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ECOLOGY AND CULTURE: ENVIRONMENTAL DETERMINISM AND THE ECOLOGICAL APPROACH IN ANTHROPOLOGY

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Introduction

Throughout the ages man has shown an interest in explaining the world around him.¹ In myths, folk-tales, poetry, literature, history and science, man has communicated his beliefs in a well-ordered universe where given causes inevitably lead to given effects. Explanations of social and cultural forms existing in a given time and place have tended to be simple: they have frequently identified a single factor as a causal agent.² An explanation that has long enjoyed considerable popularity is that geography determines man's life. The belief in the "sovereign influence of environment" has been widespread in space as well as in time. As a folk belief, it has frequently taken the form that people who live in the northern part of a given area are typically of stern and sturdy character, industrious and provident. Those who live in the southern section are characteristically easy going, indolent, talkative and of cheerful disposition. This folk belief is shared by such diverse peoples as the Japanese, the Chinese, the Indians, the Italians, the Germans, the Spanish, the English, the Dutch and the Americans.³ Men of letters who have subscribed to environmental determinism include many scholars who have in a major way affected the intellectual history of Western civilization—Hippocrates, Plato, Aristotle, Galen, Polybius, and Ptolemy.

Then come all the "moderns" who seized at first on the ideas of the ancients and developed, enriched, and enlarged their uncertain and dogmatic conclusions in the light of wider experience. There is Bodin, in his *Republique*, . . .

¹ Note, Kluckhohn's statement, ". . . there are no organized groups of human beings without their own philosophy." (1949: 356).

² See Delbert Miller's summary of popular simplistic causal theories (1957).

³ See La Piere for further discussions on this topic (1965: 24).

the Montestquieu who, in 1716, founded a prize for anatomy at the Academy of Science of Bordeaux . . . and busied himself by turns between 1717 and 1723 with medicine, physics, and natural history—approaches the great problem of physical environment as a whole, and solves it in light of a rigid determinism (Febvre 1925:2-4).

Bodin noted that the plains and river valleys are superior habitats for civilization. Civilization was limited by degrees of latitude, by degrees of longitude and by altitude. Montesquieu claimed that the enervating heat of the tropics combined with the fact that every need was supplied by nature did not permit the aboriginal populations to advance beyond savagery. Those living in frigid zones similarly could not advance to civilized states. The inhabitants of polar regions were forced to spend most of their time and energy in securing food, clothing, and shelter. The centers of civilization lie within the temperate zones and diminish in quality as one goes either toward the tropics or toward the polar regions. The temperate zones, however, furnish the happy mean: nature does not supply all of man's wants; neither does man have to exhaust himself just in order to stay alive. It is here that the centers of civilization lie and diminish in quality as we proceed toward either the tropics or the polar regions.

Ratzel was the first scholar to *systematically* study the relationships between the ways of life of different groups and their habitats. In the two volumes of *Anthropogeographie* (1882, 1891) the multiple activities of human societies are methodologically studied in relation to their geographical environment. In the *Politische Geographie*, which appeared latter (1903), the life of states is primarily considered in relationship to the soil. Although Ratzel makes many strong environmental deterministic statements in his writings, his general position has been summarized by Herskovits (1949: 156) as conservatively holding that the habitat of a people must be included among those influences that play on the formation and functioning of culture.

Ratzel's more extreme statements concerning the relationships between habitat and culture were developed by some scholars

into rigid, uncompromising systems of environmental determinism. Russell Smith (1925: 3), for example, used environmental determinism as the guiding principle for his major work on the geography of North America. He asserted that "natural resources, climate and accessibility are the stuff of which industry, trade, religion, national policy and to some extent civilization, are made . . ." The American geographer, Ellsworth Huntington made even broader generalizations about the effects of climate. Climatic conditions were the dominant forces that led to both the rise and the fall of great empires and civilizations. It was favorable climatic conditions that led to the formation of the civilizations of the Egyptians, Sumerians, Cretans, Greeks and Romans. And, it was unfavorable changes in climate that led to the downfall of these cultures. Huntington brought together a variety of evidence to show that around the Mediterranean basin there actually had occurred significant climatic changes for around three thousand years preceding the fall of Rome. Not only did climate determine the rise and fall of empires, but it had a variety of effects on individuals. Thus, according to Huntington (1915: 294) "The climate of many countries seems to be one of the great reasons why idleness, dishonesty, immorality, stupidity and weakness of will prevail."

