CHAPTER 11

George Peter Murdock: Stemming the Tide of Sterility with an Atlas of World Cultures

1 Murdock's Cross-Cultural Analytical Method

After serving in *World War I* as first lieutenant within a field artillery division, George Peter Murdock went on to graduate with a bachelor's degree in history from Yale University. Thereafter, Murdock studied law at Harvard for two years, before succumbing to an intrinsic interest in culture that directed him on a world tour, after which he returned to Yale to pursue a degree in anthropology.[1] A quondam president of the *American Anthropological Association*, Murdock was also a recipient of the *Viking Fund Medal* (1949), the *Herbert E. Gregory Medal* (1966), the *Wilbur Lucius Cross Medal* (1967), and the *Huxley Medal* (1971). Citing his first publication in 1931, and his last in 1981, an obituary (Spoehr 1985) recalled fifty years' service, much of which extended through anthropology's critical adolescence[2] (Goodenough 1964, 1994).

Some of the works Murdock went on to write were solid, standard anthropological studies. Take, for instance, *Our Primitive Contemporaries* (1934), which was something of a compendium of customs and cultures, paired with images of artifacts, relative to Tasmanians, Dahomeans, and sixteen other ethnicities besides. Such contributions were tiles of achievement in the mosaic of Murdock's career, during which he demonstrated scholarly generativity (Murdock 1970, 1980), administrative service and teaching excellence. However, the honors heaped upon Murdock's head while living, like the eulogiums he received once deceased, marked nothing so much as his collection and organization of data. Murdock's *novel, vital,*

S. C. Hertler et al., *Life History Evolution*,
https://doi.org/10.1007/978-3-319-90125-1_11

and *authentic*[3] empirical system calls to mind an anthropological variety of Toynbee's *A Study of History*. White and Brudner-White (1988; p. 59) celebrate Murdock, "truly a remarkable man, whose vision was ahead of his time," for his empirical escape from procrustean theories:

> Murdock was for decades the preeminent spokesman of the empirical tradition of direct comparison of societies. His monumental task, along with others, was to create a complex scientific apparatus by which anthropology could eventually become both a comparative and a formal science, capable of testing and falsifying theory against a worldwide data base.

White and Brudner-White put this achievement in context with the help of Marvin Harris, the anthropologist featured in Chapter 13. At that time, anthropology, at large as a discipline, was trending toward rejecting the *scientific mandate* by dispensing with cross-cultural comparisons altogether. Murdock's *Social Structure* (1949) struck a dissonant chord, jarring the harmony of many contemporary anthropologists and then giving over the search for historically detectable, anthropological laws. Such dissonance is on full display when, in the preface of Social Structure, Murdock begins by atypically acknowledging Franz Boas for his efforts in deconstruction,[4] but ends thus:

> Boas himself, who has been extravagantly overrated by his disciples, was the most unsystematic of theorists, his numerous kernels of genuine insight being scattered amongst much pedantic chaff. He was not even a good field worker. He nevertheless did convey to his students a genuine respect for ethnographic facts and for methodological rigor. In the hands of some of his followers, however, his approach degenerated into a sterile historicism consisting of rash inferences concerning prehistory from areal distributions. With others it became converted into an unreasoning opposition to all new trends in anthropology. (Murdock 1949; p. xiv)

Two minds could not be more at odds as were the orderly systematizer pursuing knowable anthropological laws and the postmodern pyrrhonist deconstructing prevailing frameworks while disallowing their replacement. More than his *Social Structure*, or any work, Murdock's *Atlas* would stem the tide of relativism.

