiting et al. 1988, Moore 1988, Bradley et al. 1990), as well as to the study of variability within regions (Moore and Romney 1994). Thus, we used correspondence analysis to scale the 351 societies on the 63 social structural traits (Whiting et al. 1988). We emphasize that the scaling itself contains *no* information about the regions; rather, it provides independent data against which to test the regions.

Given the correspondence model, we can compute the interpoint distances between societies in the multidimensional social structural space. The distance between any two societies will be inversely related to the similarity between those two societies with respect to social structure, and therefore social structural homogeneity among societies can be defined as low distances among those societies within the social structural space. Regions with lower average distances in the space are more homogeneous with respect to social structure. We use these average distance measures as an analog to measuring variance within regions.

Statistical Test Methodology

The quadratic assignment procedure is a permutation method used to test for relationships between two data matrices (Hubert 1987, Hubert and Schultz 1976). The foundational work underlying the quadratic assignment methods presented here was derived nearly 30 years ago by Mantel (1967). Mantel was working on the general problem of detecting clustering by comparing a data matrix, *Q*, with a structure matrix, *C*. In this paper we use quadratic assignment methods to compare a social structural data matrix with a structure matrix that partitions our sample into regions. With these kinds of structural data the separate points are not independent observations, since they are all connected within a common structure, and ordinary statistical tests are not appropriate. The quadratic assignment procedure tests whether the data matrix and the structure matrix are

2. This included historical data from a study of world-system linkages of 90 societies (White and Burton 1984).

3. This method is also known as optimal scaling (Kendall and Stuart 1961:568-84), dual scaling (Nishisato 1980), or canonical analysis (Gittens 1984).

4. Here "close" refers to proximity in the social structural space, not geographic distance.

more similar to each other than would be expected by chance. Because of the method's wide applicability in anthropology, we present a detailed description.

Figure 1 shows a spatial representation of two clusters of objects, circles and triangles. The data are invented to correspond closely to the average results obtained in this study. The symmetry of the figure reminds us that the data were simulated; no real data would display such perfect symmetry. We constructed these data from a simulation with two constraints. First, the average interpoint distances within the entire space are the same as in our region data. Second, the average interpoint distances within the two clusters are the same as the average distances within our regions.

The interpoint distances among the points are shown in table 3. These distances constitute Q , the data matrix. Table 4 contains C , the structure matrix. In this matrix each cell represents the relationship between two cases. The number 1 represents cases from the same group and 0 represents cases from different groups. This structure matrix, C , states the hypothesis that circles are clustered with circles and triangles are clustered with triangles. In this contrived example we can see that this hypothesis is true; in general, the circles are clustered on the left and triangles are clustered on the right.

Hubert and Schultz (1976) construct an index Γ to measure the correspondence between Q , the data matrix, and C , the structure matrix. In general, Γ is the sum of the products of the corresponding elements between Q and C . Since our structure matrix, C , is composed of 1's and 0's, Γ is simply the sum of the portion of table 3 in italics (upper left and lower right quadrants). To test how unusual an occurrence our observed Γ represents we can compare it with an "expected" Γ based on what might occur on average over all possible permutations of Q .

In our example the relevant statistics (formulas in Hubert and Schultz 1976) are as follows: observed $\Gamma = 229.70$ and expected $\Gamma = 330.78$, with a standard deviation of 10.98. This gives a Z -score of -9.21 , which is significant beyond any reasonable question. The negative Z -score indicates that the distances between items of the same type (circles or triangles) are smaller than the distances between items of different types.

In this paper the scaled distances among societies are based upon their similarity in terms of social structure. The locations in the multidimensional social structure space are obtained from data that do not include information about geographical location. The regional information is analogous to whether the society is labeled as

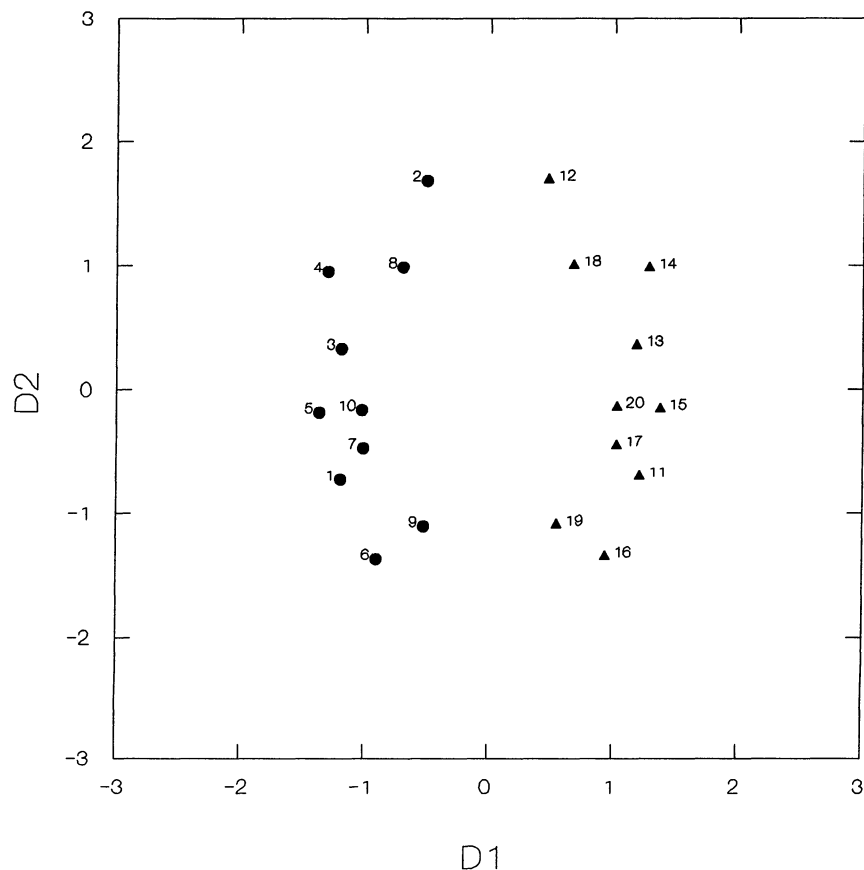


FIG. 1. *Spatial representation of simulated data, showing two clusters.*

TABLE 3
Data Matrix of Distances among 20 Simulated Points for Description on Quadratic Assignment Procedure

0.00	2.50	1.05	1.68	0.57	0.71	0.31	1.78	0.77	0.59	2.41	2.94	2.61	3.01	2.63	2.22	2.24	2.55	1.78	2.30
2.50	0.00	1.52	1.08	2.06	3.08	2.21	0.72	2.79	1.92	2.94	0.98	2.15	1.92	2.63	3.36	2.63	1.37	2.97	2.38
1.05	1.52	0.00	0.63	0.54	1.72	0.82	0.82	1.58	0.52	2.61	2.15	2.37	2.56	2.61	2.71	2.35	1.98	2.25	2.27
1.68	1.08	0.63	0.00	1.14	2.35	1.45	0.60	2.20	1.15	3.01	1.92	2.55	2.58	2.89	3.21	2.71	1.98	2.76	2.57
0.57	2.06	0.54	1.14	0.00	1.27	0.46	1.35	1.25	0.34	2.63	2.63	2.61	2.89	2.74	2.58	2.41	2.36	2.12	2.40
0.71	3.08	1.72	2.35	1.27	0.00	0.90	2.36	0.46	1.21	2.22	3.36	2.71	3.21	2.58	1.84	2.14	2.85	1.48	2.29
0.31	2.21	0.82	1.45	0.46	0.90	0.00	1.49	0.80	0.31	2.24	2.62	2.35	2.71	2.41	2.14	2.04	2.24	1.68	2.07
1.78	0.72	0.82	0.60	1.35	2.36	1.49	0.00	2.10	1.19	2.55	1.37	1.98	1.98	2.36	2.85	2.24	1.38	2.42	2.06
0.77	2.79	1.58	2.20	1.25	0.46	0.80	2.10	0.00	1.07	1.78	2.97	2.25	2.76	2.12	1.48	1.68	2.42	1.07	1.83
0.59	1.92	0.52	1.15	0.34	1.21	0.31	1.19	1.07	0.00	2.30	2.38	2.27	2.57	2.40	2.29	2.07	2.06	1.83	2.05
2.41	2.94	2.61	3.01	2.63	2.22	2.24	2.55	1.78	2.30	0.00	2.50	1.05	1.68	0.57	0.71	0.31	1.78	0.77	0.59
2.94	0.98	2.15	1.92	2.63	3.36	2.62	1.37	2.97	2.38	2.50	0.00	1.52	1.08	2.06	3.08	2.21	0.72	2.79	1.91
2.61	2.15	2.37	2.55	2.61	2.71	2.35	1.98	2.25	2.27	1.05	1.52	0.00	0.63	0.54	1.72	0.82	0.82	1.58	0.52
3.01	1.92	2.56	2.58	2.89	3.21	2.71	1.98	2.76	2.57	1.68	1.08	0.63	0.00	1.14	2.35	1.45	0.60	2.20	1.15
2.63	2.63	2.61	2.89	2.74	2.58	2.41	2.36	2.12	2.40	0.57	2.06	0.54	1.14	0.00	1.27	0.46	1.35	1.25	0.35
2.22	3.36	2.71	3.21	2.58	1.84	2.14	2.85	1.48	2.29	0.71	3.08	1.72	2.35	1.27	0.00	0.90	2.36	0.46	1.21
2.24	2.63	2.35	2.71	2.41	2.14	2.04	2.24	1.68	2.07	0.31	2.21	0.82	1.45	0.46	0.90	0.00	1.49	0.80	0.31
2.55	1.37	1.98	1.98	2.36	2.85	2.24	1.38	2.42	2.06	1.78	0.72	0.82	0.60	1.35	2.36	1.49	0.00	2.10	1.19
1.78	2.97	2.25	2.76	2.12	1.48	1.68	2.42	1.07	1.83	0.77	2.79	1.58	2.20	1.25	0.46	0.80	2.10	0.00	1.07
2.30	2.38	2.27	2.57	2.40	2.29	2.07	2.06	1.83	2.05	0.59	1.91	0.52	1.15	0.35	1.21	0.31	1.19	1.07	0.00

NOTE: Distances among circles appear in italics in upper left quadrant; distances among triangles appear in italics in lower right quadrant.

a circle or triangle (e.g., Asia or Africa). We have nine regions, and we use the numbers 0 and 1 in the structure matrix. For example, a 1 in a cell *i, j* would mean that societies *i* and *j* are both in the same region, while a 0 would mean they are in different regions.

Finding the optimal solution to the relationship between regional categories and social structural distances is exactly the quadratic assignment problem (Hubert and Schultz 1976). As stated above, there is no analytic solution to the general problem of defining regions, hence

there is no single algorithm that will yield the best solution through one computation. The process we used involves trial and error—the sequential testing of hypotheses, which were developed using the criteria defined above.

To test each hypothesis we defined a structure matrix and a distance matrix. Suppose, for example, we were to ask whether African societies are different in social structure from Eurasian societies. The distance matrix and the structure matrix would be defined for all societ-

TABLE 4
Structure Matrix for Distinction between Two Groups of 10 among 20 Simulated Points for Description of Quadratic Assignment Procedure

0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1

ies in those two continents. Entries in the distance matrix are simply the social structural distances for all pairs of societies in the two continents. Entries in the structure matrix would be 1 for all pairs of African societies, 2 for all pairs of Eurasian societies, and 0 for all other pairs. A statistically significant Z-score from the quadratic assignment procedure would indicate that the two continents differ in social structure.

The Social Structural Space

The correspondence analysis produced a two-dimensional configuration of societies and social structural traits. An earlier paper (Whiting et al. 1988) discussed this configuration. Here we develop a more complete interpretation based on scores of the social structural traits on the two dimensions.⁵

The first dimension of the correspondence analysis contrasts *matricentric* and *patricentric* social structures. Table 5 lists social organization and kinterm traits that have high positive or negative scores on this dimension. We have called this dimension “matricentric” (positive end) versus “patricentric” (negative end) because of the way the variables cluster empirically. Matricentric social organization traits include localized or dispersed matrilineal groups, matrilocality or uxori-locality, monogamy, and the absence of marriage exchange. Hence, matricentric societies tend to organize kinship groups around women through matrilocality or uxori-locality residence or through matrilineal kinship groups. Patricentric social organization traits include nomadic or seminomadic settlement patterns, clan communities, localized or dispersed patrilineal groups, patrilocality residence, polygyny,⁶ and bridewealth payments. Hence, patricentric societies tend to organize kin groups around men, through patrilocality residence, patrilineal descent, or polygyny.

Kinship terminologies follow the same pattern. Strongly matricentric kinship terminologies include generational aunt terms, bifurcate merging aunt terms, and Crow cousin terms. The former two terminologies classify mother and mother’s sister together, as one would expect of societies that keep related women together after marriage, and Crow cousin terms are well known to be associated with matrilineal descent. Strongly patricentric kinship terminologies include bifurcate collateral aunt terms and Omaha cousin terms. Bifurcate collateral terminologies, assign separate terms to mother and mother’s sister, as one would expect of societies that separate women after marriage, and Omaha terms are well known to be associated with patrilineal descent.

5. The scores are similar to factor loadings but are standardized differently and therefore have a different range. To save space we omit kinterm scores for siblings. See Whiting et al. (1988) for a plot of all 63 traits.

6. Sororal polygyny is associated with patricentric bilateral systems, nonsororal polygyny with patrilineal systems.

TABLE 5
First Dimension: Matricentric versus Patricentric

Matricentric social organization traits	
Dispersed matrilineal sibs	2.26
Matrilocal or uxori-locality residence	1.70
Segmented communities	1.69
Localized matrilineal groups	1.65
Independent family	1.12
No marriage exchange	.93
Monogamy	.75
Matricentric kinterm traits	
Generational aunt	2.84
Crow cousin	2.64
Merging grandparent	1.59
Bifurcate merging uncle	1.49
Bifurcate merging aunt	1.25
Patricentric social organization traits	
Bride-price	-0.62
Sororal polygyny	-0.70
Dispersed patrilineal sibs	-0.78
Transhumance	-0.80
Exogamous communities	-0.81
Localized patrilineal groups	-0.95
Patrilocality residence	-0.97
Clan communities	-1.05
Nomadic or seminomadic	-1.10
Patricentric kinterm traits	
Omaha cousin	-0.67
Skewed bifurcate collateral uncle	-1.33
Skewed bifurcate collateral aunt	-1.39
Bifurcate collateral niece/nephew	-1.45
Bifurcate collateral uncle	-1.69
Bifurcate bisexual grandparent	-1.83
Bifurcate collateral aunt	-1.86
Sex different bifurcate collateral niece/nephew	-2.69

The second dimension of the correspondence analysis contrasts *unilineal* and *bilateral* social structures. Table 6 lists social organization and kinterm traits that have strong positive (unilineal) or negative (bilateral) scores on this dimension. Again we have named the poles on the basis of the empirical results of the scaling. Unilineal social organization traits include clan communities, dispersed or localized patrilineal groups, dispersed matrilineal groups, patrilocality residence, nonsororal polygyny, cousin marriage, and bridewealth payments. Bilateral social organization traits include bilateral kin groups, ego-centered kindreds, virilocality residence, bilocal residence, monogamy, and prohibition of cousin marriages.

Unilineal kinship terminologies include Crow, Omaha, and Iroquois cousin terms, all well known to be associated with unilineal systems, as well as bifurcate merging and skewed bifurcate collateral aunt terms. Bilateral kinship terminologies include Hawaiian and Eskimo cousin terms as well as lineal aunt terms.

The combination of the two dimensions produces four quadrants. Moving clockwise from the upper right of the figure, these are matrilineal, matricentric bilateral, patricentric bilateral, and patrilineal.

TABLE 6
Second Dimension: Unilineal versus Bilateral

Unilineal social organization traits	
Clan communities	1.83
Nonsororal polygyny	1.45
Patrilocal residence	1.43
Dispersed patrilineal sibs	1.36
Localized patrilineal groups	1.13
Segmented communities	.97
Dispersed matrilineal sibs	.93
Cousin marriage permitted	.90
Bridewealth	.85
Unilineal kinterm traits	
Omaha cousin	1.54
Bifurcate merging aunt	1.20
Bifurcate merging niece/nephew	1.18
Bifurcate merging uncle	1.14
Skewed bifurcate collateral uncle	1.00
Crow cousin	1.00
Iroquois cousin	.92
Skewed bifurcate collateral aunt	.89
Bilateral social organization traits	
Cousin marriage prohibited	-0.85
Monogamy	-0.85
No marriage exchange	-0.96
Virilocal residence	-1.19
Ego-centered kindreds	-1.25
Exogamous communities	-1.26
Endogamous demes	-1.28
Bilateral descent groups	-1.66
Bilocal residence	-1.77
Bilateral kinterm traits	
Hawaiian cousin	-1.19
Generational niece/nephew	-2.01
Eskimo cousin	-2.26
Lineal aunt	-2.62
Lineal niece/nephew	-2.67
Lineal uncle	-2.91

Determinants of the Positioning of Societies in the Space

Correspondence analysis positions the societies and traits in the same space, so that the location of each society corresponds as closely as is possible with the location of its traits. Our labeling of dimensions is an interpretation based on the scaling model. For example, our labeling of the second dimension as "unilineal" means that "unilineal" societies have many of the traits that are associated with patrilineal or matrilineal descent groups and few of the traits that are associated with bilateral descent groups.