Otis T. Mason, writing in the same general vein, noted that the North American climatic zones distinguished by C. Hart Merriam corresponded closely to the areas occupied by linguistic families (Powell 1891), each of which in turn corresponded respectively to relatively homogeneous cultures. Mason (1896, 1905) distinguished twelve regions in North America, which he designated as "ethnic environments." His general position can be summarized by a belief that non-human environmental factors—physical geography, climate, predominant plants, animals, and minerals—determine cultural development. More cautious statements relating climate and other aspects of the habitat were made by Clark Wissler. Wissler (1926: 214), noted that the culture areas of North American Indians (Kroeber 1923) so closely parallel floral and climatic distribution that it was reasonable to propose that the distribution of cultural traits is ". . . in some way based upon ecological relations."

Attacks on environmental determinism have come from various sources. Febvre (1925) reviews a whole variety of geographical deterministic positions and finds them inadequate. Wilson D. Wallis (1926: 702-8) after a summary of the positions of a number of well-known environmentalists wrote perhaps the strongest short and reasonable rejection of environmental determinism. With great clarity, indisputable logic, and an excellent command of his data, Wallis shows the fallacious thinking involved in the works of Huntington, Gomperz, Draper, Semple, and other "modern" environmental determinists. Wallis concludes:

In explaining everything the environment explains nothing. . . . If we wish to predict what a people will do when they move into a new environment, it is more important to know the people than to know the place—or better, one must know both (1926:708).

In anthropology the simplistic generalization of the environmental determinists led to a strong reaction against "environmentalism." The orthodox views of many anthropologists came to be that historical and cultural forces, rather than environment, best explain cultural forms and patterns. This point of view was well expressed in the works of Melville Herskovits, Daryll Forde, and Alfred Kroeber. Herskovits argued that if environment is indeed an important determinant of culture, similar environments should be inhabited by similar cultures. Herskovits showed that similar cultures exist in different environments and that different cultures exist in similar environments. For the latter, he compared the Eskimo with tribes in the Siberian Arctic and stated, "Here in the difficult circumpolar habitat then we have two quite different ways of life . . . The adaptation of both peoples is equally successful inasmuch as the only test of success in adaptation is survival" (1949: 158).

As to the general relationship between environment and culture Herskovits wrote (1949: 163):

Habitat then is a limiting factor, but it *selectively* limits behavior . . . man not only adapts himself to his natural

setting, but as his adaptation becomes more effective, he is freed from the demands of his habitat, making it possible for him at times to challenge or even defy its limitations.

Daryll Forde (1949: 463) after a comprehensive study of food gatherers, cultivators and pastoralists wrote similarly :

Neither the world distributions of the various economies, nor their development and relative importance among particular peoples, can be regarded as simple functions of physical conditions and natural resources. Between the physical environment and human activity there is always a middle term, a collection of specific objectives and values, a body of knowledge and belief : In other words, a cultural pattern.

Kroeber explained the farming practices of Indians of South-western United States by diffusion of the invention of agriculture through a series of successive tribal contacts. He goes on: "Climatic or physical environment did not enter into the matter at all, except to render agriculture somewhat difficult in the arid Southwest, though not difficult enough to prevent it" (1923: 185). And, as to general relationships between culture and geography, he wrote (1948: 163): "Changes in culture due to natural changes in the environment undoubtedly occur. But this explanation for culture change has probably been propounded ten times for every actual case of such change."

For a number of anthropologists the explanations of neither the simplistic geographical determinists nor their opponents were satisfactory. Scholars such as Julian Steward were not prepared to relegate environment to a passive role in cultural formation. A solution which gave the environment a "creative" role to play and which allowed for a disassociation from simplistic geographical determinism was found in ecology. In recent years an ecological approach has gained broad acceptance in anthropology. Its growing popularity in the light of anthropology's recent history of anti-environmentalism requires some explanation.

The Ecological Approach

Anthropology's growing concern with an ecological approach seems undeniable. Within the last four years the major journal in American anthropology—*American Anthropologist*—has carried two symposia on ecology and culture (Baker 1962, Goldschmidt 1965). Scholars who have reviewed the ecological literature in anthropology agree that an ecological approach is drawing a growing number of adherents. June Helm (1962: 630-640) wrote of the "rise in emphasis on ecology that is evidenced jointly in studies by archaeologists and by ethnologists and social anthropologists" and in the same paper provided an extensive bibliography, listing a great variety of ecological studies in anthropology. Paul Baker (1962: 20) wrote similarly: "Within the last 10 years an increasing emphasis on the role of environment may be noted, and this has proved a productive approach to culture historical problems." A full understanding of the ecological approach in anthropology today must include an answer to the question: "Why is ecology currently popular?"