2 Murdock's Project and Galton's Problem

Murdock contributed serial installments of coded cultural information, which, in 1967, was published as the *Atlas of World Cultures* featuring 862 societies. Thereafter, serial contributions to the journal *Ethnology* continued, bringing the total from 862 to 1264 by 1971. As Murdock (1981) explained by way of introduction to a selective revision culling 563 societies from the larger sample, certain continental classifications amassed groupings that were sometimes too large, as with Asia and Africa, and other times too small, as with Europe. Murdock corrected the imbalance by sundering the Sahara from Africa and the Near East from Asia, both of which were added to Europe to form a *Circum-Mediterranean* region. The result is the following modification of continental clusters:

- *Africa*, exclusive of Madagascar and the northern and northeastern portions of the continent
- *Circum-Mediterranean*, including Europe, Turkey and the Caucasus, the Semitic Near East, and northern and northeastern Africa
- *East Eurasia*, excluding Formosa, the Philippines, Indonesia, and the area assigned to the Circum-Mediterranean but including Madagascar and other islands in the Indian Ocean
- *Insular Pacific*, embracing all of Oceania as well as areas like Australia, Indonesia, Formosa, and the Philippines that are not always included therewith
- *North America*, including the indigenous societies of this continent as far south as the Isthmus of Tehuantepec
- *South America*, including the Antilles, Yucatan, and Central America as well as the continent itself

Even as they may be wanting in many ways, such modifications of the continental clusters are not without logic. For instance, the Near East and Saharan African peoples may in fact have more contact with Europeans than with peoples of the Far East or Sub-Saharan Africa. As seen in maps of the Roman Empire, the waters of the Mediterranean Sea bound its coastal regions in networks of war and trade. After all, the Crusades, like the Reconquista and the original Islamic incursions it reversed, are histories of vying Circum-Mediterranean populations. At the same time, Africa and Asia were, to some extent, divided by ecological boundaries: the former by increasingly desiccated, non-coastal sections deep within the Sahara, and the latter by the Polar desert existing within the late Neolithic (Hetherington and Reid 2010; p. 224). Of further note, the Near and Far East were also more permanently separated—within lower latitudes by the Tibetan Plateau stretching 600 miles North to South and 1600 miles East to West, with an average elevation of 4500 meters; within middle latitudes by 500,000 square miles of barren Gobi Desert; and within the highest extent of latitude by tundra and permafrost.

As to content, Murdock coded all societies systematically across the following metrics: subsistence economy, mode of marriage, family organization, marital residence, community organization, patrilineal kin groups and exogamy, matrilineal kin groups and exogamy, cognatic kin groups, cousin marriage, kinship terminology for cousins, type and intensity of agriculture, settlement pattern, mean size of local communities, pottery, house construction, hunting, fishing, animal husbandry, agriculture, and so on. Murdock operationalized an ordinal classification scheme for the foregoing variables, which was represented by a code, and so could be presented within a table. For instance, the variable, *segregation of adolescent boys*, could be coded *A* for absent, *P* for partial, *R* for complete segregation from the nuclear family, *S* for complete separation from all family, and *T* for those societies sequestering adolescent boys among themselves, while segregating them from the group at large. With information so thoroughly collated, patterns emerge. For instance, we find that Africa has the lowest rates of monogamy, as per page 164, Figure 11.1. Specifically, in the *World Ethnographic Sample* (Murdock 1957), on which the Atlas was based, monogamy was recorded 8 times in Africa, 43 times in the Circum-Mediterranean, and 34 times in East Eurasia. Conversely, general polygyny was recorded 92 times in Africa, as compared to 17 times in the Circum-Mediterranean, and 21 times in East Eurasia.

Having coded hundreds of cultures across a wide variety of traits in his Atlas of World Cultures, Murdock is known primarily as a meticulous systematizer. But what was Murdock's overarching goal sustaining him through all this toil and tedium? Murdock's *cross-cultural analytical method* was designed to break down cultural variation into its most fundamental units—units of *cultural universals*, which were the basic elements or building blocks from which different cultures were composed. This method is roughly equivalent to what is called the *comparative method* in evolutionary biology and anthropology (Mace et al. 1994). From this analytical perspective, like elements comprising compounds in chemistry, or atoms residing within molecules, the basic structure of a culture could, in principle, be reconstructed by a comprehensive knowledge of these constituents. With the constituent parts so delineated, patterns existing among different cultures could presumably be inferred statistically by use of correlational analyses. For example, one may find a small but statistically significant positive association ($\varphi = .166$) between the presence of male genital mutilation and the presence of polygyny in the Murdock et al. *Standard Cross-Cultural Sample*. In principle, co-occurring *clusters* of such traits could be spatially aggregated (Korotayev and Munck 2003).