This kind of labeling is the opposite of what Appadurai calls "totalizing." Rather than typifying a society or region by a single salient trait, we characterize it by its overall pattern, in keeping with Kroeber's (1939) emphasis on whole patterns. The labels are based on the general pattern of many traits, even if the most salient traits of the pattern are absent. For example, a society could be in the "unilineal" group if it did not have organized unilineal descent groups, provided that it had several other traits that are statistically associated with

unilineal descent, such as Omaha cousin terms, nonsororal polygyny, and patrilocal residence.

Since the dimensions are measured on a continuous scale, societies can be placed in intermediate positions on the two dimensions, to reflect the more subtle kinds of variation that occur empirically. For example, the Nuer are listed in Murdock's *Ethnographic Atlas* (1967) as having bridewealth payments, virilocal residence, nonsororal polygyny, patrilineal sibs, a seminomadic settlement pattern, and Omaha cousin terms. Four of these six traits are "unilineal," but virilocal residence and seminomadic settlement pattern are "bilateral." On the basis of the overall pattern, the Nuer are scaled in our model as "weakly unilineal," with a score of .39.

Certain traits, such as avunculocal residence and polyandry, are not included in our analysis because the statistical model requires deletion of traits that occur infrequently. A society with avunculocal residence, for example, would be scored as 0 on the four residence traits that we included (patrilocal, virilocal, bilocal, matrilineal or uxorilocal), so its position in the space would not be affected by its residence pattern. Our ability to obtain a robust scaling model, given some missing data of this type, is based on the fact that there is redundancy in our traits. Missing data on a few traits will have little effect on the overall picture.⁷

The Effect of Ethnographic Dates

Murdock coded each society for the date of an important ethnography. Hence, as with most comparative research in anthropology, the societies in our sample were observed at different points in time. Dates of the ethnographies range from 1520 to 1960, with a median value for the Americas of 1870 and a median value for Africa, Eurasia, and the Pacific of 1930. Is there evidence of change over time, within our sample, in the positions of societies on the two social structural dimensions?

We hypothesized that such changes would take the form of a shift toward the European pattern as a result of increasing European influence throughout this time period. If so, societies observed more recently would be more likely to be patricentric and bilateral (the European pattern), and the correlations between date of observation and the two social structural dimensions would be negative. We obtained a correlation of .16 between the ethnographic date and the matricentric-patricentric dimension and a correlation of .05 between the ethnographic date and the unilineal-bilateral dimension. Neither correlation is strong, and neither supports the hypothesis.⁸ Together they provide little evidence for extensive changes in social structural patterns over time

7. By the same token, errors in coding some of the variables will have little aggregate effect on the overall pattern.

8. Given the large difference between the Americas and the Old World and Pacific in median dates, we also computed the correlations separately for each hemisphere, with no change in the findings.

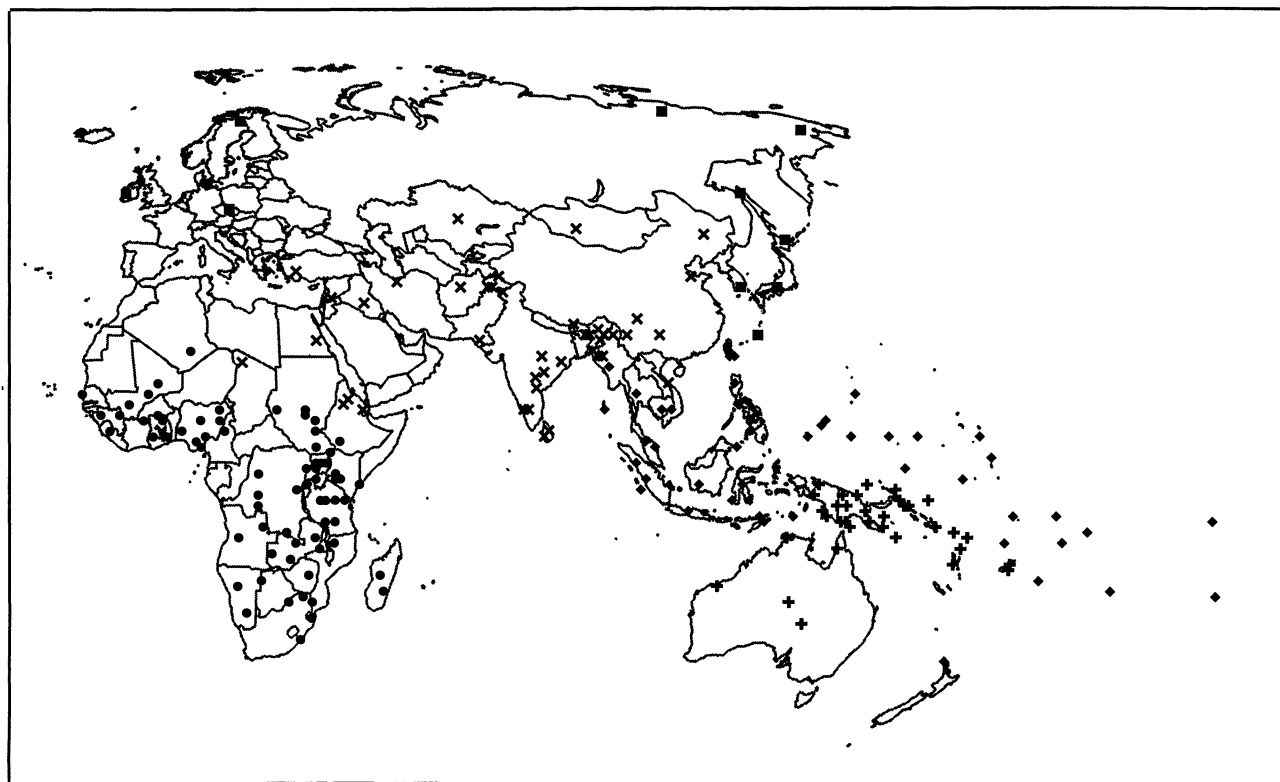


FIG. 2. *Regions of Africa, Eurasia, and the Pacific.* ●, Sub-Saharan Africa; ×, Middle Old World; ◆, Southeast Asia and the Insular Pacific; +, Australia, New Guinea, and Melanesia; ■, North Eurasia and Circumpolar.

within our sample, given the range of ethnographic dates.⁹

Developing the Regional Classification

We developed nine regions using the criteria described earlier. In the first stage of the analysis we developed five regions for Africa, Eurasia, and the Pacific (Burton et al. 1992), as shown in figure 2. In the second stage we developed four regions for the Americas, as shown in figure 3. The analyses required multiple refinements, each formulated as a hypothesis and tested against the data. These hypotheses took several forms. One was the hypothesis that two contiguous regions should be merged. This would be tested using the quadratic assignment procedure to determine whether the social structural data of the two regions were statistically different. The second took the form of a hypothesis that some region should be subdivided because it was too large and heterogeneous. If the quadratic assignment procedure showed the two subregions to be significantly different, then the partition was made. The third kind of test involved moving small groups of societies across the boundary between two regions. We made these moves

9. For those concerned with the much more extensive social changes of the past 30 years we emphasize that our sample cannot speak to those issues.

if they made sense in terms of our criteria and if doing so reduced the average social structure distances within the two regions. Table 7 lists societies by region with their social structure coordinates, and figures 4 to 12 plot the societal coordinates by region.

Description of the Regions

1. *Africa, Eurasia, and Pacific.* Previous regional classifications divided Eurasia between the Occident and the Orient. There is no empirical justification for this east-west split, whose logic has been criticized by Said (1978). Instead, we find evidence for a north-south split. The first four regions border the Indian Ocean. The fifth region includes North Eurasia and the Circumpolar portion of the Americas.

Sub-Saharan Africa is strongly unilineal (fig. 4). Of the 71 African societies in our sample, 69 fall within a single unilineal cluster. The outlier to the left of the cluster is the Nuer, one of the most strongly patrilateral societies in our sample but, as discussed above, only weakly unilineal. The bilateral outlier is the !Kung, the only African foraging society in our sample.

The African data show the kind of constraint pattern that we discussed above. African societies rarely have bilateral social structures. While being constrained on the dimension of lineality, they are free to vary on the gender dimension. Both matrilineal and patrilineal de-



FIG. 3. Regions of the Americas. ●, Eastern Americas; ×, Mesoamerica, Central America, and the Andes; ▲, Northern and Western North America; +, Northwest Coast; ◆, Southern South America.

scendent systems are found in close proximity in much of West Africa, even within the same society (Leis 1974), and some societies have both kinds of descent groups.

From reading ethnographies we know that African unilineal systems tend to emphasize the autonomy of women. Within the patrilineal societies women usually retain membership in their fathers' groups after marriage, even though they reside with their husbands. Women usually have an independent economic domain, with female farming being frequent. Also reflecting the autonomy of women are such customs as female-husband marriage and women's organizations such as the Sande societies of West Africa (Little 1951). In the literature on women and development a pervasive theme is development's undermining African women's autonomy (Savané 1986).

In the upper right of the figure the three most strongly matrilineal societies are Pende, Yao, and Ndembu, all

located within the "matrilineal belt" of Central Africa. The two slightly bilateral societies at the bottom of the large cluster are Lozi and Merina. The Lozi of Zambia have bilateral descent in combination with other traits, such as nonsororal polygyny, that are associated with unilineal systems. The Austronesian-speaking Merina are located in Madagascar. Their social structural pattern is marginal to the main African pattern, and they could have been placed within Southeast Asia and Pacific.¹⁰

Sub-Saharan Africa was linked historically by systems of trade and migration, including the Bantu migrations throughout Central, Eastern, and Southern Africa. Hence, the region satisfies the criterion of social-historical contiguity. Sub-Saharan Africa also has strong

10. We included Madagascar within Africa on grounds of contiguity as well as the social structure pattern.

TABLE 7
Societies by Region with Social Structure Coordinates

Region and Society	D1	D2	Region and Society	D1	D2
Sub-Saharan Africa			Wolof	0.36	0.99
!Kung	-0.31	-2.16	Songhai	-0.33	0.74
Ndorobo	-0.03	1.03	Fur	0.44	0.48
Nama	-0.46	1.09	Djafun	-0.49	0.77
Sandawe	-0.20	1.21	Woodabe	-0.80	0.52
Herero	-0.19	0.67	Merina	0.77	-0.26
Swazi	0.14	1.56	Tanala	-0.53	0.44
Lozi	-0.07	-0.10	Middle Old World		
Thonga	-0.16	1.49	Tigrinya	-1.14	-0.07
Mbundu	0.30	1.51	Afar	-2.01	0.84
Venda	0.34	1.54	Amhara	0.01	-1.45
Pondo	-0.62	0.83	Teda	-1.72	0.33
Tswana	-0.56	1.30	Egypt	-1.66	0.33
Shona	-0.80	1.34	Turks	-1.45	-0.32
Ila	-0.20	0.78	Kurd	-0.89	-0.26
Pende	1.90	1.57	Rwala	-1.79	0.41
Lamba	1.32	0.82	Sindhi	-1.95	0.38
Ndembu	1.25	1.68	Pathan	-1.47	0.40
Yao	1.70	0.95	Hazara	-1.79	0.26
Ngoni	1.15	0.62	Iranians	-0.98	0.11
Chewa	1.41	1.24	Kazak	-2.12	0.68
Chokwe	0.21	1.01	Khalka	-1.63	0.12
Dzing	-0.91	0.44	Lolo	-1.90	0.91
Bajun	-0.04	0.15	Manchu	-1.32	1.12
Nyoro	-0.33	1.14	Miao	-1.16	0.93
Kikuyu	-0.57	1.07	Minchia	-1.41	0.23
Nyakyusa	0.62	0.79	Shantung	-1.51	0.63
Ganda	-0.93	0.71	Burusho	0.22	0.59
Shambala	-0.54	0.83	Lepcha	-0.49	-0.21
Bena	0.61	0.80	Dard	-1.38	0.60
Nyamwezi	-0.57	0.17	Kashmir	-1.75	0.42
Turu	-0.36	1.07	Chenchu	-0.94	0.21
Haya	-0.86	0.90	Maria	-1.37	1.20
Amba	0.62	1.52	Coorg	-1.25	0.41
Nkundo	0.99	1.57	Bhuyia	-1.14	0.82
Ruanda	-0.76	1.33	Baiga	-2.02	1.24
Ahaggaren	0.38	0.47	Telugu	-1.03	0.85
Rega	-0.46	0.79	Vedda	-0.53	0.61
Ashanti	1.07	1.13	Sinhalese	-1.16	0.20
Mende	0.54	0.45	Garo	0.22	0.34
Yoruba	1.05	0.28	Lhota	-0.92	1.03
Ibo	0.25	0.97	Lakher	-0.09	1.07
Efik	-0.14	0.85	Kachin	0.36	1.10
Ewe	0.40	0.85	Khasi	0.59	0.49
Bambara	-0.49	1.16	Chakma	-1.38	0.75
Dogon	-1.02	0.76	Aimol	0.32	0.48
Tallensi	-0.45	0.95	Sema	0.21	1.36
Futajalonke	-0.21	1.18	Chin	0.08	1.12
Malinke	-0.64	0.90	Annamese	-0.42	0.00
Konkomba	-0.91	1.29	Toda	0.11	1.28
Lobi	0.09	0.34	Southeast Asia and Insular Pacific		
Katab	0.59	0.68	Andamanese	0.48	-2.10
Tiv	0.80	1.25	Burmese	0.88	-1.21
Longuda	1.57	0.98	Mnong Gar	2.70	0.88
Yungur	0.84	0.97	Semang	0.27	-1.29
Shilluk	-0.60	0.96	Cambodians	0.50	-1.13
Dilling	-0.50	0.97	Malay	0.75	-1.10
Mesakin	1.35	0.81	Siamese	0.71	-1.26
Teso	-0.46	0.47	Atayal	0.20	-1.30
Nuer	-2.01	0.39	Ifugao	1.52	-0.48
Lango	-0.58	0.92	Subanun	1.37	-0.76
Turkana	-0.64	0.21	Hanunoo	0.73	-1.85
Bari	0.25	1.39	Ami	2.04	-0.64
Kipsigis	0.26	1.19	Bunun	0.38	-0.95
Konso	0.21	0.86	Puyuma	1.98	-0.88

TABLE 7
(Continued)

Region and Society	D1	D2	Region and Society	D1	D2
Tawi-Tawi	0.68	-1.71	Lau Fiji	-0.24	1.21
Yami	0.83	-1.63	Vanua Levu	0.95	1.02
Iban	0.97	-1.86	Santa Cruz	0.41	0.60
Javanese	1.05	-1.46	Tikopia	0.75	1.15
Batak	-0.33	0.95	North Eurasia and Circumpolar		
Minangkabau	2.05	0.75	French Canada	-0.12	-1.74
Mentawaians	-0.13	0.09	Irish	-0.79	-1.10
Macassarese	0.81	-1.17	Saami (Lapps)	-0.73	-0.94
Alorese	0.48	-1.14	Czechs	-0.17	-1.97
Belu	1.80	0.52	Polar Eskimo	-0.86	-0.93
Tanimbar	0.41	0.82	Chukchee	-1.13	-0.84
Palau	0.32	0.05	Sivokakmeit	-0.59	0.24
Chuuk (Truk)	3.41	0.21	Ainu	0.69	-1.65
Majuro	1.85	0.15	Koreans	-0.37	-1.20
Ifaluk	1.68	-0.26	Japanese	0.23	-2.24
Pohnpei	1.92	0.41	Okinawa	0.03	-1.00
Yap	1.89	0.53	Nunivak	-1.27	-0.42
Chamorro	0.44	-1.96	Aleut	-0.39	-0.05
Ulithi	1.58	-0.82	Yukaghir	-0.37	-1.09
Nauru	1.83	0.17	Iglulik	-0.20	-1.70
Makin	1.75	-0.42	Tareumiut	-0.06	-1.74
Rotuma	2.12	-0.52	Nunamiut	0.08	-2.12
Samoa	1.37	-0.72	Gilyak	-0.09	0.98
Mangareva	0.89	-0.99	Caribou Eskimo	-0.19	-2.15
Pukapuka	1.29	0.08	Eastern Americas		
Tuvalu	1.64	0.19	Wind River	0.07	-0.60
Toradja	1.27	-1.31	Kiowa Apache	0.69	-0.23
Tokelau	1.76	0.70	Comanche	0.16	-0.40
Kapingamaringi	1.30	-1.02	Teton	-0.15	-0.07
Tonga	1.50	0.33	Assiniboin	-0.10	-0.11
Mangaian	0.89	-1.14	Hidatsa	1.12	0.02
Maori	1.21	-0.55	Omaha	0.12	0.77
Marquesas	0.05	0.22	Wichita	0.25	-0.38
Australia, New Guinea, and Melanesia (Sahul)			Pawnee	1.58	0.16
Aranda	-0.69	1.13	Hasinai	0.36	-0.24
Tiwi	-0.31	0.29	Shawnee	-0.16	0.53
Dieri	-0.07	0.25	Creek	1.02	0.35
Kariera	-0.46	1.13	Cherokee	2.06	0.54
Wikmunkan	-0.64	1.09	Natchez	-0.11	-0.50
Kapauku	0.12	1.43	Choctaw	1.41	0.35
Wantoat	0.10	1.22	Jicarilla	0.16	-0.23
Keraki	-1.24	0.91	Garifuna	-0.52	0.00
Waropen	1.14	1.46	Callinago	1.78	0.97
Orokaiva	0.80	1.49	Barama	-0.01	0.02
Kwoma	-1.09	1.39	Wapishana	-0.38	-0.53
Kiwai	0.16	1.16	Saramacca	1.19	0.46
Miriam	0.53	1.00	Shiriana	0.58	0.12
Abelam	0.62	1.40	Yabarana	0.61	0.12
Kutubu	-0.49	0.50	Camaracoto	-0.17	-0.27
Kimam	1.08	-0.32	Macusi	-0.68	-0.12
Ontong	1.68	-0.20	Panare	0.11	-0.12
Marindan	0.87	1.02	Makiritare	0.42	-0.31
Muju	0.26	1.32	Mundurucu	1.00	0.73
Siuai	0.93	1.25	Waiwai	0.43	-0.32
Trobriands	2.49	1.28	Siriono	1.56	0.17
Kurtatchi	1.27	0.32	Tucuna	-1.00	0.56
Lesu	1.71	1.15	Jivaro	0.72	-0.22
Dobuans	1.44	1.24	Cubeo	-0.95	0.70
Ulawans	1.03	0.34	Terena	0.06	-0.57
Manus	0.43	1.04	Trumai	-0.62	-0.04
Rossel	0.70	0.45	Bacairi	0.67	0.11
Choiseul	1.36	0.14	Camayura	-0.63	-0.19
Mota	1.85	1.18	Caraja	-0.44	-0.65
Seniang	-0.14	1.15	Sherente	1.08	0.86
			Ramcocamecra	1.50	0.30