According to Baker, the ecological approach gained much momentum from two works published respectively in 1949 and 1950: Steward's "Cultural Causality and Law" and the study on race by Coon, Garn and Birdsell. These works undoubtedly had an influence on ecological thinking since "they attempted to relate some of the inherited anatomical and functional variations in man to selection by the physical, biotic and cultural environment" (Baker, 1962: 19). Along with these works, however, were a number of intellectual currents which all seemed to influence the development of an ecological approach to culture. Such currents include: (1) "Fears for the baby" in simplistic geographic determinism; (2) A growing parallel interest in the evolution of socio-cultural forms; (3) A pervasive functionalism in anthropology; (4) A traditional natural history and holistic approach; (5) A growing interest in synthesis coupled with a realization of the synthesizing possibilities inherent in an ecological approach.

Fears that the geographical "baby" is not thrown out with "bath waters" dirtied by overgeneralization are present even in the writings of the strongest critiques of environmental determinism. Wilson Wallis, for example, does not deny that environ-

ment has an influence on men's lives. He wrote (1926: 702):

The view that nature has made or has unmade man is suggested by man's dependence upon nature. He is a creature of the earth's surface. Only by keeping touch with her can he maintain life. Geographical environment is the cradle in which man's genius awaits the promptings of motives which give him mastery over his fate.

Herskovits is willing to allow that the environment is a "limiting factor" which (to turn his argument around) limits most strongly where adaptive techniques are simplest. Implicit in a culture-area approach is the notion of environmental influences, and such staunch cultural-history advocates as Kroeber and Herskovits were much interested in delineating culture areas. Kroeber (1947: 322-30) has explicitly stated that culture-area classifications are essentially ecological.

Those who were most concerned for the geographical "baby," however, wanted a much stronger role for environment than its being an influence or a limiting factor. In anthropology, the leading proponent for a "creative" or "causal" role for the environment was Julian Steward. Steward neatly parried the seemingly devastating attacks of the anti-environmentalists—that similar environments do not lead to similar cultures, and that similar cultures exist in different environments—by raising a basic question. To-wit: What does similar environment mean? Is the criterion of similarity to be climate, topography, flora, fauna, all of these, or a particular grouping of them? The importance of this question was that statements contradicting environmental generalizations were put to doubt. Parenthetically, it should be noted that the question: "What does environment mean?" was also used to cast doubt on the writings of the geographical determinists. For, as Wilson Wallis (1926: 704) tells us, the geographical determinists "have been loth to define the meaning which they attach to 'geographical environment'."

As will become apparent below, "what is the environment?" is still a central question in any ecological analysis. However, Steward's use of the question dubbed the anti-environmentalists as unscientific in their use of environmental controls. Steward

thus helped to legitimize a re-opening of the question of environmental relationships to socio-cultural forms.

The fact that cultural evolution has also been developing as a respectable mode of analysis has much facilitated the development of an ecological approach in anthropology. Whether the classical writers on cultural evolution used a biological model or not,⁴ evolutionary thinking in biology has had an ever increasing influence on evolutionary thinking in anthropology.⁵ For a growing number of anthropologists, the processes involved in cultural and biological evolution are essentially similar. That is, many follow Julian Huxley (1956: 3-24) in his belief that ". . . the whole of phenomenal reality is a single process, which properly may be called evolution . . . *cultural (psycho-social) evolution shows the same main features as biological evolution*" (italics inserted). Since a more sophisticated theory of evolution has been developed in biology than in cultural anthropology, it seems reasonable to use the former as a model for the latter. Since evolutionary biology is intimately related to ecological analysis, cultural evolutionary analysis must have similar ecological ties.

Steward's (1955) "multilineal evolution" approach is closely tied with "cultural ecology"—a method for examining what relationships exist between environmental adaptational problems and social organization and culture. In a recent compendium (Tax 1964) of what "young anthropologists" think is significant and interesting today, the papers "The Study of Evolution" and "Culture and Environment" show close similarities in analysis. In the former, Eric Wolf discusses the "environmental variables" which help the "new evolutionism" to synthesize a variety of current anthropological approaches. In the latter, Sahlins uses such typical evolutionary concepts as "specialized cultures," "generalized cultures," "higher cultures," etc. The results of the 1955 Washington Summer Seminar of the Society for American Archaeology (Beardsley 1956) included a paper which closely linked an evolutionary framework to an ecological

⁴ Compare Keesing's statement (1958:139) with Herskovits' statement (1949: 464). For early evolutionary analyses see August Compt (1893).