Although this seems to us as a capital idea, it drew criticism from the outset. One critical strain came from the purported irreducibility of *emergent* cultural properties. Take, for instance, the seminal work, *Patterns of Culture*, by the early Boasian anthropologist Ruth Benedict (1934), insisting that the whole of a culture was more than the sum of its parts. Benedict's holistic approach, termed *configurationalism* by Salzman (2001), stood in marked contrast to the elementistic one championed by Murdock. Another, and perhaps more serious, threat to the validity of Murdock's overall systematizing project has historically been *Galton's Problem*. At the 1888 meeting of the *Royal Anthropological Society* in London, *Sir Edward Burnett Tylor* presented an early example of the cross-cultural analytical method, using a sample of 350 pre-industrial societies to illustrate the *cultural adhesions* or statistical associations present among different traits, such as post-marital residence and reckoning of descent (Dow and Eff 2013). This work was critiqued at that same meeting by *Sir Francis Galton*, father of modern psychometrics and co-developer of the *correlation coefficient*,[5] for violating a statistical assumption. Specifically, Tylor's measures of association required that the data points deriving from his sampled pre-industrial societies be independent of one another. Yet, as Galton made clear, contiguous or adjacent cultures interacted with one another in various ways that inevitably interfered with this assumption due to their spatial proximity. Galton's Problem thus throws the inferential validity of Murdock's entire cross-cultural analytic project into question and has resulted in its widespread and persistent disrepute within traditional anthropological circles (Dow and Eff 2013; Eff 2001).

3 Social Biogeography

Murdock's cross-cultural systematizing marks a grand social scientific venture. Following from its meta-theoretical scope, we find Murdock, like many another author in the present volume, unwittingly measuring cross-cultural variation in life history speed. Murdock's venture touches the hearth and hearthstones of our own ambitions as life history theorists. After all, *Differential K Theory* endeavored to explain cross-continental life history variation—variation we continue to investigate under the broad banner of *social biogeography*.[6] As such, in endeavoring to measure life history variation as it is expressed across nation-states, we find ourselves in the position of Murdock, and Tylor before him, confronted with Galton's Problem. Thus, we take up Galton's Problem in reviewing Murdock within life history perspective, for its direct implications for *An Atlas of Cultures* and its concomitant implications for social biogeographical applications of life history theory.

Recent work has confirmed the quantitative impact of such confounding effects, but has nevertheless proposed innovative mathematical solutions involving the statistical control of *network autocorrelations* among spatially contiguous societies (Dow 1984, 1993; Dow et al. 1984). Dow and Eff (2013) have described the general form of the mathematical problem as follows:

> In the geographical literature the similarity of variable scores within spatially proximate clusters of sample units is widely known as spatial autocorrelation. Simply stated, *spatial autocorrelation* implies that what happens at one location in space is in some way related to what happens at nearby locations. More generally, *network autocorrelation* implies that the attributes of each node in a network can be predicted in part from knowledge of the attributes at related nodes, conditioned on the strength of the pairwise ties. (pp. 2–3)

Thus, it has become possible, both in principle and practice, to control statistically for Galton's Problem using autoregressive methods via the construction of such quantitative models.

Such ingenious mathematical solutions, however, have also been recently criticized as being too conservative in that they arbitrarily assign causal priority to the phylogenetic origin of a trait, whether by cultural diffusion or demic migration, over the maintenance of a trait by ongoing selection (Thornhill and Fincher 2013). In other words, such statistical controls may well be effacing ongoing, ecologically maintained, evolutionary variance. By statistically controlling for spatial contiguity among cultures, the effects of current adaptation (by means of continuing selection) to similar environments might be attenuated from its veridical magnitude or even completely lost. Thus, one would make a type two error, or false negative, rejecting evolved differences that are indeed present and persistent.[7] The problem of spatial contiguity in anthropology is isomorphic to that of phylogenetic relatedness in biology in that similarities among spatially contiguous cultures often stem from shared cultural ancestry, whether by diffusion or migration. Autoregressive statistical controls for spatial contiguity among different cultures thus have the same effects as phylogenetic controls for shared ancestry among different species. Both methods arbitrarily privilege the *origin* of a trait as a causal hypothesis over its *maintenance* by ongoing selection within the current ecology. This favoring of one alternative causal explanation over another violates the most basic principles of the method of multiple working hypotheses (Chamberlin 1897) and strong inference (Platt 1964). But precisely how might one critically examine such multifactorial causal influence both empirically and quantitatively? For this, one would have to go beyond simply showing the existence of spatial autocorrelations. One would have to show that the autoregressive effects in one variable, the putatively causal one, may be *driving* (presumably via natural-selective pressures) the autoregressive effects in cultural traits among spatially contiguous groups. To demonstrate the principle espoused by Thornhill and Fincher (2013), this putatively causal effect should be a contemporary ecological pressure as opposed to an ancestral phylogenetic signal.