TABLE 7
(Continued)

Region and Society	D1	D2	Region and Society	D1	D2
Tenetehara	0.06	-0.50	Klamath	-1.62	-0.93
Tupinamba	-0.49	-0.15	Maidu	-1.47	-0.95
Coroa	0.53	-0.20	Eastern Pomo	-0.90	-0.37
Mesoamerica, Central America, and Andes			Southern Pomo	-0.35	-0.30
Hano	1.54	0.33	Patwin	-1.26	-0.04
Zuni	1.90	0.62	Serrano	-1.77	0.80
Taos	0.42	-2.15	Winnebago	-0.95	0.63
Cochiti	1.96	-0.40	Cupeno	-1.66	0.43
Isleta	0.14	-1.65	Luiseno	-1.78	0.84
Tewa	0.65	-2.31	Kiliwa	-1.60	1.05
Hopi	1.75	0.22	Tenino	-1.73	-1.06
Tarahumara	-0.18	-0.73	Southern Ute	-0.54	-0.81
Huichol	0.56	-2.02	Hukundika	-0.44	-0.76
Chichimec	0.52	-1.94	Washo	-1.18	-0.95
Aztec	0.11	-1.19	Kutenai	-0.58	-0.86
Cuna	0.43	-1.64	Shushwap	-0.60	-1.49
Chorti	0.39	-2.35	Flathead	-1.26	-0.90
Choco	1.35	-1.35	Sinkaietk	-1.00	-1.35
Bribri	0.11	-0.32	Wishram	-1.30	-1.67
Yucatecan	-0.79	-0.50	Kidutokado	-1.46	-0.95
Cagapa	0.34	-1.46	Paiute	-1.65	-1.09
Paraujano	0.38	-1.64	Uintah	-0.71	-0.62
Goajiro	0.18	0.16	Gros Ventre	-0.16	-0.42
Guahibo	-0.62	-0.92	Sarsi	-0.12	-0.90
Piapoco	-0.13	-1.44	Piegan	-0.62	-0.54
Inca	0.97	-0.48	Plains Cree	-0.88	-0.12
Aymara	0.17	0.02	Chiricahua	-1.24	-0.84
Cayapa	-0.54	-0.48	Western Apache	-0.33	0.08
Tunebo	-0.52	-1.32	Yuma	-1.00	0.76
Toba	-0.05	-1.95	Keweyipaya	-0.37	0.02
Aweikoma	1.01	-1.52	Seri	-1.15	-0.52
Northern and Western North America			Pima	-0.29	-0.92
Nabesna	-0.32	0.16	Northwest Coast		
Naskapi	-0.81	-0.55	Kaska	1.24	0.32
Attawapiskat	-1.23	-0.15	Ingalik	0.27	-1.91
Carrier	-0.16	-0.60	Tanaina	0.08	-0.84
Kutchin	-0.25	-0.58	Haida	0.55	0.74
Chippewa	-1.21	0.09	Twana	0.00	-1.85
Eastern Ojibwa	-0.78	-0.13	Kwakiutl	0.34	-1.72
Alkatcho	-0.40	-1.99	Eyak	0.11	0.44
Yurok	-0.34	-1.74	Bellacoola	0.32	-1.76
Tolowa	-2.03	0.75	Nootka	0.11	-1.91
Karok	-1.17	-0.85	Klallam	-0.15	-1.28
Hupa	-1.51	-0.82	Puyallup	0.24	-1.96
Wiyot	-0.88	-1.14	Tlingit	0.45	0.72
Tubatulabal	-0.89	-0.38	Quinault	0.07	-2.07
Yokuts	-0.69	0.25	Lillooet	-0.16	-1.98
Atsugewei	-1.92	-1.23	Southern South America		
Miwok	-0.56	0.76	Ona	-0.78	-0.99
Diegueno	-1.76	1.03	Yahgan	-1.60	-0.90
Yuki	-1.34	-0.95	Mapuche	-1.39	1.28

historical connections with North Africa, the Middle East, and India, which are all in the Middle Old World region. In the west, the northern boundary of Sub-Saharan Africa is the center of the Sahara Desert, an important hindrance to travel.

There is no obvious physical boundary in Northeast Africa, and many of the societies in Northeast Africa could be placed either within Africa or within the next

region. This is one of several places in the world in which regional boundaries are not straightforward but better described as fuzzy or contested.¹¹ Our best guess at a "boundary" in Northeast Africa is the Sudd in the Nile River basin, a vast swamp that was historically difficult to cross. East of the Nile Basin we have placed the

11. The latter phrase aptly describes the Sudanese civil war.

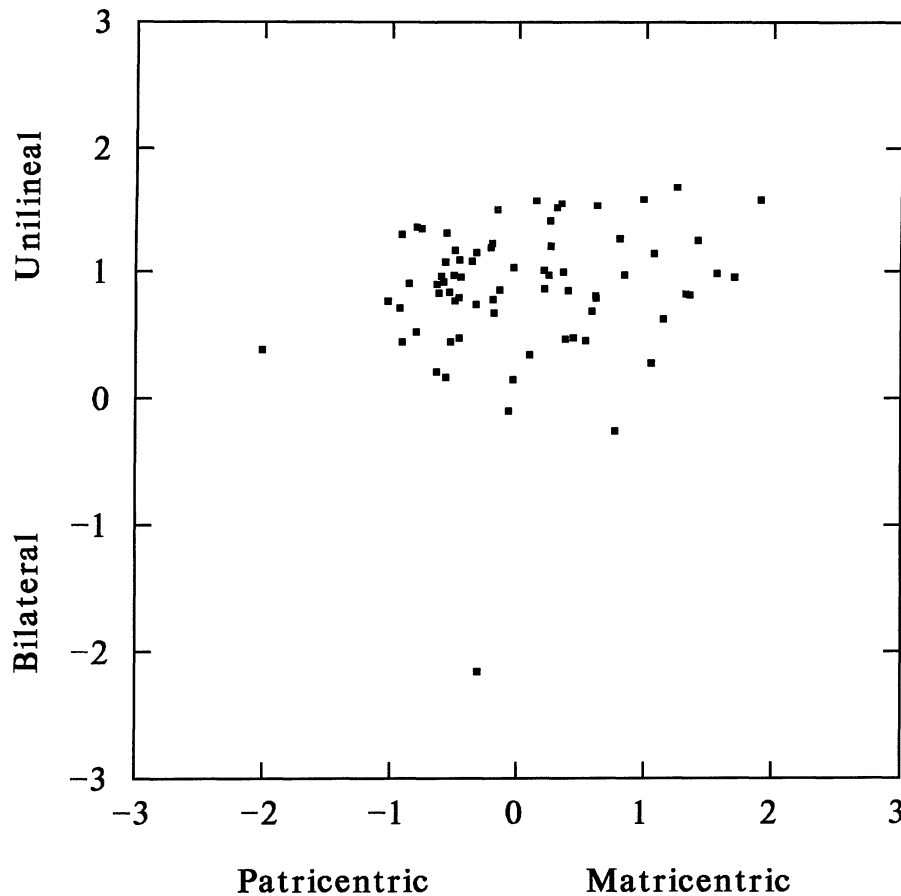


FIG. 4. Sub-Saharan Africa.

boundary south of the Central Ethiopian highlands and north of the Ahmar Mountains, placing southern Ethiopia within Sub-Saharan Africa. This attempt at a boundary provides the best correspondence between the data and the regional classification, while making use of physical topography. In Northeast Africa and in other areas where regional boundaries are fuzzy, we have made use of our own ethnographic knowledge or consulted ethnographies or *Ethnographic Atlas* codes of societies not in the current sample to assist us in placing the boundary.

Among the nine regions, Sub-Saharan Africa is the second most homogeneous with respect to social structural distances. Without the !Kung, Africa would be the single most homogeneous region.¹²

The *Middle Old World* includes North and Northeast Africa, the Middle East, South and Central Asia, most of China, and the Vietnamese. It may also include a portion of Southeastern Europe, but we have no cases there.¹³

Abu-Lughod (1989) describes a world system that pre-

ceded the European capitalist world system. This system was centered in the Middle East, South Asia, and China. As Abu-Lughod argues, for most of history the economic center of Eurasia was in this region. The precapitalist world system was based on trade routes by land and sea. The most important land routes went from the Middle East to China. The most important sea routes crossed the Arabian Sea to India and then went through the Straits of Malacca to China (Curtin 1984). Many scholars have noted the importance of this region. Lomax described a larger region that also included much of Southern Europe, coastal East Africa, and portions of Southeast Asia, that he called the Old World High Culture Region (Lomax 1968).¹⁴ This region is also the basis for many of Goody's comparisons (1976, 1982, 1993), and Kroeber (1948:423) described it by the Greek label *oikumene*, meaning "civilized world."¹⁵

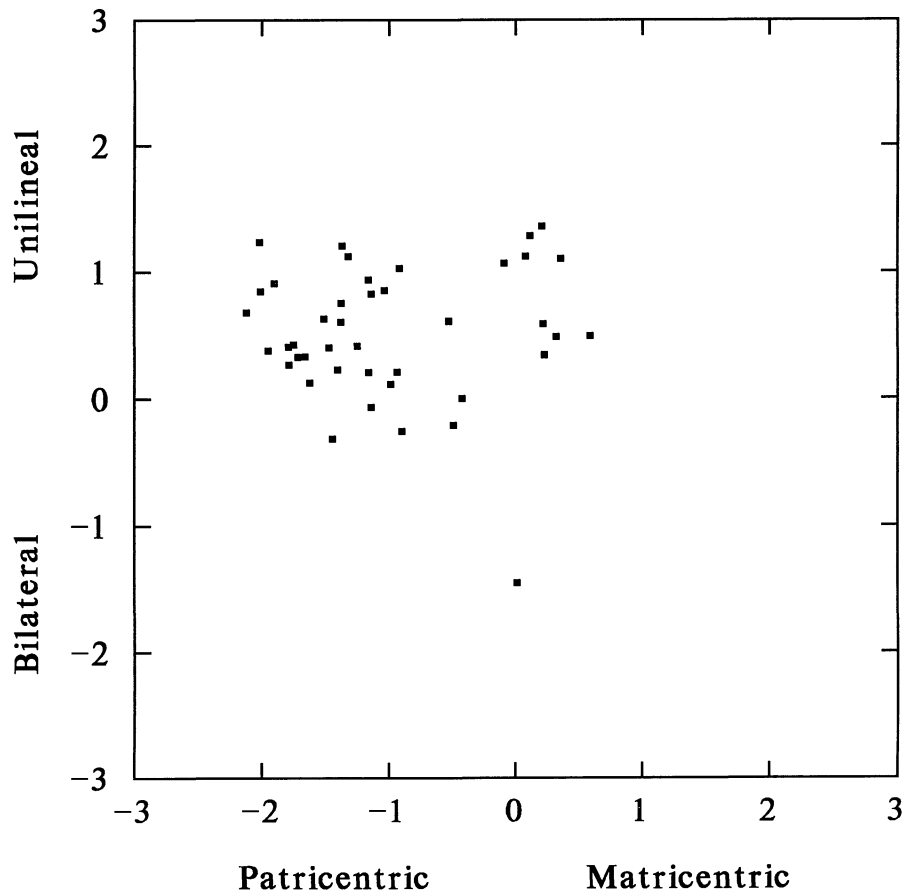
Like Sub-Saharan Africa, the Middle Old World is unilineal (fig. 5), but it is mainly patrilineal, with no strongly matrilineal societies, and the quadratic assignment procedure shows a significant difference in social structure between the Middle Old World and Africa ($Z = -9.99, p < .0001$). The Middle Old World has a

12. The average social structure distance would be 1.07.

13. Some additional societies in Southeast Europe are coded in the *Ethnographic Atlas*. We placed the boundaries around the Middle Old World after consulting these additional codes.

14. We thank Phil Bock for pointing this out to us.

15. We thank Richard Fox for bringing this concept to our notice.

FIG. 5. *Middle Old World.*

combination of two kinds of constraints—it is constrained both to being unilineal and to being patricentric. Of the five slightly matrilineal societies three (Khasi, Garo, Chin) are border societies, adjacent to the matricentric Southeast Asia and Pacific region. The other two (Toda and Burusho) are in India. The one bilateral society, the Amhara, would be an outlier in either Africa or the Middle Old World, having a kind of bilateral social structure that is common among the Christian societies of Europe. We placed Amhara within the Middle Old World on the basis of its long-standing historical connections with that region.

The Middle Old World is connected by a continuous zone of arid or semiarid land that extends from North Africa through the Middle East to China, a zone that has long been populated by pastoralists and was the site of land trade routes that were dependent upon domesticated animals. Throughout the region the horse was an instrument of military power and means of transport.

Agriculture within the Middle Old World frequently involves the plow, cereal crops, and the cattle complex of domesticated animals—variables that have been shown to be strongly associated with male farming (Burton and White 1984). Along with male farming, the Middle Old World shows a strong tendency for women to be restricted from public roles, with little political or

economic autonomy. Purdah, veiling of women, foot-binding, infibulation, the suttee, and the honor-shame complex all originated within the Middle Old World. Among patrilineal societies of the Middle Old World, women are incorporated into their husbands' groups after marriage, in sharp contrast with the African patrilineal pattern.

In the Middle Old World there have been many civilizations based on irrigation agriculture. Most of the earliest Eurasian civilizations are in the Middle Old World—Egypt, Mesopotamia, the Indus Valley, and China. Most of the important empires of Old World history were in the Middle Old World, and all of the major world religions originated in this region, as did many of the world's writing systems. The importance of the Middle Old World is not simply historical—countries located within this region currently contain about half of the world's population.