⁵ See particularly Sahlins and Service (1960); Wolf (1964: 108-119); Steward (1955, 1960: 169-186).

one. Seven cultural types were here identified which varied according to productivity in subsistence resources per man hour of labor expended. The work of Betty Meggers (1954, 1960) also illustrates well the close conceptual ties between evolutionary and ecological analysis.

June Helm (1962: 632) connects the pervasive interest in functionalism in anthropology with an ecological orientation. Exactly how a functional viewpoint is related to ecology is clarified by Duncan and Schnore (1959: 142):

Ecological structure is conceived as an organization of functions—activities that are dependent upon other activities . . . It is significant that, while theorists of culture and behavioralists have been propounding confused hypothetical versions of functionalism, ecologists have been busy making inductive studies of the functions of communities and correlating functions with aspects of organization, location, and demographic structure. This suggests that *the ability to manipulate ideas about function effectively in research develops rather easily after an ecological perspective is adopted.* (italics inserted).

The natural history approach in anthropology is closely allied to an ecological orientation. Indeed, we might well go along with Bates' view that ecology is "a rather new word for an old subject—natural history." The anthropological interest in describing the whole system logically leads to an interest in the habitat within which "the system" operates. The fact that a natural history approach and holism are completely orthodox in anthropology lends respectability to ecological analysis.

The synthesizing possibilities inherent in an ecological framework are not least in accounting for its growing popularity. That is, given a growing anthropological interest in establishing "a master formula" (Wolf 1964: 111) and arriving at laws which interrelate a variety of phenomena (Steward 1949; Titiev 1963; Sahlins and Service 1960; et al.); and given that an ecological framework is large enough to accommodate a great variety of approaches, the growing popularity of the ecology is almost inevitable. The number of linkages that can be made from an

ecological starting point are varied and many. As Sahlins has written (1964: 134): "Cultural ecology has an untapped potential to provoke useful thoughts about militarism, nationalism, the orientation of production, trade, and many other specialized developments . . ." Additional linkages from an ecological base include studies of (1) acculturation and diffusion—linked by broadening the meaning of "environment" to include the social environment, (2) animal ecology, (3) rural sociology, (4) bureaucracy, stratification and urbanization,⁶ (5) formal organizations, (6) technology, and (7) economy. The nature of ecological links to formal organizations, technology and economy are clear from the description of the province of human ecology by Duncan and Schnore (1959: 135-6):

In the most general terms the framework of human ecology embraces four main referential concepts: population, environment, technology and organization. . . . Organization is assumed to be a property of the population that has evolved and is sustained in the process of adaptation of the population to its environment . . . organization tends to be investigated as a ramification of sustenance activities, broadly conceived, which utilize whatever technological apparatus is at the population's disposal or is developed by it.

The "naturalness" of the technological link to an ecological framework is obvious in much of the anthropological ecological literature. As June Helm (1962: 630) has written: ". . . Tylor and Morgan, both set forth *technological advance* as a major referent for stages of cultural development, and it remains a viable and enduring theme in contemporary longitudinal ecological views in anthropology." The links to writings which emphasize technological aspects of social systems attaches ecology to an enormous array of literature. Such writings include works by Wilhem Ostwald (1907), G. G. MacCurdy (1933), Leslie White (1949, 1959), Jean Fourastie (1960), Lynn White (1962), Stuart Chase (1956), Francis Allen, Hornell Hart,

⁶ See Duncan and Schnore's (1959) discussion of ecological ties to analyses of bureaucracy, stratification and urbanization.

Delbert Miller, William Ogburn, and Meyer Nimkoff (1957). The ecological interest in "sustenance activities" makes for a natural link to writings which emphasize economic variables as basic for an understanding of social systems. Thus, the ecological framework permits an inclusion of the works of such influential scholars as Karl Marx (1904), Emile Durkheim (1933), and Thorstein Veblen (1912).