4 Proof of Concept

There is no published article, the citation of which would solve Galton's Problem, whether in confirmation or disconfirmation of Murdock's systematizing endeavors. Therefore, as a proof of concept, we present some preliminary analyses in advance of their publication within the primary literature. The information comes from a cross-national data set compiled for a recently published work on the social biogeography of homicide[8] (Peñaherrera-Aguirre et al. 2018), which was itself originally obtained from the last and most complete international homicide database published in 2012[9] by *UNODC*, the *United Nations Office on Drugs and Crime* (2013). Instead of using network autocorrelations, we performed this proof of concept by constructing a simpler ordinal variable representing the sequential distance "Out-of-Africa" for each national polity. This method simultaneously reflects common human origins and subsequent outward migrations. This reduced the complexity of the mathematical problem, from one of estimating *network* autocorrelations, to one of estimating *serial* autocorrelations for each national polity with each spatially adjacent one within that ordered sequence.

Having allowed for a glimpse behind the methodological veil as it relates to the data set and statistical analysis, we do the same regarding the actual variables employed. Using a natural logarithmic transformation, we relate *parasite burden*[10] to the aggregate life history strategy. More precisely, proof of concept will come from relating slow life history speed positively to life expectancy, and negatively to infant mortality, adolescent fertility, and total fertility rates (World Bank 2012). Finally, we add ethno-linguistic diversity, a cultural criterion, as multiply-operationalized by a linear composite of (1) ethnic diversity, (2) linguistic diversity, and (3) religious diversity (Alesina et al. 2003). Within the analytical framework just described, we ran three discreet analyses: the first generated simple correlations, and the second two generated correlations accounting for lag in time and distance in space.

The first analysis ran simple bivariate correlations among four variables: (1) ordinal distance out-of-Africa; (2) natural logarithm of parasite burden; (3) slow life history; and (4) ethno-linguistic diversity. From so doing, we find ordinal distance out-of-Africa correlated negatively with the natural logarithm of parasite burden, positively with slow life history, and negatively with ethno-linguistic diversity. Additionally, the natural logarithm of parasite burden correlated negatively with slow life history and positively with ethno-linguistic diversity. Lastly, slow life history correlated negatively with ethno-linguistic diversity, although less so than parasite burden in absolute value, indicating, at most, partial mediation of the effects of parasite burden on ethno-linguistic diversity.[11] What all this can be taken to mean is that, as humans expanded out of Africa, their parasite burden was decreased by living in more temperate climates, their life history strategy significantly slowed as a result of the reduced extrinsic morbidity and mortality, and their ethno-linguistic diversity was consequently reduced. These results suggest that the decrease in parasite burden, concomitant to migrating out of Africa, directly influenced both the slowing of life history and the reduction in ethno-linguistic diversity.