Southeast Asia and the Insular Pacific includes mainland and insular Southeast Asia, Micronesia, and Polynesia. Societies in Southeast Asia and the Insular Pacific are almost all matricentric (fig. 6), with the patricentric option being excluded. This is the only strongly matricentric region, and it includes the most strongly matricentric society in our sample, off the graph to the right, Chuuk (formerly called Truk). The matricentric pattern

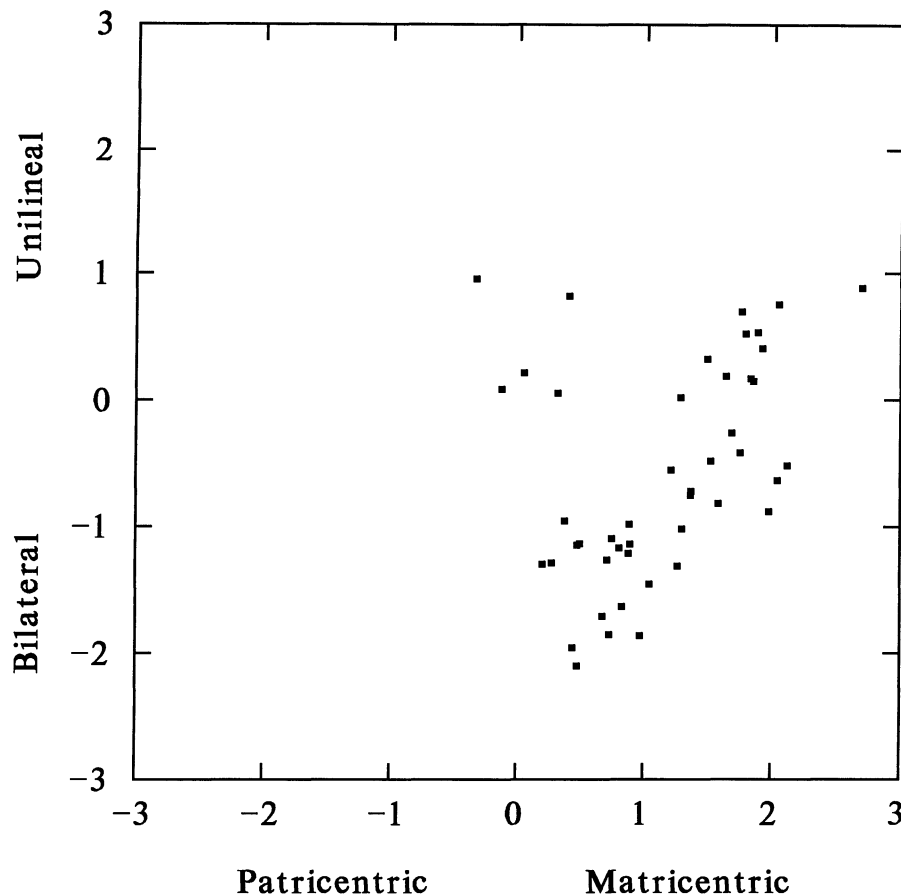


FIG. 6. Southeast Asia and the Insular Pacific.

includes matrilineal societies, such as Chuuk and Minangkabau, as well as matricentric bilateral societies, such as Maori, Subanun, Java, and Toradja, described in the Pacific literature as having nonunilineal-descent systems (Davenport 1959). The center of gravity of the region is in the matricentric bilateral quadrant. The two most strongly bilateral societies are the Andamanese and the Chamorro. The former are geographically peripheral to the region, and the latter experienced three centuries of Spanish colonization. Forty of the 47 societies in Southeast Asia and the Insular Pacific have Austronesian languages, and the region includes 40 of the 56 Austronesian-speaking societies in our sample.¹⁶ However, there is no statistically discernible difference in social structure between the Austronesian and non-Austronesian societies of this region, nor are there differences among hypothesized subregions (Insular Southeast Asia, Mainland Southeast Asia, Polynesia, Micronesia).

The boundary between Southeast Asia and the remainder of Asia is marked by mountains, and the mountainous region of southern China is like Northeast Af-

rica and southeastern Europe, a boundary zone in which many societies could be placed in either region. Matricentric social systems have been described within the Chinese national boundaries, in the south.

Historically there were trade and migration linkages between the Middle Old World and Southeast Asia, and the Austronesian peoples are thought to have originated in southern China before migrating throughout the region. However, the two social structural patterns are almost completely mutually exclusive. Within Southeast Asia, Islamic societies such as the Javanese and Minangkabau fit the matricentric pattern. Even though their religious systems diffused from the Middle Old World, the social structural pattern remains matricentric.

Australia, New Guinea, and Melanesia includes Australia, New Guinea, the islands near New Guinea that are now called "Melanesia," and Fiji. It has unilineal social structure (fig. 7), with the exclusion of the bilateral option, and the overall pattern is not significantly different from the African pattern ($Z = -1.52, p = .13$). The most strongly matrilineal society is the Trobriands, and the most strongly patrilineal societies are Keraki and Kwoma. There are two slightly bilateral societies—Kimam and Ontong Java. The matrilineal societies of Melanesia fit better within this region than within

16. Of the others 2 are in Madagascar and 14 in Melanesia or New Guinea.

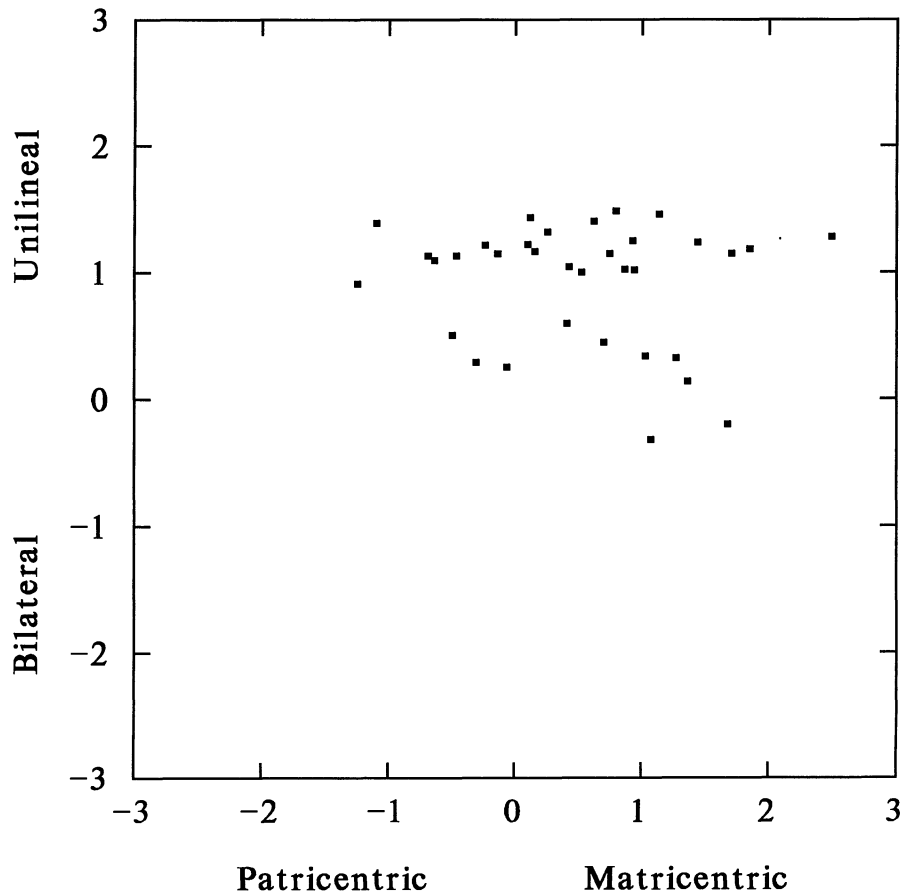


FIG. 7. *Australia, New Guinea, and Melanesia.*

Southeast Asia and the Insular Pacific because they are more unilinear.

Australia and New Guinea are much larger landmasses than the remaining Pacific Islands, and the ecological adaptations of this region are more often land-based rather than sea-based. Australia, New Guinea, and some surrounding islands are on a separate continental plate, called either Sahul or Meganesia, and share many unique flora and fauna. During the Ice Ages there was a land bridge between the two.

In the Pacific literature there is a long-standing regional classification into Australia, Melanesia, Polynesia, and Micronesia. This distinction has been widely criticized (Thomas 1989), and there had been recent discussion of the validity of the Melanesian region (Terrell 1993). However, there is considerable social interchange between the Papuan and Austronesian populations of this region, so this regional division makes sense in terms of contiguity. The current classification also produces more homogeneous regions with respect to social structure.¹⁷ Our classification of societies in Southeast Asia and the Pacific into two regions is more parsimonious than conventional usage, which has five regions (Southeast Asia, Micronesia, Polynesia, Melanesia, Australia).

17. This includes our placement of Fiji within Melanesia.

We call the region north of the Middle Old World *North Eurasia and Circumpolar*, since it includes North Asia and the Inuit and Aleut, who are closely related to Siberian societies. Most societies in the region are patricentric and bilateral (fig. 8), none is strongly matricentric and only one, the Gilyak, a reindeer-herding society, is strongly unilinear.

Our sample has only four European societies, of which the Czechs are the farthest south. They are all found in the patricentric bilateral quadrant. Lacking data, we cannot be certain where the boundary should be between Western Europe and the Middle Old World, but an inspection of data from the *Ethnographic Atlas* suggests that some of the societies that were in the Ottoman Empire should be placed within the Middle Old World. Therefore we have placed the boundary in the middle of the Balkans¹⁸ in the eastern Mediterranean and in the Mediterranean farther west. From here the boundary runs through the Black Sea and north of the Caucasus Mountains. Within Central Asia the boundary is north of the historically important trade routes between South Asia and China. We placed Japan and Korea within North Eurasia on the basis of social structure and proximity to Siberian societies. We classified the Inuit and Aleut with North Eurasia on the ground that they

18. Another currently contested zone.

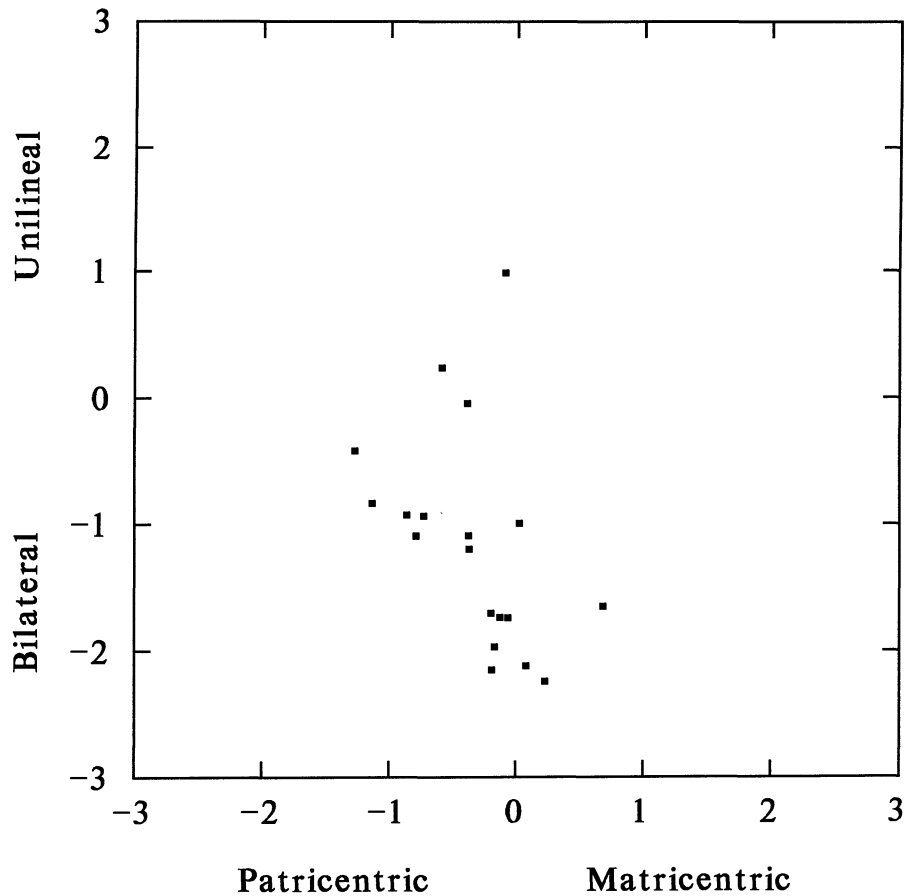


FIG. 8. North Eurasia and Circumpolar.

migrated to North America more recently than other Native Americans and the Inuit also live in Siberia.

Societies in Europe developed agriculture and urban society later than the societies in the Middle Old World,¹⁹ and many of the societies in this region are too far north for agriculture. Many societies in this region obtained religious ideas, farming practices, and technology from the Middle Old World and were on the periphery of the precapitalist world system.

As we noted above, the first four regions border on the Indian Ocean. This is no accident—the Indian Ocean was the social and economic center of the classical Old World. Within the Indian Ocean world system the Middle Old World was the central region. The Middle Old World has strong historical linkages with three other regions: Sub-Saharan Africa, North Eurasia, and Southeast Asia. As the core of the ancient world system, the Middle Old World connected all of the major parts of the Old World system by land routes as well as the Indian Ocean.

2. *The Americas.* Murdock's Americas sample is primarily a sample of American Indian societies. It includes only a small number of societies of post-

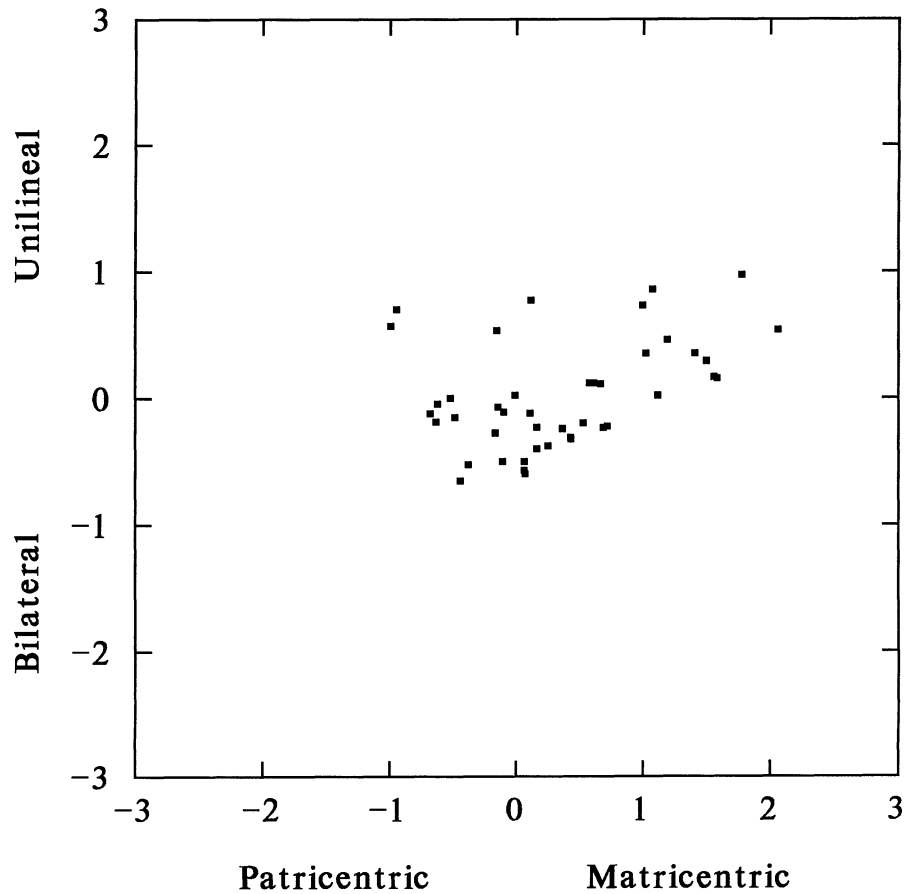
Columbian migrants from the rest of the world. Of these, the French Canadians, Saramacca, and Garifuna are in our sample.

American Indian societies lacked several technological traits that were important in the Old World social structure. These included the horse and other important domesticated animals, the wheel, the sail, the plow, and ironworking. With these technological differences, we would not expect social structure patterns between the two hemispheres to be identical, and they are not ($Z = -15.60, p < .001$). However, we should not overstate the difference, since partition of the world by hemisphere increases homogeneity only by 6%. Dividing the Americas between North America and South America produces little statistical improvement.

In formulating regions for the Americas we began with older classifications of North American Indians. Kroeber (1939) classified North America into six regions—Arctic Coast, Northwest Coast, Southwest, Intermediate and Intermountain, Eastern, and Mexico and Central America. His approach influenced further classifications by Driver (1961) and Jorgensen (1980). As we extended the model, we found that the distinction between North and South America is invalid; three of our four regions cross the boundary.

Eastern Americas. It took some time for us to see the

19. According to Renfrew (1987), agriculture spread to Europe from Anatolia with the Indo-European migrations.

FIG. 9. *Eastern Americas.*

striking similarity between the American Indian societies of eastern North America and those of eastern South America. The Eastern Americas includes the eastern woodlands and plains of North America, the Caribbean, and the woodlands portion of eastern South America.²⁰ Within this region there is no discernible difference in social structure between North America and Central-South America ($Z = -.53, p = .60$). Rouse (1986) makes a convincing argument for the ease and frequency of historical migrations between eastern North America and eastern South America, and migration within eastern North America and eastern South America was facilitated by major river systems such as the Mississippi and the Amazon.²¹

Societies within the Eastern Americas tended to practice farming in a forest environment, with high levels of hunting, gathering, and fishing. The Eastern Americas corresponds closely to three of Wissler's (1922:2) eight American food areas—the manioc area, the eastern maize area, and the bison area. We paid close attention to the placement of Plains Indian societies, because they are outside the forest zone. While some of these mi-

grated into the Plains from the west, many of the Plains Indians migrated from the Eastern Woodlands and subsisted partly by farming, and most Plains Indian societies fit better within the Eastern Americas region than within the Northern and Western North America region.