The second set of analyses estimated (lag = 1) serial spatial autocorrelations among parasite burden, slow life history, and ethno-linguistic diversity with respect to ordinal distance out-of-Africa.[12] As can be seen in tabular form,[13] all serial spatial autocorrelations were positive in direction and substantial in magnitude. Using data generated from the second analysis, a third analysis estimated simple bivariate correlations among serial spatial autocorrelations for each of the four major variables.[14] To clarify, this third analysis repeats the first, using data from the second. In other words, bivariate correlations are once again generated, but now using data generated from the serial spatial autocorrelations, as can be seen in an appended table. In doing so, we find: (1) the ordinal distance out-of-Africa of each society correlated negatively with the serial autocorrelations among their successive parasite burdens; (2) the serial autocorrelations among successive parasite burdens correlated positively with both those among their corresponding slow life histories and those among their corresponding ethno-linguistic diversities; and (3) the serial autocorrelations among successive slow life histories correlated positively with those among their corresponding ethno-linguistic diversities, indicating complete mediation of the effects of serial autocorrelations among successive parasite burdens on those among their corresponding ethno-linguistic diversities.[15] What all this can be taken to mean is that, as humans expanded out of Africa, the serial spatial autocorrelations among contiguous societies were significantly reduced for all three variables of current interest: (1) parasite burden, (2) life history strategy, and (3) ethno-linguistic diversity. Perhaps more importantly, what this shows is that the cross-national pattern of serial autocorrelation in ethno-linguistic diversity is plausibly attributable to the serial autocorrelations in parasite burden and life history strategy. The cross-national serial autocorrelations in parasite burden may be mostly driving ($r = .675$); those in life history strategy are partially driving ($r = .452$). This means that the cross-national serial autocorrelations in parasite burden may be *indirectly* driving ($r = .305$) those in ethno-linguistic diversity through their effects on life history strategy. These results therefore suggest that the decrease in the serial spatial autocorrelations among contiguous societies in parasite burden that was concomitant to migrating out of Africa had direct and indirect effects: It *directly* facilitated corresponding decreases in the serial spatial autocorrelations among contiguous societies in life history strategy; and *indirectly* facilitated the corresponding decreases in the serial spatial autocorrelations among contiguous societies in ethno-linguistic diversity through their effects on those in life history strategy.

These findings are consistent with the empirical results reported in Fincher et al. (2008) as well as in Fincher and Thornhill (2012), although life history strategy was not identified in either work as an important mediator of these effects. Perhaps more importantly, these findings are consistent with the line of theoretical argumentation advanced in Fincher and Thornhill (2012) regarding the importance of contemporary ecological selective pressures, as opposed to phylogenetic or cultural inertia. Truly, the selective pressures exerted by human parasite burden upon human life history strategies appear to be a major influence in generating the patterns of spatial autocorrelation observed in the cross-cultural distribution of ethno-linguistic diversity.

Getting back to Murdock's overarching project, as we have interpreted it here, this means that Galton's Problem has not proven fatal to the validity of the enterprise. If applied advisedly, with the proper precautions, the cross-cultural analytical method pioneered by Murdock, and supported by so much of his meticulous work in systematizing and cataloguing the most elementary particles of culture, can still be useful in contemporary work, such as the emerging field of social biogeography.

Notes

1. This opening information was obtained from the *New World Encyclopedia* at the following Web address: http://www.newworldencyclopedia.org/entry/George_Peter_Murdock.
2. These biographical details were taken from the National Academies of Sciences, Engineering, and Medicine's 64th volume of biographical memoirs, available at the following Web address: https://www.nap.edu/catalog/4547/biographical-memoirs-v64.
3. These adjectives were used by White and Brudner-White (1988).
4. As Murdock discusses, some of Boas' deconstructive efforts centered on early evolutionary theories.
5. In association with Karl Pearson.
6. See Chapter 7, which reviews the work of Landers, for an example of social biogeographic life history applications.
7. In evolutionary biology, the effects of *phylogenetic inertia* and those of current ecological adaptive pressures are two alternative hypotheses which should be accorded comparable weight as possible causal determinants, whether acting singly or jointly. To clarify, phylogenetic inertia often creates incongruity between an organism's adaptations and environmental demands. This arises when the organism's adaptations are honed by past selective pressures, which are presently different.