Eastern Americas has the most homogeneous social structural pattern of all regions. This pattern ranges from slightly bilateral to moderately unilineal, with a tendency toward matrilineality (fig. 9). Compared with two other regions where horticulture is practiced within a forest environment—Africa and Australia–New Guinea—Eastern Americas is much less unilineal, possibly because of the absence of large domesticated animals.

Mesoamerica, Central America, and the Andes includes the major state-level systems of Mesoamerica and the Andes, along with societies such as the Pueblos that had historical links with these systems. It is very close to Wissler's area of intensive agriculture (1922:2). The southern boundary is the Atacama Desert. Societies in this region tend to be bilateral (22 out of 27 societies) or matrilineal (20 societies), with 16 out of 27 societies having both attributes (fig. 10).²² The three matrilineal

20. The sample includes two African-American (Garifuna, Saracacca) societies that had historical contact with American Indian societies.

21. We are indebted to Joe Jorgensen for this observation.

22. Including the Aztec and Inca. On Inca gender see Silverblatt (1987).

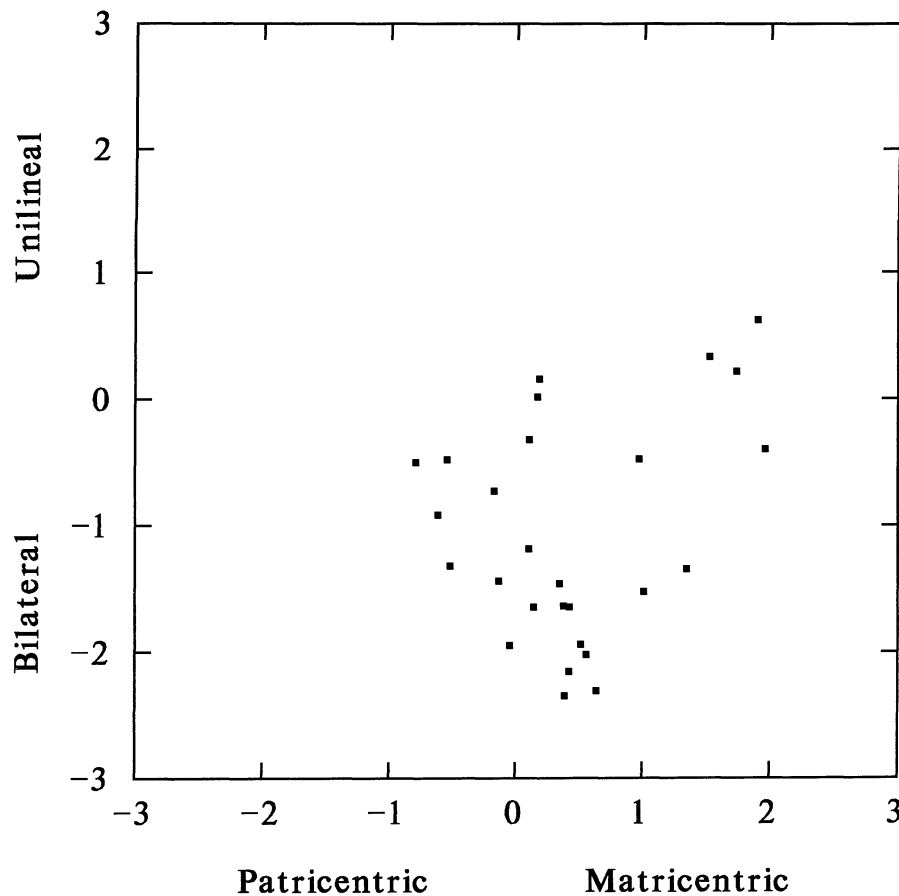


FIG. 10. Mesoamerica, Central America, and the Andes.

societies are Hano, Zuni, and Hopi. Two others are slightly matrilineal.

Many of the societies within this region have a long history of contact with Spanish culture, usually involving clear domination, and it seems plausible that its social structure pattern has been affected by this contact. If so, the pattern within the region would have been shifted towards the European pattern of patricentric bilateral social structure, and this region would have once been more similar to the Eastern Americas. Since Spanish culture had differential effects on New World communities, the likely effect would have been to make the region less homogeneous than it once was.

Northern and Western North America includes Canada, Alaska, and the United States west of the Rockies, excluding the Northwest Coast and the Pueblos. This region has a striking patricentric pattern, with both patrilineal and patricentric bilateral cases (fig. 11), and a complete exclusion of the matricentric option. The most highly patrilineal societies are Kiliwa, Diegueño, Serrano, Yuma, and Miwok, and the most strongly bilateral societies are Alkatcho, Yurok, and Sinkaietk. Societies in this region are predominantly dependent upon hunting, gathering, and fishing for subsistence.²³

23. Steward's (1955) patrilocal-band concept was based on his research in this region.

We derived Northern and Western North America by merging Driver and Coffin's (1975:15) Northern and Southwestern regions and then removing the Northwest Coast and Pueblo societies. We have no cases from a portion of Eastern Canada, so we cannot be certain where the southern boundary should be in that area.

While Northern and Western North America is like North Eurasia and Circumpolar, its neighbor to the north, in being patricentric, it is more strongly so and more likely to be unilineal. The quadratic assignment procedure shows significant differences between the two regions ($Z = -3.80, p < .0001$).

Northwest Coast societies fall into two groups, a group of four moderately matrilineal societies, all Na-Dene-speakers (Kaska, Haida, Tlingit, and Eyak), and a group of gender-balanced bilateral societies. The Northwest Coast region extends from Alaska to the Columbia River and possibly into Oregon.²⁴ California societies do not fit within the Northwest Coast. Jorgensen (1980: 146), who also makes this point, says that an important distinction is between the tendency toward individual property ownership in California versus kin-group property ownership in the Northwest Coast. The Northwest Coast (fig. 12) is more matricentric than the adjacent

24. Our sample has no cases from the Oregon coast.

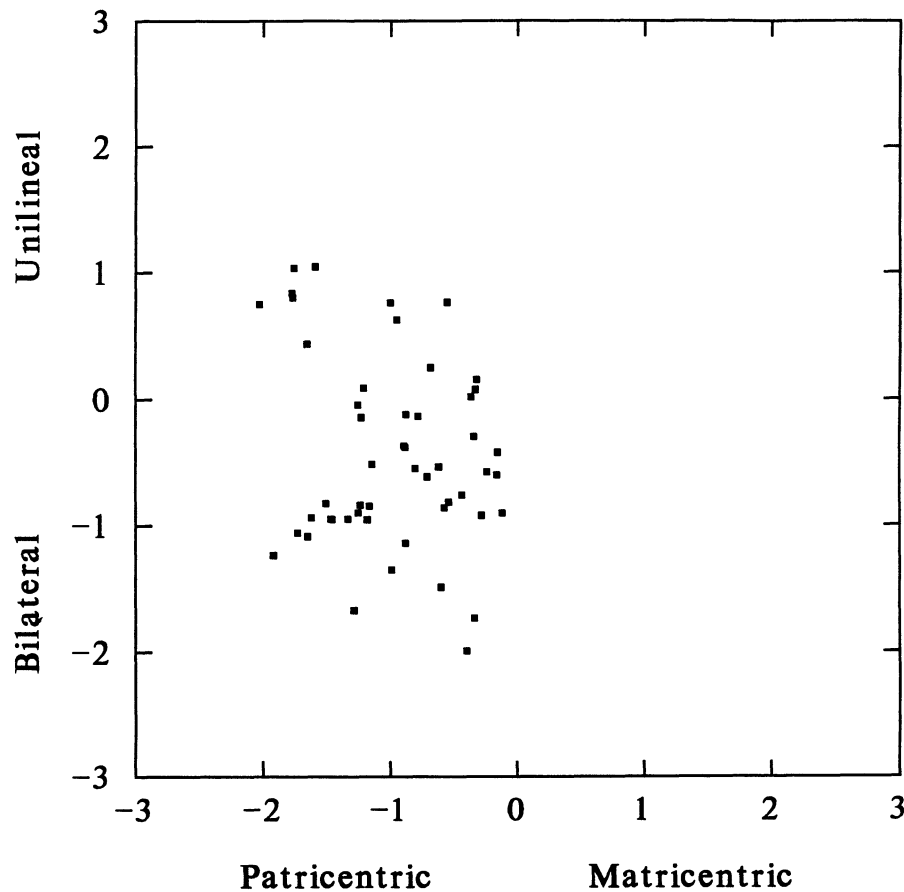


FIG. 11. *Northern and Western North America.*

North Eurasia and Circumpolar region, but the quadratic assignment procedure shows only a moderate difference between two ($Z = -1.64$, $p = .10$).²⁵ Furthermore, the Northwest Coast cannot be distinguished statistically from Mesoamerica and the Andes ($Z = -.37$, $p = .71$), and the latter is very similar to North Eurasia and Circumpolar ($Z = -1.92$, $p = .06$). Hence, with the exception of California, the Pacific Rim from Japan to Chile shared a predominant bilateral social structural pattern.

Southern South America consists of three strongly patricentric societies that fit neither with Eastern Americas nor with Mesoamerica-Andes. Two of these, the Ona and the Yaghan, are foragers with a patricentric bilateral pattern. The third, the Mapuche, had extensive herds of llamas and a patrilineal social structure. We have too few cases here to test the hypothesis that there is a tenth region in southern South America.

Mean Values, Average Distances, and the Quadratic Assignment Procedure

Mean values of the regions on the two dimensions are plotted in figure 13. The ellipses show the 90% confi-

25. Placing the Eskimo and Aleut in the Northwest Coast rather than North Eurasia would worsen the fit to the data.

dence interval for each region's mean. The quadratic assignment procedure showed a strong fit between the model and the data ($Z = -38.11$, $p < .0001$). We measured social structural homogeneity as the average distance in the social structural space among societies within each region (table 8). Average distances within regions range from 1.07 to 1.44, with an overall mean distance within regions of 1.20. By comparison, the average social structural distance within the entire sample of 351 societies is 1.81. The ratio of the two—66.3%—expresses the relative homogeneity of societies within regions compared with worldwide homogeneity. Hence, the regional classification accounts for one-third of the aggregate distances within the social structural space. Of all regional classifications we considered, the one presented here has the best fit to the data.

Comparison with Murdock's Regions

Murdock developed a six region classification and used it for three important cross-cultural samples—the World Ethnographic Sample (Murdock 1957), the *Ethnographic Atlas* (Murdock 1967), and the Standard Cross-Cultural Sample (Murdock and White 1969). His regions are East Eurasia, Circum-Mediterranean, Africa, Insular Pacific, North America, and South America. These regions seem

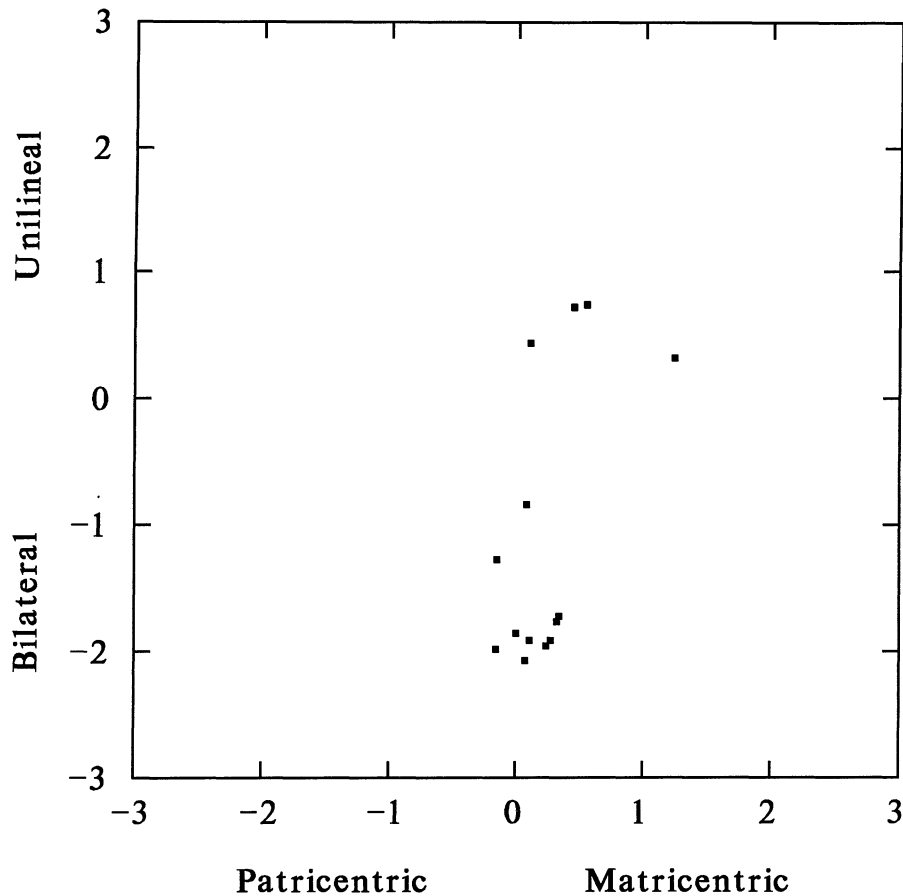


FIG. 12. Northwest Coast.

to have been accepted uncritically by a wide variety of scholars. Many cross-cultural studies have used them, and they have been used widely outside of cross-cultural research (Goody 1976, Caldwell, Caldwell, and Quiggin 1989, Paige and Paige 1981, Whyte 1978).²⁶

Murdock's East Eurasia region includes Madagascar, South Asia and Iran, East Asia, Siberia, Central Asia, and mainland Southeast Asia. His Circum-Mediterranean region includes Europe, Northern Africa, portions of Sub-Saharan Africa, and much of the Middle East and extends from Iraq and Senegal to Iceland. Murdock's rationalization for the Circum-Mediterranean was as follows (1957:666):

Africa and Eurasia are characterized by a much larger land surface and a considerably greater diversity of cultures than the other three. We therefore reduced them to comparable properties by creating a sixth region, the Circum-Mediterranean, and transferring to it the northern portion of Africa and the western portion of Eurasia, including Europe, the Caucasus, and the Near East. This new area corresponds

roughly to the core of the Christian and Islamic worlds.

The boundary between Africa and the Circum-Mediterranean is based on religion. Christian (Amhara) and Moslem (agricultural Tukolor Fulani, Wolof, Songhai, Kanuri, and Hausa) societies are placed in the Circum-Mediterranean and adjacent nonmonotheistic societies (pastoral Futajalonke Fulani, Serer, Mende, Bambara, Tallensi, and Azande) in Africa, thereby placing the northern boundary of Africa in the middle of the Sahel and dividing historically connected West African societies.

The Circum-Mediterranean and East Eurasia regions both include very diverse societies that were not closely linked historically by trade, migration, or other contact. Neither region is accurately described by its name, and our statistical measures show them both to be heterogeneous in social structure. Although Murdock claimed that his Circum-Mediterranean contained the core of the Islamic and Christian worlds, he placed Christian societies in a single region while splitting the Islamic world among the Circum-Mediterranean, East Eurasia, and the Insular Pacific. Being centered in Europe, the Circum-Mediterranean treats the historical homelands of Western civilization—Egypt and Mesopotamia—as

26. Barry (1980) lists 128 studies citing the Standard Cross-Cultural Sample as of 1978. Since this sample is based on stratification by region, any use of it constitutes an implicit acceptance of Murdock's regions.

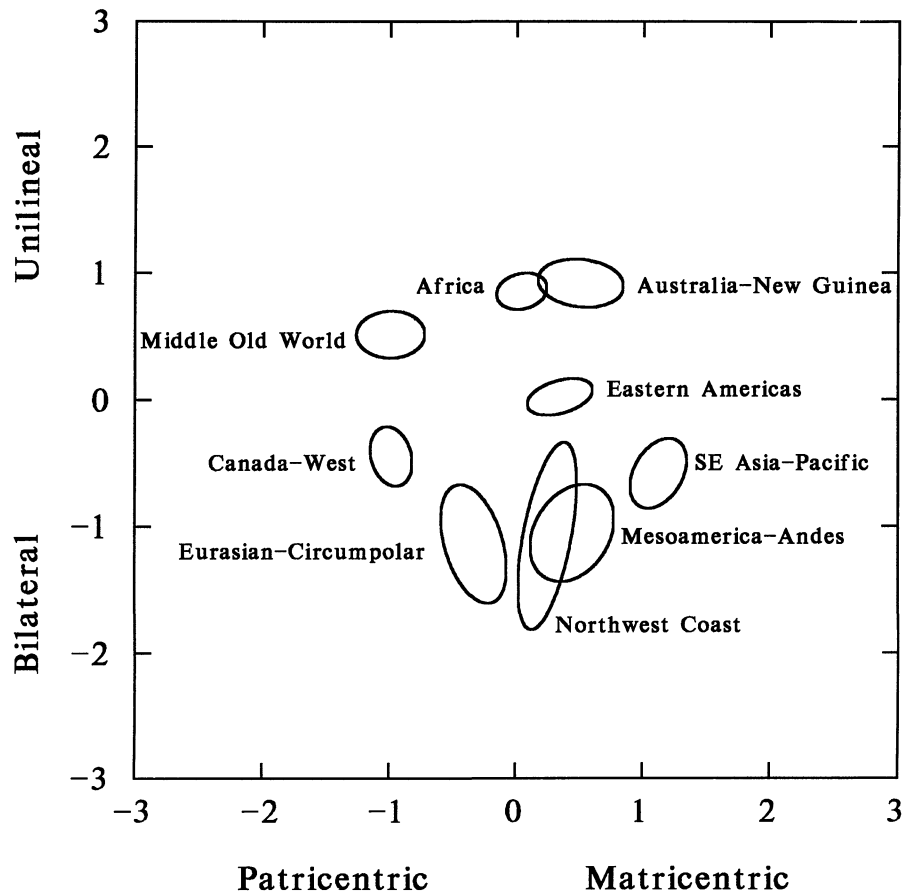


FIG. 13. *Relationships among the regions.*

peripheral to a predominantly European region. Furthermore, we can see no basis in principle for the location of Murdock's boundary between the Circum-Mediterranean and East Eurasia at the Caspian Sea and the Ural Mountains, neither of these being a significant physical barrier. Murdock included the Kalmyk Mongols in East Eurasia, although they are west of the Caspian

Sea, while their near neighbors the Armenians and Circassians are in the Circum-Mediterranean.