8. Although the present analyses do not encompass the homicide data.
9. Using data from the previous year.
10. Following Thornhill and Fincher's just emphasis on this variable, and its action as an agent of extrinsic mortality.
11. The following provides a higher level of detail, quantifying the effects of this first analysis for the interested reader:
    The first analyses done on this cross-national sample were estimating the simple bivariate correlations among the four major variables; this was done using the continuous parameter estimation model (CPEM; Gorsuch 2005), by multiplying the standardized scores of each variable by that of each of the other variables and then averaging across all observations. Table 1 displays the following results: (1) Ordinal distance Out-of-Africa (OOA) was correlated negatively with the natural logarithm of parasite burden (LPB), positively with slow life history (LHS) and negatively with ethno-linguistic diversity (ELD); (2) LPB correlated negatively with LHS and positively with ELD; and (3) LHS correlated negatively with ELD, although less so than LPB in absolute value, indicating only at most *partial* mediation of the effects of LPB on ELD. This last result was also obtained using CPEM, where the expected indirect effect of LPB on ELD, as mediated by LHS, was estimated by multiplying the bivariate correlation of LPB and LHS with that of LHS and ELD: (−.802) * (−.595) = .477, which was statistically significant ($p < .05$). The residual direct effect of LPB on ELD was estimated by subtracting this estimated indirect effect from the total effect, as indicated by the bivariate correlation of LPB and ELD: (.230) – (.477) = −.247, which was also statistically significant ($p < .05$), hence the only *partial* mediation reported.
12. More specifically, the second set of analyses estimated the means of the first (lag = 1) serial spatial autocorrelations of LPB, LHS, and ELD, with respect to ordinal distance OOA; this was also done using CPEM, by multiplying the standardized scores of each variable by the one immediately preceding it in the OOA sequence, then averaging across all observations.

Table 1 Raw CPEM bivariate correlations

	OOA	*LPB*	*LHS*	*ELD*
OOA	1.000			
LPB	−.315	1.000		
LHS	.486	−.802	1.000	
ELD	−.194	.230	−.595	1.000

Note CPEM correlations = $\Sigma(zX * zY)/n$

Table 2 CPEM first (lag = 1) serial spatial autocorrelations

	Means
LPB_{Lag1}	.607
LHS_{Lag1}	.792
ELD_{Lag1}	.501

Note CPEM spatial serial autocorrelations = $\Sigma(zX_{OOA} * zX_{OOA-1})/(n - 1)$

13. Table 2 displays the serial spatial autocorrelations of LPB, LHS, and ELD, which were all positive in direction and substantial in magnitude.
14. This analysis was done using CPEM, by multiplying the standardized scores of the autocorrelation coefficients of each variable by that of each of the other variables and then averaging across all observations. Table 3 displays the following results: (1) Ordinal distance Out-of-Africa (OOA) was correlated negatively with the first (lag = 1) serial autocorrelations of the natural logarithm of parasite burden (LPB_{Lag1}), positively with slow life history (LHS_{Lag1}) and negatively with ethno-linguistic diversity (ELD_{Lag1}); (2) LPB_{Lag1} correlated positively with both LHS_{Lag1} and ELD_{Lag1}; (3) LHS_{Lag1} correlated positively with ELD_{Lag1}, although less so than LPB_{Lag1}, indicating *complete* mediation of the effects of LPB_{Lag1} on ELD_{Lag1}.
15. This last result was also obtained using CPEM, where the expected indirect effect if LPB_{Lag1} on ELD_{Lag1}, as mediated by LHS_{Lag1}, was estimated by multiplying the bivariate correlation of LPB_{Lag1} and LHS_{Lag1} with that of LHS_{Lag1} and ELD_{Lag1}: (.675) * (.452) = .305, which was statistically significant ($p < .05$). The residual direct effect of LPB_{Lag1} on ELD_{Lag1} was estimated by subtracting this estimated indirect effect from the total effect, as indicated by the bivariate correlation of LPB_{Lag1} and ELD: (.421) – (.305) = .116, which was not statistically significant, given that this residual direct effect was under the $r > .15$ cutoff ($p < .0495$) for a sample size of $N = 172$. This result supports the claim of *complete* mediation reported in this case.

Table 3 Correlations among CPEM first (lag = 1) serial spatial autocorrelations

	OOA	LPB_{Lag1}	LHS_{Lag1}	ELD_{Lag1}
OOA	1.000			
LPB_{Lag1}	−.475	1.000		
LHS_{Lag1}	−.544	.675	1.000	
ELD_{Lag1}	−.203	.421	.452	1.000

Note All correlations coefficients tabulated are statistically significant, given that the two-tailed probability under the null hypothesis for a sample size of $N = 172$ of any correlation coefficient > .15 is $p < .0495$

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