Murdock minimized the size of Africa by putting Madagascar with East Eurasia and large portions of Sub-Saharan Africa within the Circum-Mediterranean. He said he did this because of Africa's great spatial extent and cultural diversity. However, his East Eurasia region is twice the size of Africa. Furthermore, our statistical measures show that, unlike his East Eurasia, Africa has a homogeneous social structural pattern.

Murdock's Insular Pacific includes Indonesia, Australia, New Guinea, Melanesia, Polynesia, and Micronesia. The name is misleading in that Indonesia is not in the Pacific. The Austronesian-speaking Malay and Malagasy are placed in East Eurasia. The Insular Pacific region is more heterogeneous than our two Pacific regions.

The boundary between North and South America is unusual, dividing North America at the Isthmus of Tehuantepec and thus placing the Yucatecan Maya in "South America." The Caribbean and the Bahamas are also placed in South America.

Murdock's classification divides several important cultural groupings into two or more regions, including Circumpolar (North America, East Eurasia, and Circum-Mediterranean), Islamic societies (Circum-Mediterranean, East Eurasia, and Insular Pacific), West Africa (Cir-

TABLE 8
Average Social Structure Distances within Regions

	N	Average Distance
Sub-Saharan Africa	71	1.13
Middle Old World	42	1.17
Southeast Asia and the Insular Pacific	47	1.42
Australia, New Guinea, and Melanesia	34	1.25
North Eurasia and Circumpolar	19	1.20
Eastern Americas	43	1.07
Mesoamerica, Central America, and the Andes	27	1.44
Northern and Western North America	51	1.15
Northwest Coast	14	1.33
Average within regions		1.20
Average worldwide		1.81

cum-Mediterranean and Africa), Malaya and Indonesia (East Eurasia and Insular Pacific), and Mesoamerica (Aztecs placed in North America, Mayans in South America).

The average social structural distance within Murdock's regions is 1.57, or 86.7% of the worldwide average, meaning that Murdock's regions account for only 13% of the distances within the social structural space. Murdock's regions do no better than a simple classification into four continents (Africa, Eurasia, North America, and South America) plus the Pacific. That classification has an average social structural distance of 1.58, 87.4% of the worldwide average. The ratio of average distances within our regions to average distances within Murdock's regions is .76, meaning that our system is almost 25% better with respect to the social structural distances.

Discussion

Our findings will add to the emerging discussion about regions and their effect on the anthropological research process. We have identified regions that correspond with known social-historical processes and have interpretable social structural patterns. The regional patterns take the form of variation within a bounded domain. Within these domains, societies seem to have been free to vary within limits set by a cultural configuration—often interpreted in terms of options that are excluded. The model that would be appropriate here seems to be Kroeber's model, wherein cultures vary freely within an environment that puts a stable limit on their variation. For example, societies in two regions (Africa, Sahul) have been constrained from developing the option of bilateral descent; societies in Southeast Asia and the Insular Pacific have been constrained from developing patricentric systems while being in free variation between unilineal and nonunilineal systems; and societies in Northern and Western North America have been constrained from developing matricentric systems while also being in free variation between unilineal and bilateral descent.

The presence of interpretable social-historical patterns supports the notion that cultures are not isolated units but are connected within larger systems through economic, political, and migration links. By taking social-historical linkages into account, our regions are intended to respect important macroscopic linkages among societies. The resulting classification keeps intact the two precapitalist world systems—the Middle Old World system and the American system that included Mesoamerica and the Andes. Our findings should contribute to ongoing discussions about world systems and the state.

There is a strong relationship between the work embodied in this paper and research on Galton's problem, which has posed a threat to the validity of comparative research in anthropology. Previous work on Galton's problem has involved improvement in sampling strata

(Murdock 1968, Murdock and White 1969, Naroll 1967), improvement in measures of historical and spatial connections among societies (Naroll 1965, White, Burton, and Dow 1981), and improvement in the statistical methodology for correcting for those connections (Dow et al. 1984, Loftin 1972). By developing a regional classification based both on social structural patterns and on historical connections among societies, the present research will make a contribution to the first two of these agendas.

Our research shows that gender is a defining feature of culture regions. We did not choose the social structural dimensions in advance of the analysis; rather, they emerged from the data. However, our discussion of these topics has been informed by anthropological theory. Instead of a universal gender pattern we see three main patterns—regions that vary freely between patricentric and matricentric social systems, patricentric regions, and a matricentric region. While these findings are consistent with the trend of anthropological research on gender, they are not consistent with some current theoretical positions in gender studies. For example, a number of theorists link the state with low female status. While the state-level societies of Eurasia follow a strongly patricentric pattern, this is not true of the Americas, where the pattern of state-level systems shows more gender balance. We think that the patterns of gender inequality within Eurasian state-level societies can be explained by the specific circumstances of production and exchange within those societies rather than by intrinsic characteristics of states per se. Other forms of hierarchy do not necessarily imply gender inequality.

Previous regional constructs incorporated several conceptual errors. Most notably, they divided Eurasia on an east-west basis and the Americas on a north-south basis. In fact, the alignment of these two landmasses is the opposite, with the north-south division being more appropriate for Eurasia and the east-west division more appropriate for the Americas. There is very likely a geographic basis for these alignments, based on the primary alignment of major mountain ranges (Diamond 1994). Mountain ranges can act as a barrier to migration across the range, while mountain valleys act as a conduit to migration in the direction of the range. Hence, Old World mountain ranges and valleys facilitated east-west migration while New World mountain ranges and valleys facilitated north-south migration. Furthermore, the alignment of continents affects the alignment of sea routes. To a great extent the Old World system was organized around the Indian Ocean, with Africa to the west, the Middle Old World to the north, and Austronesia and New Guinea to the east. Within the New World, sea travel would have had to be from north to south, with the Caribbean offering a favorable route for sea travel (Rouse 1986).

The method developed here could be used to identify regions based on criteria other than social structure. These criteria could be as diverse as artistic styles and subsistence. The method could also be used to identify subregions, either by further analysis of the present data

or by working with other data sets. It allows for the integration of historical, ecological and cultural information within a single framework. Finally, it can be used to study relationships between sociocultural domains and language families. We are currently working on an analysis of relationships between language families and social structure.

It is nearly 100 years since Boas published his paper on comparative method, setting the agenda for an important research program in anthropology. Only recently have methodologies been developed that make it possible to improve upon the work of the great anthropologists of the early 20th century. The problem has proven to be more complex than Boas could have imagined, and the current paper represents only a small portion of the work yet to be done to obtain valid understandings of the relationships among the environment, history, and space.

Comments

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“Regions Based on Social Structure” is an important, innovative, imaginative solution to the problem of defining regions (culture areas) for the purpose of testing cross-cultural generalizations. Such work depends ultimately on the existence of systematic data based on large numbers of cultures, like Murdock’s 1957 World Ethnographic Sample, the best then available, which, he told me, he published in the *American Anthropologist* instead of his presidential address so that other anthropologists could work with it—and so they did.

This generous act provided a new standard in terms of the data base, as have successive and larger samples growing in part out of his work. Over the decades, these samples have been used for better comparative studies. The subdivision of the world into culture areas, however, remained impressionistic. The present authors deserve our gratitude for providing us with the methods for and the results of a new, nonarbitrary division of the world into regions, as well as the methods for new partitions using other variables. Their maps have given the world of culture a new look.

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The idea of the existence of precapitalist world systems is one of the main advances in the social sciences. However, the precapitalist world system has only been for-

mulated theoretically. Neither historians nor anthropologists have been able to discover a sociohistorical structure with those characteristics. In physics scientists speak of black holes and know their properties, but they have not yet *seen* a black hole through a telescope. We are in the same situation.

Reading Burton et al.’s paper suggests to me that there may be two ways of discovering social dynamics (of which world systems are a particular kind), both based on multivariate statistical methods: (1) the constrained classification of modern societies and (2) analysis of the dynamics of past societies. This is the old distinction between anthropology (synchronic) and history (diachronic). Burton et al. adopt the first approach, but to my mind it is the less appropriate. They have arrived at some interesting generalizations, but I question the point of classifying modern societies. They seem to think that observed similarities in modern social structure are the result of belonging to a past world system. In other words, if some human groups have been connected for a period of time, then they will show the same social structure today. I reject this assumption.

Human societies change continuously. Our goal as social scientists (historians or anthropologists) should be to discover and explain this change. Classifying societies does not tell us anything about historical phenomena or about the historical consequences of world-system dependency relationships. This paper offers a view of human societies as if they had not changed in the past 5,000 years. An alternative approach to the discovery of the consequences of world systems for modern social structure is that of Frank, which is, however, full of sampling errors and adopts too formal a view of historical dynamics (cycles of 200 years). Instead of randomly classifying some modern societies we must select spatially contiguous groups and study their changes and interrelationships over long periods of time.

Correspondence analysis is one of the best classificatory algorithms, but it is not appropriate for spatial classification, and this is what Burton et al. are doing (a region being a spatial group of human groups). This is not the place to explain why classical statistics is unable to process spatially distributed data (see Cressie 1991, Ripley 1987, Tricot 1987, Voiron Canicio 1993, among others), but methods of transforming social distances into spatial distances include multidimensional scaling (Gattrell 1983) and the use of a GIS system with analytical capabilities to calculate the variogram of each spatial variable (Voiron Canicio 1993). The latter method is probably the best adapted to an investigation of whether contiguous human groups show similar values in social variables. In other words, the statistical concept of *class* or *type* is not useful for representing a social concept such as *society* or *region*. It is hard to understand why Burton et al. do not use a geographical method to discover regions when this is probably the most geographical of all concepts (see Voiron Canicio 1993).

This paper is a good scientific work, but I do not accept its main assumption (that similar societies are similar because they were connected in the past, regardless

of their spatial contiguity) and therefore I do not understand the interest in discovering modern "sociocultural" regions. Although the statistical work produces some moderately interesting generalizations, clustering modern societies does not produce knowledge of social dynamics. What these researchers call a *region* is nothing more than a statistical group of societies and not the consequence of any sociohistorical process. We have to look elsewhere for a useful way of explaining social dynamics.

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"Regions Based on Social Structure" is a major contribution to scientific anthropology that considerably strengthens and improves the possibilities for theory testing using cross-cultural data. Employing both descriptive and confirmatory methods that are new to comparative research, Burton et al. uncover nine regional groupings of a large worldwide sample of societies that are strikingly different in composition from the six world regions proposed decades ago by Murdock. And these new regional groupings are solidly grounded in theoretical concerns and empirical findings, unlike the more impressionistic groupings of Murdock that have been employed by comparativists for many years. Since the methods employed—correspondence analysis and quadratic assignment—are perfectly general and replicable and readily accessible in various software packages, it seems likely that they will soon see further application to large regional data bases such as Jorgensen's (1980) Western American Indians.

Burton et al. note that "the scientific validity of regional studies is dependent upon the validity of the regional constructs." This is obviously also true of worldwide studies employing regional replication. It is commonly accepted that in any kind of survey research the most trustworthy approach to generating confidence in any findings is through some form of replication. Replication in survey research is usually conducted to assess the extent to which the original findings hold up against chance composition of the sample, hidden third factors, or other forms of methodological artifact. In worldwide cross-cultural survey research, incorrect identification of meaningful regions, especially if the composition of regional subgroupings is as different as that of those proposed by Murdock and Burton et al., has to be an important source of potential error in any attempt at replication of findings. Indeed, this may well be an important contributing factor to the disappointing fact that so few worldwide studies have thus far been shown to replicate across Murdock's six regions. Two areas that should reveal the importance of the new regions proposed by Burton et al. to the future of rigorous theory testing involving replication designs come to mind.

First, as Driver (1973:354) noted some time ago, "One

of the goals of cross-cultural method is the substitution of variables for proper nouns referring to places or time periods. It seems likely that in the future most correlations will exhibit significant areal differences, in magnitude if not in sign." As Driver's statement implies, the replication problem spans two levels of phenomena. At the first, or micro-, level, regression coefficients indicate associations between variables within regions. At the second, or macro-, level, these (expectably variable, according to Driver) regression coefficients are conceived of as being dependent variables whose variance is predictable from higher-order independent variables. This two-level hierarchical linear model is now quite commonly used in educational research geared to estimating within- and between-classroom effects on student achievement. It seems entirely probable that in future comparative studies, higher-order variables will be substituted for the names of the nine regions reported by Burton et al. The success of such modeling efforts will clearly depend on correct specification of regional groupings.

A second potentially important consequence of Burton et al.'s approach to determining regions is that their methods can be iteratively applied to large continuous areas to produce smaller clusters of societies. As I have shown elsewhere (Dow 1989, 1993), clustering of cross-cultural data can have potentially devastating effects on statistical inferences based on the chi-square distribution. Given the likely increase in the use of sophisticated statistical methods in comparative research, especially methods for categorical data analysis that rely heavily on chi-square-based inference, accurate identification of smaller clusters within regional samples will eventually become crucial to rigorous theory testing.

The importance of the new alignments of world regions reported by Burton et al., together with the potential of their methods for improving the quality of theory testing in comparative research, lead me to believe that "Regions Based on Social Structure" will become a minor classic in the comparative literature.

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The idea of a "region" will always be a construct, in this case ours as a profession. It should be tested, therefore, at two levels: the technical level of the procedures for defining it and the facilitative level of the arenas of enquiry it opens up. That the techniques be refined and rendered as explicit as possible is always desirable, but since my proficiency is limited here I leave these issues to others and confine my comments to the contribution of a new definition of regions to theoretical development.

Boas, Herskovits, Steward, and others used the concept of region to combat crudely evolutionary classifications and arguments. One would have thought that the battle over social evolutionary models had been won

or declared a truce or otherwise superseded, but it has not. Indeed, it is very much alive and well in ways that are hardly hinted at in this paper, which is written in low-key, technical style as if the only important issues were procedural. Rather than basing our thinking about the current world on a cautious and sceptical elaboration of regional histories, we have a resurgence of evolutionary thinking as scholars grapple with a globalized world. Alongside Fukuyama's (1992) hopeful vision of "the end of history," with its emergent terminus of universal sociopolitical development in liberal democracy, there is a thoughtful and voluminous volume by Netting (1993) on smallholders in which he argues strongly that intensive agriculture generates similar social forms in far-flung geographical contexts. In a social theoretical vein, Giddens (1994) invokes a generic "traditional thought" that modernity first fixed in place (especially with respect to gender) and now demands that we be "reflexive" about. All of these arguments bracket regional culture history of the kind the authors want to promote in favor of arguments about repetitive paths and convergences.

The problem is this: While the resurgence of a "one-world" assumption potentially allows flexibility of thought about a fluid human condition, it can court the "block thinking" in standardized *a priori* categories that marked the crudest 19th-century social evolutionism. Working in Africa, I still consider the latter so dangerous, so prone to encourage a complacent assumption that we already know enough to make such categories for all intellectual purposes, that I favor exploratory approaches on the basis of regions. At least a regional approach reminds us that there is still a large and intellectually demanding empirical project. We have, for example, some fine empirical elaborations for the equatorial region in the work of Vansina (1990) and Herbert (1994) that open up new issues. And we deeply need regional agricultural histories to test against the posited evolutionary trajectories from extensive to intensive production. So, given the continuing potential of regional analysis and the enormous and increasing prominence of evolutionary theory, I would have liked the authors to engage more directly with the classical issues that lie at the basis of all this work. What can we do that's new, in a newly reconfigured world, with a new definition of regions?

The terms here seem so old-fashioned that the novel possibilities are not only masked but even perhaps undermined. The criteria used to classify societies are narrowly focused on kinship, without—as far as I see it—anything but an implicit indication of why. If the convenience of drawing on the HRAF definitions is a factor, it needs to be defended because of decades of critique of the "butterfly-collecting" variety and the more recent arguments to which Burton et al. refer, namely, that the regional ethnography has been shaped by gatekeeper intellectual processes that ensure repetition in the terms of description. If, alternatively, they are essentially arguing that kinship is much less historically malleable than, say, the religion by which Murdock classi-

fied the Sahel as part of the Circum-Mediterranean, then this needs to be stated as a proposition; it may even qualify as a finding, to be counterposed to Netting's argument in favor of the potential universal emergence of the household. In brief, these criteria for regional grouping read strangely in 1995 unless they are explained. And odd comments—such as the "lacking data" about Europe (of all places!) and manifest boundary crossing in the body of the paper preceding a conclusion that "The regional patterns take the form of variation within a bounded domain"—don't increase one's confidence.

The real question is: Where do "regions" fit into our vision of the central issues for empirical exploration? Without explicit theorization, even a convinced supporter of regional analysis such as myself can remain unclear about whether this particular version helps.

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Burton et al. have produced a welcome, needed, and significant methodological and substantive contribution. Their general approach to the definition of cultural regions is "right on," and I am impressed with the specific details of the particular implementation they offer in this paper. Similarly, I find their alternative to the traditional set of culture areas reasonable and stimulating. Their discussion and treatment of the interplay between history and geography is especially to the point, as is also their consideration of the effects of various world systems.

My only significant reservation concerns an aspect of the work which is beyond the authors' control but highlighted by the new sophistication they bring to the ethnological task of analytic comparison. This reservation concerns the quality of the ethnographic record and subsequent analytic codings on which their analysis is based.

There are several levels at which concerns with the underlying ethnographic record might be raised. At the most abstract, we have the problem that the concepts by which ethnographic cases are described and the definitions by which empirical occurrences are linked to analytic categories are dependent on theories of what matters (or on the theoretical presuppositions, explicit or implicit, of ethnographers and coders) and can be quite variable in practice. This was the issue foregrounded by the Goodenough-Fischer debate (Goodenough 1956; Fischer 1990, 1958) and to my eyes (Kronenfeld 1992) admits of no simple and universal solution. That debate showed clearly that differing approaches and questions can produce radically differing residence codings (even with an apparently common set of analytic/descriptive categories).

At the most concrete level, there is the simple question of the consistency with which different cases are described in terms of the standard, if largely implicit, traditional theory and conceptual definitions of contem-

porary sociocultural anthropology—for example, Christensen's erroneous (he misconstrued the theoretical issue) ascription of double descent to the Fanti (1954: 127–28; see Kronenfeld 1970:xx)

Concerns at the abstract level will only be resolved as we develop more effective theories, and then only through anthropologists' attempts to apply such theories to the ethnographic record. The present contribution should constitute an important part of that feedback process in that it highlights problematic situations. Explicitness about theory and presuppositions on the part of ethnographers certainly can help, as can a process of continuously updating comparative data stores (such as those of HRAF) in the light of such clarification.

As the authors suggest (n. 7), one of the impressive strengths of their approach is its relative immunity to incidental or random errors (or instances of divergent classification criteria). For instance, my own sense, not being clear on the coding criteria but being quite familiar with Evans-Pritchard's ethnography, is that Nuer residence patterns are as clearly viri-patrilocal as those of any other patrilineal group in Africa, and therefore, I assume that there was some glitch in the coding system or the interpretation of the text which caused them to be coded otherwise. There is some statistical evidence in Evans-Pritchard's account which might seem to make the patri- part of that pattern less secure, but, as I explain elsewhere (Kronenfeld 1975), such a conclusion, while plausible in the abstract, entails a standard that no functioning patrilineal patrilocal society would normally meet. The possible mis-scoring of that case does not particularly worry me because, as the authors make clear, by being strange it has not unduly affected their results.

Where divergent criteria for recording and interpreting ethnographic observations exist on an areawide basis, however, they do carry the possibility of substantially biasing findings. For instance, from my reading of Kunkel's (1974) characterization of the (Great Basin) Pomo residence patterns and of Evans-Pritchard's Nuer descriptions (1940, 1951) I concluded (Kronenfeld 1975) that there was nothing in Kunkel's characterization (based on statistical analysis of censuses of local communities) which made his Pomo case inconsistent with localized patrilineages (such as the Nuer exhibited). Kunkel, however, using different criteria, classified the Pomo as nonunilineal on the basis of this very evidence. Since Kunkel's criteria are closer than mine (and Evans-Pritchard's) to those normally used in Great Basin studies (see Burton et al.'s n. 23), the possibility is raised that the Great Basin cases in general have been classified according to different criteria than have African cases and that some of the observed differences between the two areas are an artifact of this difference.

The problem of culture areas, then, is not simply a matter of empirical similarities among the cases being considered; it can also be a matter of differing theoretical or descriptive traditions among the anthropological "tribes" who study the various areas. This is hardly surprising, since one of our major tasks in training graduate students is socializing them into the community of

scholars who study their culture area. I suspect that a number of classical anthropological controversies—such as that between "descent theorists" and "alliance theorists"—have had as much to do with such differing interpretive traditions among the ethnographers who worked in the areas as they did either with the universal empirical status of the theories being argued or with genuine ethnographic differences between the areas from which the data were drawn. In my example, descent theorists pretty much worked in Africa while alliance theorists worked in Southeast Asia. Since each side applied its theory to the cases of the other, the debate appeared to be about theoretical differences. A careful examination of actual ethnographic cases—see, for instance, Fortes (1950) and Kronenfeld (1973) on the Akan and de Josselin de Jong on the Minangkabau (1952, 1975)—suggested, rather, that the difference was one between genuinely different kinship structures in the two culture areas. However, later ethnographic work (Thomas 1980) showed that many of the apparent differences between the two areas were much more a matter of differences in modes of ethnographic description than of actual empirical differences. In a sense the argument came full circle—back to theory. These were not, however, theoretical differences evaluated in terms of neutral ethnographic descriptions but theoretical differences built into the ethnographic data collection—differences, then, which made the typical data sets from the two areas essentially incomparable. Examples such as Thomas's, which could provide cross-area comparability, will be outliers and will have no particular effect on the characterization of the two areas.

This problem of consistent areal ethnographic bias is not one that can be dealt with at the level of Burton et al.'s analysis, and it is not one that any of us will resolve by fiat. And it will take much longer for the feedback process spoken of regarding incidental or random errors to work its magic here—though eventually, I presume, it will. By raising it to consciousness and focusing some attention on it, we can hasten the process. But, in the interim, it underscores the importance for comparative purposes that inheres in the process by which cases are coded for comparative variables, and it underscores the importance of continuing to improve the actual corpus of ethnographic cases, as well as the scoring of old cases.

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This is a fascinating and important paper, not only because it introduces a new statistical method for developing and testing culture areas but also because of the variables chosen to define these regions. Culture areas have, in the past, been defined by giving importance to variables the investigator already thought were the most important. The advantage of using a limited number of variables from a single domain permits the construction

of regions without a preconceived theory of causation. In this case social organization is thought to be singularly impervious to diffusion but sensitive to demands of subsistence technology and the constraints of environment. One intriguing possibility is that the method may reveal evidence for change over time. This possibility is noted by the authors for the westward extension of the Eastern region onto the High Plains of North America, where immigrant matrilineal societies were adapting to a new environment and subsistence technology.

In this regard, however, the discussion of the Eastern region mentions only the known migration of eastern societies onto the Plains and the retention of some agriculture. I would have liked to know which elements of social structure were retained. This region has the most homogeneous social structure pattern of all, but it is characterized as ranging from moderately unilineal to slightly bilateral, with a tendency to matricentricity. One wonders whether there are any characteristic clusters of features or whether the homogeneity can be expressed only as a statistical abstraction.

A similar problem is presented by the Northwest Coast. It is one of the more heterogeneous regions but is the smallest geographically. Environmental uniformity and significant societal interaction did not produce structural uniformity. The division is spatial, with unilineal societies in the north and bilateral in the south. The sharpness of the division is graphically shown by figure 11. The avunculocal residence found among some northern societies suggests that matrilineality is not congenial to the environment and subsistence technology as we know it. Yet a majority of the bilateral societies tend to matricentricity. One would like to know which matricentric elements are characteristic of this tendency.

Although Burton et al. explain why such infrequent elements as avunculocal residence are not included in the analysis, the reasons for excluding moieties are less obvious. Moieties are not rare in North America or in the Pacific, and although most often associated with unilineal descent and exogamy they are not invariably so. Where, in North America, they are agamous but unilineal or even nonlineal and thus may not qualify as descent groups, they have often become agamous as a result of population collapse. In other instances they appear to have been borrowed from unilineal neighbors to facilitate contact and trade. Granting that the inclusion of moieties would have posed a coding problem, would the inclusion of agamous and nonlineal moieties coded as lineal have changed the analysis of the Northwest Coast, Northern and Western, or Eastern region?

Burton et al. require that the regions they identify have clearly interpretable social structure patterns. They present statistical descriptions, but these are difficult to relate to the various societies without some effort to characterize typical or frequently found social structures. They also require that regions contain societies that are geographically contiguous. Yet, when we consider the Pueblos of the Mesoamerican region, we find that they have been included because of "historical"

links. But these are surely prehistorical links, and whether the result of trait diffusion or migrations is not known. Moreover, such links should be inferred from the empirically derived region and not used to create the region. As it stands, there is no way to travel from the Pueblos to Mesoamerica without traversing the southern reach of the Western region. And if such "historical" links can be used to place Pueblos in the Mesoamerican region, why are the Western Apache and Chiricahua placed in the Northern and Western region along with their northern Athabascan congeners when the Jicarilla are placed in the Eastern region?

Burton et al. note that whether regions defined in terms of different criteria would correspond to each other can be tested empirically. Murdock (1978) derived correlations between regions and theories of illness which were later tested by Moore (1988) using optimal scaling. I would like to see a discussion of Moore's findings and a derivation of regions using the same methods used in the present study.

In sum, this paper stimulates the little brain cells and poses a number of questions, some best pursued by the use of other methods, for example, Driver's continuous area sampling. Such explorations are not the purpose of this paper, but I for one would like to have seen more expanded descriptive sections of each region. Lacking this possibility, it might have been possible to include an appendix table showing each society and its variables.

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Will the real anthropology please stand up? Is this the discipline that deconstructs group boundaries and exposes taxonomic constructs as essentialized, historically situated representations? Or is this the discipline that strives to develop testable means of defining cultural units and aggregates with greater scientific validity? Obviously, "real" anthropology includes both of these endeavors, though their aims appear irreconcilably different. Tracing their intellectual genealogy to Boas, Kroeber, and other founding figures, Burton and his colleagues believe that societies can be classified and compared naturalistically, according to objectively ascertainable criteria. They seek to improve and refine the construct "region" by means of statistical techniques not available to forebears such as Wissler and Murdock. While their work is impressive in both analytic rigor and clarity of purpose, a significant number of anthropologists would disagree with its fundamental premises about the comparability of ethnographic data and about the value of systematic cross-cultural comparison.

Inadvertently perhaps, this meticulously crafted article highlights the diversity and the apparent incompatibility of competing paradigms in our discipline. In this comment I will attempt to offer a mediating perspective on the comparative project in anthropology. This article deserves a wider readership than "unregenerate positiv-

ists" (a phrase borrowed from H. Russell Bernard). The methods and findings of Burton et al. may have relevance even for anthropologists who prefer to speak of "transnationalism" rather than of "regions." In turn, the article's authors might address some of the points that are often associated with "interpretivist" critique. Issues of situatedness and context, I suggest, are fundamentally questions of data validity.

Over the past two decades anthropologists have become acutely aware that ethnographic data are rarely collected in a verifiable, systematic fashion that would pass scientific muster. Burton et al. use George Peter Murdock's coded data on social structure to test and refine their hypothesized nine world regions. With a correspondence analysis they build a two-dimensional map of the societies within a region according to social-structural similarities. They then employ the quadratic assignment procedure—essentially a statistical significance test for matrix data—to test whether the "region" hypothesis explains the pattern of proximities among the societies. Quadratic assignment is an exciting tool for anthropologists who want to discuss things that happen rather than (or in addition to) texts and contexts. However, researchers who have gone back to Murdock's sources have found problems with the data and the coding. One classic problem is that of ambiguity in descriptions of postmarital residence "rules." According to Burton et al., the ethnographies range in date from 1520 to 1960. Early ethnographers seldom clarified their criteria for social-structural attributions, and they rarely provided numbers to substantiate their characterizations. With 63 traits, Burton et al. may feel that such vagaries will not significantly affect the regional patterns, but some anthropologists feel that the source sample is fatally flawed; at the very least, it does not match the scientific rigor of the statistical techniques applied to it.

In a revealing footnote, Burton et al. state that their "sample cannot speak" to the "extensive social changes of the past 30 years." Many of our disciplinary peers are concerned precisely with changes occurring in the hybrid postcolonial world and would argue that such a concern is vital if anthropology is to escape an image of antiquarianism and irrelevance. Burton et al. argue convincingly that the regional scheme developed here is an improvement over Murdock's formulation. Their classification makes sense in a number of ways, and it will be of use to ethnohistorians and to those seeking a baseline in analyses of culture change. But if the end goal is systematic cross-cultural comparison, the temporal issue is troubling, perhaps most glaringly so when they use the present tense for the Ona and Yahgan of South America. Is there a way for such comparison to be less ahistorical?

Many "interpretivist" and "postmodernist" anthropologists reject the project of cross-cultural comparison outright as conceptually flawed and downright old-fashioned. To amend a phrase from Clifford (1988:10), however, I suggest that comparison is "a deeply compromised idea [we] cannot yet do without." Although not all anthropologists seek to formulate regularities, an-

thropologists of all persuasions employ cross-cultural comparisons and generalizations as a matter of course in their writing. Most of the comparative statements made by today's anthropologists are of the unsystematic variety, and most are offered in passing rather than in the context of causal explanations. Nonquantitative comparisons do not necessarily lack analytic rigor, however. Cross-cultural comparison appears to be an indispensable narrative strategy in our discipline. Further, comparative statements imply that constructs such as "culture," "society," and "region" have ontological status or, minimally, heuristic value. Though many anthropologists now espouse the study of transnational relationships and border crossings, the reference points are still useful. A dialogue on the uses of comparison *broadly conceived* might underscore our disciplinary commonalities rather than the polarization that so often preoccupies us.

Reply

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We thank all the commentators for their careful attention to the paper. We especially appreciate the warm words of Aberle, the detailed methodological comments of Dow, and the specific substantive suggestions and queries of Kronenfeld and Levy. The remarks by Barceló, Guyer, and Linnekin raise broader questions about the general legitimacy of empirical comparative research.

1. *Development of the project.* Some readers seem to be under the impression that we did the analysis quickly, using an automatic classification procedure such as cluster analysis. Actually, the project took many years. The computer did not discover the regions for us. We used the social structure space as a template for testing regions that we formulated on the basis of our own scholarship. Those tests used objective methods and explicit criteria. It may help to summarize the knowledge base and time-line for the research, which began in 1985. We scaled the social-structure variables as part of a contribution to a symposium held at the American Anthropological Association meetings after Murdock's death. That analysis included variations in social structure by region and language family and used Murdock's regions. Readers interested in the social-structure variables may wish to read the original paper (Whiting et al. 1988). We had been unhappy with Murdock's regions for years, however, and had used alternative regionalizations in previous publications (Whiting 1964, Burton and White 1984, Moore 1988, Bradley et al. 1990). In doing the regional classification we drew upon our own knowledge of ethnography, based on over 100 years of combined experience in anthropology, including nearly a dozen field research projects, many worldwide cross-cultural

projects, and a world-systems history project that involved coding 90 societies for many kinds of historical linkages with other societies (White and Burton 1984). In using language families as evidence of past historical connections, we drew upon a long-standing project to code a world sample of societies for language-family membership, a project that has involved reading original sources by linguists for all of the world's major language families.

2. *Methods and representations.* Barceló misunderstands correspondence analysis when he says we should have used a multidimensional-scaling model. Correspondence analysis is a kind of multidimensional-scaling model, one that is especially useful to cultural anthropologists because it does not have to begin with interval-scale numbers. For example, Linnekin says that early ethnographers often did not provide numbers (nor do many contemporary ethnographers). However, correspondence analysis requires only categorical variables pertaining to the presence or absence of traits, and those judgments often can be made from ethnographies. In this way, correspondence analysis is one of the class of models that induces interval scales from multiple nominal measures (e.g., Weller and Romney 1990).

It is true that classical statistics may have problems of autocorrelation with spatially distributed data. We know that, and have published on the problem (Dow, Burton, and White 1982). Quadratic-assignment analysis is one of the kinds of models that were developed to deal with relational data sets, including spatial models, and is widely used to test structures within multidimensional-scaling models (Romney and Weller 1989), something we said in the paper.

Several comments concern the general problems and representations implied by these methods. For example, it seems that some reviewers wanted more in the way of a diachronic analysis or the discovery of social dynamics. This was not our primary agenda—just the opposite, in fact, since we used current theories and research findings about historical processes in formulating the regions. It would have been circular to then use the regions to discover historical processes. We think that Barceló's distinction between anthropology as synchronic and history as diachronic is not useful, given that anthropology takes an even longer time perspective than history by including prehistory as a subfield.

Also, some reviewers misunderstand the nature of the social structural patterns, apparently thinking that we have described societies within a region as having the same social structure. This is far from what we said. We described a considerable amount of variability within regions. This variability often takes the form of free variation within a constraint. Readers may be familiar with this structuralist concept from their readings in anthropological linguistics. The African societies in our sample do not share a social structure; they share a constraint on social structure that has kept them from adopting bilateral descent systems, while allowing them to be either matrilineal, or patrilineal, or both. Similarly, the Northern and Western societies share a constraint

on social structure that has kept them from adopting matricentric systems. Within that constraint their social systems take many forms, from strongly patrilineal to patricentric bilateral (the two alternative interpretations of Pomo that Kronenfeld discusses).

Guyer seems to misunderstand this point when she talks of the variation within constraints as "manifest boundary crossings," as if these reflected a problem with the analysis itself. These boundary-crossing constraint models are the entire point of the analysis and are based on a nonlinear statistical model that is also found in some of our earlier work (Burton, Brudner, and White 1977) and was developed by two anthropologists (Greenberg 1966, D'Andrade 1976) in an attempt to overcome some of the problems that conventional linear models present for anthropologists.

Barceló rejects the assumption that "human groups that have been connected for a period of time . . . will show the same social structure." Again, we emphasize that we do not claim that the societies within regions have the same social structure. Rather, they fall within the same ranges of variation in social structure, so that their similarities with one another are relative, not absolute. How could these relative similarities of social structure within regions have occurred? We note that there are only a limited number of ways in which human groups can come to share any cultural or social patterns, including the constraint patterns that we have described. These include descent from a common ancestral group, diffusion or borrowing from neighboring societies, common history of incorporation within a religion or political system, parallel evolution of the same set of principles within a common environment, or chance. Our statistical tests effectively rule out the possibility of chance. If environmental factors were the only driving force, then we would not have regions that cut across major ecological zones, as do several of our regions. Since neither chance nor a common environment could give an adequate explanation for the regions, it follows that some combination of common descent, diffusion, or shared political or ideological history must be involved in our shared social structural patterns. These all have to do with long-standing connections among societies.

3. *Cross-cultural research.* Several commentators raise questions about the cross-cultural codes. Many anthropologists are concerned with problems of the comparative method, especially with cross-cultural coding, and consensus about these problems seems to have crystallized with Goodenough's paper on residence rules (1956). Contemporary writers seem to find it acceptable to refer to that consensus without having to describe the alleged problems in any detail.

Publishing cross-cultural research is often frustrating because so few anthropologists seem to know how comparative methodologists conduct their research. One of the most commonly encountered misconceptions is the widely shared belief that the Human Relations Area Files are identical to the coded cross-cultural data. We see this misconception in the comments, with the

HRAF archives being referred to as if they contained computer-coded data. This image of HRAF is completely wrong. HRAF is a text archive, not a quantitative archive. It incorporates a text retrieval system that improves our access to ethnographic sources, including many that would otherwise be difficult to find (including complete translations of older ethnographies into English that are available nowhere else). We think that many of our colleagues fail to use this valuable source of archival data because of their widespread misconception as to its nature. Some cross-cultural coding projects are based entirely on the original sources and do not use the HRAF. Most coders use many sources, including the HRAF. Murdock himself used a wide range of sources for his own coding. He had a well-deserved reputation for having read an enormous number of original ethnographic sources, and his codes were based mainly on those original sources, not on the HRAF. When Kronenfeld recommends that cross-cultural data bases such as HRAF should be continually updated he exhibits this misconception about the HRAF. He is also offering gratuitous advice to HRAF, which continually upgrades its archives. One of its major current activities is to fix the problem of the undersampling of Europe and Central Asia, an activity that began about ten years ago (M. Ember, personal communication).

Cross-cultural researchers have put a great amount of effort into improving their methods over the past 40 years, and it is not fair to judge any scholarly field according to the standards of its distant past. However, one of the main criticisms, about validity problems with cross-cultural coding categories, seems to us to have been mistaken, even as a criticism of Murdock's methodology. The debate between Goodenough and Fischer over residence rules is at the core of this issue. Residence was one of many variables in our social-structure analysis. The scaling methodology that we used is based on multiple variables, so that errors in a single variable, such as residence, will not greatly affect the result. However, it seems that many anthropologists read the residence-rules debate as a demonstration that all cross-cultural codes were flawed, and this is why the Goodenough-Fischer debate was important.

We think anthropologists have overstated the negative implications of the residence-rules debate for the validity of cross-cultural codes. Kronenfeld provided a detailed discussion of these issues, which we need not summarize here. However, his discussion does not convey the magnitude of the differences between Fischer and Goodenough with respect to their two analyses. In percentage terms the differences are actually quite small. The debate was based on two censuses of the same community on Romonum Island, Chuuk (formerly Truk). Fischer coded 58% of the households as matrilocal and Goodenough coded 71% as matrilocal, a relatively small percentage difference. By either tabulation a cross-cultural coder would code Chuuk as having primarily matriolocality, as did Murdock.

The biggest difference between the two ethnographers was that Fischer coded 20% of the households as patrilocal

but Goodenough said that most of those involved a man living with his son because of his son's wife's land rights. To Goodenough this was not patrilocal residence because the son and his wife did not move to live with the father; instead the father moved to live with his son. The difference between the Fischer and Goodenough analysis is important for understanding internal processes of Chuukese society but does not centrally concern the validity of the cross-cultural codes themselves, which are at a more macroscopic level.

Most important, the difference between the Fischer and Goodenough analyses would not affect the location of Chuuk within the matricentric pattern that we found for Southeast Asia and the Pacific, since neither analysis would have produced a code of primarily virilocal or primarily patrilocal residence—the two residence categories associated with the patricentric options that are excluded from this region.

Kronenfeld is troubled by Murdock's classification of Nuer residence as virilocal rather than patrilocal, saying, "My own sense . . . is that Nuer residence patterns are as clearly viri-patrilocal as those of any other patrilineal group in Africa." We do not agree with Kronenfeld's sense of the matter. In fact, Murdock codes the Nuer residence pattern as initial uxorilocal residence followed by virilocal residence (Murdock 1957), and Evans-Pritchard clearly states that a Nuer wife lives with her parents until the birth of the first child (Evans-Pritchard 1951:71–72), with her husband visiting her there. Evans-Pritchard also devotes many pages to alternative marriage and residence options open to a Nuer woman, including leaving her husband to live with a lover while bearing children who will be affiliated with her husband's lineage, bearing children outside of marriage, and taking wives who will reside with their fathers' groups. A Nuer widow often returns to her father's village with her children, and Evans-Pritchard emphasizes that Nuer villages include many relatives through affinal ties. This pattern is different from that of another Nilotic society that we know well, the Maasai, where women cannot be husbands, young wives leave their parental homes immediately when married, divorce is not easily obtained, and widows continue to live with their husbands' families. As with the Chuukese case, the two possible residence codes under discussion for the Nuer (virilocal or patrilocal) are both consistent with the regional pattern, in this case unilineal, and therefore neither coding judgment would have affected our findings.

The difference between these debates about coding single societies and our macroscopic analysis of cross-cultural data is partly due to differing levels of aggregation. Social systems are multileveled, and the use of different measures and codes to represent different levels should not be seen as a contradiction. We see no reason to privilege any level of analysis, as is often done both by reductionists and by macroscopic thinkers such as a world-system theorists. Rather, an accurate analysis must allow for representation of the various levels as well as the linkages among them. The model that best explains Chuukese society will not do as well for

Palauan society, codes that are best-suited to Micronesian societies will not be as useful for comparisons with Africa, and more general codes must necessarily average across some internal processes of a given society. We see no problem here so long as the cross-cultural codes are not represented as being all there is to know about the given society. Neither Murdock nor other cross-cultural coders claimed that there was as much information in the codes as in the original ethnographies, yet cross-cultural researchers are often treated as if they had done so.

Little previous work has been done to model multi-level systems per se. Rather, most research has required the choice of a level, with the predictable consequences for futile debates about levels of analysis (Burton, Nero, and Egan 1995). Much more research is needed on the multilevel problem. Dow's suggestion for use of hierarchical linear models is directed to this important question, and we recommend that anthropologists learn about this approach (Bryk and Raudenbush 1992).

The most serious criticism in Kronenfeld's comment is that there may be systematic bias in cross-cultural coding, with ethnographers having systematically used different criteria in different regions. However, it was not the ethnographers who did the coding but the ethnologist, so the question is whether Murdock would have interpreted the ethnographies of different regions differently, assuming that Kronenfeld's hypothesis is correct and the ethnographers of different regions worked within consistently different paradigms. For this to have happened, many different scholars working within a region would have had to follow the same biases over a long time period, since the ethnographies within any of the regions were done over many decades, by scholars from different countries and different schools of thought, and Murdock would have to have been unable to correct for the ethnographers' biases when doing the coding. Was there really such a strong correspondence between ethnographers and regions, and would the differences have been so extreme?

We tested for one kind of systematic bias in the data, by the date of the ethnographies. We thought that the changes in ethnographic practices over time would be the greatest source of systematic bias, and we tested the statistical relationship between the two social structural dimensions and the dates of the ethnographies, finding no effect. One of the advantages of systematic cross-cultural studies is that they make possible this kind of test of hypotheses about data quality.

Another kind of systematic bias is the undersampling of some regions. Guyer is concerned about there being few European cases in the sample. There was a bias against studying Europe in earlier anthropology, but was Murdock responsible for that bias? We quote here from Murdock's *Ethnographic Atlas* (1967:2):

The case is still different for Europe . . . an area for which ethnographic responsibility rests primarily with sociologists and historians rather than anthropologists. The author . . . has included only a small

and unrepresentative fraction of the many adequately described societies—and these only because of his conviction that the exclusion of the Western peoples and their cultures from the ethnographic universe is totally unwarranted.

We knew that there were too few European cases in our sample, so we did additional research with respect to a number of additional European societies. We described this in the paper. We also used published sources or codes for a number of other societies not in the sample, especially when trying to think of counterexamples to our generalizations about the social structural patterns.

4. *Specific findings.* We had anticipated more comments about our substantive findings, but these are limited to two topics. Guyer wonders whether we think that kinship and gender are more resistant to change than religion. We can answer her quickly by saying that she guesses right (we do think that kinship has been persistent), but it would take many more words, as well as more empirical research, to develop that theme.

Levy has two questions about the Americas. We found it more difficult to develop regions for the Americas than for Africa, Eurasia, and the Pacific, and the classification of the Americas was done last. Therefore we are not surprised if readers have some questions about this part of our work. Levy points to the heterogeneity of the Northwest Coast region and a possible lack of contiguity between the Pueblos and Mesoamerica. We could not improve on the Northwest Coast region using our data, and we do not expect that anthropologists can settle any issue with a single analysis. The concept of contiguity between the Pueblos and Mesoamerica is based on archaeological evidence for travel between them. In our analysis the Southwest is on the border among three regions and like other border areas, such as Northeast Africa, Southeast Europe, and Melanesia (Green 1991), presents special problems for a regional analysis.

In response to Levy's question about the social structural characteristics of the Eastern Americas, we realize that the paper would have been easier to read if readers had had access to the raw data, but space did not allow us to publish a table of 351 societies by 63 variables. We will gladly make that data set available to anyone who requests it. While writing this response we tabulated the social structural variables for the 43 Eastern American societies. Space does not permit publishing the entire table, so we will summarize some salient tabulations. Eastern Americas societies tend to have bride service (16 societies) or no marriage exchange (16 societies) rather than bride-price (3 societies). They have limited polygyny (24 societies) or sororal polygyny (15 societies) rather than monogamy (2 societies) or nonsororal polygyny (2 societies). Residence is most often matrilineal or uxorilocal (23 societies). Kinship terminologies for parents' generation tend to be bifurcate merging or bifurcate collateral, with lineal and generational terminologies occurring rarely. Cousin terms are Iroquois, Crow, or Omaha (32 out of 43 societies) or Hawaiian (8 societies), with Eskimo terminology virtually absent (1 soci-

ety). Eastern Americas societies are relatively infrequently coded as having organized unilineal groups (14 societies).

5. *Philosophical issues.* Linnekin raises several philosophical issues in arguing that our analysis is relevant for postmodern anthropologists. We agree with her goal of building bridges between the two camps, and we wish to make some suggestions for improving the level of discourse about goals of contemporary anthropology.

Our approach seems sometimes to be thought of as a kind of naturalism—a phrase used by Linnekin and in past work by Guyer (1984). We take this concept as referring to causal interpretations based on evolutionary adaptations to natural environments. The position is usually contrasted with explanations based on economic, cultural, or political systems. All three of these have influenced our work, and our orientation is not primarily naturalistic. However, we see no contradiction in the joint use of ecology and political economy in formulating explanations. Why is it so controversial to claim that human societies are affected by their environments as well as by larger political and economic systems and culture?

Guyer discusses a resurgence of social evolutionary models in anthropology. However, she correctly reads our paper as contrasting with evolutionary models. Our regional analysis built upon previous research showing that specific local and historical processes, as well as regional differences, provide better explanations for change in subsistence systems than do global evolutionary theories (White, Burton, and Dow 1981, Burton and White 1984, Bradley et al. 1990). Some of the theorizing that she misses in this paper is readily available in work published by ourselves or others. If we had to publish all of the relevant theories in every paper, there would be too little journal space for the empirical research.

Linnekin is concerned with our not having recent data. She and Guyer use the terms “antiquarian” and “old-fashioned,” respectively. Postmodernism is based on the assumption that contemporary changes are mixing different peoples and cultures in a transglobal system wherein many older categories and processes are no longer relevant. We think that it is an empirical question whether or to what extent contemporary changes are qualitatively different from those of preceding years. Transnational migration, global economy, multiethnic communities, and ethnic conflicts are not new, and many of the recent changes are due to the advance of the same capitalist world system that has been on the march for 500 years. Even if the recent past is dramatically different from previous history, we wish to maintain a vision of anthropology as a field that studies all of the human experience, not just its past few years.

We do not see the usefulness of name-calling, nor does it seem appropriate to render professional judgments by so doing. We think terms like “antiquarian” and “old-fashioned” serve the purposes of ageism. Do we really want to create an age-set system wherein each generation of younger academics cancels the accomplishments

of the previous generation? Scholars who participate in this kind of activity should realize that this is a form of discrimination that they could face in their own future and therefore that they are establishing the rules of a game that could soon be turned upon them.

Furthermore, this kind of judgment seems to be disruptive of any motivation to undertake cumulative, long-term projects, which may take 25 or 30 years to complete. Scholarly work is by necessity done slowly and carefully. We cannot have an instantaneous image of all of the world's contemporary societies ready for comparative analysis. There will always be a long lag time from the collection of data to the time when systematic analysis is possible. If our profession allows the findings of long-term projects to be ruled out of court as “old-fashioned,” it will discourage the collection of systematic data in large long-term projects. In our view the trendiness of anthropology is one of the major problems of our field.

Current debates within anthropology have been represented as if there were a strong faction of positivists within our field. It often seems that any research program using quantitative methods is represented as an example of positivism, even if, as in the present case, its theories and methods are virtually opposite to those of positivism. We agree with Roscoe (1995) that positivism misrepresented the goals and methods of science and was never widespread within anthropology. This philosophy of science has been dead so long, even within the natural sciences, that it is time to focus on the very real issues that are both contemporary and enduring within scholarly fields. These have to do with empiricism, science, the role of text and of numbers in our analyses, the extent to which there is a real world independent of the mind of the observer, the effect of observers' biases, and the role of unobservable constructs or of constructs that are measured only indirectly.

It is with respect to the latter issue that positivism played such a strong and limiting role in early-20th-century social science. Readers may recall that the positivist physicist Mach resisted the use of unobservable constructs such as atoms. Barceló's statement about physicists' not being able to see a black hole (an absurd idea, since black holes absorb light) is reminiscent of this impossible standard. Mach's view was not widely shared even among his contemporaries, including the much greater physicist Einstein, and in fact many important scientific concepts were not observable when they were first formulated.

A better standard is that we do not have to directly observe constructs as long as we can make an argument for their existence using a combination of logic, models, measures, and empirical evidence. Our social structural dimensions (gender and descent) are examples of constructs based on indirect evidence rather than direct observation. The standard that we do not support is the idea that a finding can be ruled out without the use of any empirical data at all just because it does not agree with someone's preconceived notions.

6. *Summary.* The distrust that many anthropologists

show toward comparative research is based on misinformation, logical errors, or perceptions of methodological problems that either have been corrected or are in the process of being corrected. While there are always changes in scientific standards over time, the value of cumulative empirical research, which necessarily has a long gestation period, outweighs any possible costs to the use of data that may not have been collected according to a currently fashionable theoretical program. There is no need for false dichotomies between text and numbers, between old data and new data, between description and comparison, or between microscopic and macroscopic approaches. Finally, although some popular statistical models that were developed for use within other academic disciplines have limited value within anthropology, great progress has been made in the past 20 years in developing statistical approaches that have considerable value to our discipline.

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