Given the multiple connections which can be made from an ecological framework, its popularity in anthropology⁷ is understandable. The analysis thus far leads to the conclusion that the phrase "an ecological approach" is anthropology's current synonym for "a systems approach." A critical analysis of the utility of an ecological approach must then answer the following questions: (1) What are the advantages and disadvantages of substituting "ecology" for "system"? (2) Do the advantages more than compensate for the disadvantages? The advantages of thinking ecology rather than system include the following: first, the term ecology includes the concept system, while the concept system does not necessarily include the concept ecology. Differently put, the concept ecology leads to systems analysis with a more complete set of systems variables than would be present if one did not think "ecology." Second, the ecological system comes with a set of clearly defined system variables. The modeling of human or cultural ecological studies after works in animal ecology and human geography leads to the possibility of incorporating into social science a language with many well defined terms—adaptation, ecological niches, predation, parasitism, mutualism, commensalism, rank, dominance, and many others—which can with profit be used for the analysis of social systems (Wagner 1960). Third, an ecological approach forces the social scientist to deal with the real problems of social living: procuring food, shelter and clothing. By emphasizing the environment in which humans play their roles and create their institutions, the ecological approach deals with society more realistically and in somewhat more concrete terms than most other approaches. Fourth, an ecological approach forces one to consider the con-

⁷ The lack of (1) a strong interest in evolution, (2) a natural history tradition, (3) a holistic tradition, makes sociology's weaker attachment to an ecological approach understandable.

cept of *space* as a critical variable in social systems. The value of such an emphasis has been described by Duncan and Schnore as (1959: 136):

First, territoriality is a major factor giving unit character to populations. Second, space is simultaneously a requisite for the activities of any organizational unit and an obstacle which must be overcome in establishing inter-unit relationships. Finally, space—like time—furnishes a convenient and invariant set of reference points for observation, and observed spatio-temporal regularities and rhythms furnish convenient indicators of structural relationships.

Finally, the ecological view avoids both reductionistic and “mystical” explanations of social and cultural forms. Its view of social organization as the “collective adaptation of a population to its environment avoids the reductionism of behavioral concepts and the etherealism of the ‘value-pattern’ concepts of some cultural theorists” (Duncan and Schnore 1959: 135).

The disadvantages of thinking “ecology” rather than “system” are first, an ecological approach can be deflected into formal and barren exercises in demography. Second, it can fairly easily degenerate into the old geographic determinism. That is, ecological statements, which are loose, which over-generalize, and which indicate simplistic causal relationships between ecology and culture, may become acceptable simply because ecological analysis is today prestigious.⁸ That this is a real problem can be seen from the following types of “ecological” statements which are appearing in the anthropological literature:

1. Differences in soil fertility, climate and other elements determine the productivity of agriculture, which, in turn, regulates population size and concentration and through this influences the socio-political and even the technological development of culture (Meggers, 1954:802).

2. My ultimate aim is to be able to predict culture from

⁸ The analogy here is accepting “authority statements” not on their merits but rather because they were made by a prestigious authority figure.

habitat. . . . By habitat I mean the physical environment of a region. Habitat includes the wild flora and fauna, climate and weather, soils, land forms, geological formations and the like (Quimby, 1960: 380).

3. Each environment offers to human occupation a different set of challenges, and therefore a different set of alternate cultural responses may be expected. . . . In responding to such challenges, cultural response tends to take the path of greatest efficiency in the utilization of the environment (Sanders, 1962: 34).

Sanders also re-opens the old argument of the relationship between environment and civilization. He finds certain geographical conditions to be "crucial" to centers of civilization: the presence of a fertile soil; sufficient water for irrigation; easily controllable scanty plant cover; presence of a major river and a general deficiency of natural resources other than good agricultural land (1962: 36).

Finally, it is easy to slip into false types of casual analysis because of the problems which exist in dealing with the concept "environment." Bates has clearly described these problems (1961: 552-3):

The idea of environment seems obvious and easy; it covers the surroundings, the setting, of an organism; it is the sum of the forces acting on the organism from the outside, in contrast with the forces that arise from the inside, from the nature of the organism itself. But when we start to work with this contrast between inside and outside, we soon get into difficulties. The old "nature versus nurture" controversy is an example of one kind of difficulty. . . . We cannot sort traits into two separate pigeonholes, one labeled "hereditary" and the other "environmental." Everything about the organism is a consequence of the interaction of both. . . . Another kind of difficulty with the organism-environment contrast is illustrated in an extreme form by the human animal. When we investigate the environmental relations of the human species, what do we do about culture? Is culture an attribute of the man or of the environ-

ment? The environment concept is thus a constant source of trouble, but I know of no way of getting along without it. One must go ahead and use it confidently—but also somewhat warily, keeping alert to the dangers.

The advantages of an ecological approach appear to considerably outweigh the disadvantages. Further, the disadvantages, as such, are not basic: they need not be part of an ecological orientation. If, following Bates, one goes ahead “somewhat warily, keeping alert,” the possible traps involved in an ecological orientation can be side-stepped. The ecological approach can provide a realistic, activity-oriented, and systematic approach to social and cultural phenomena. An approach, moreover, which, as Duncan and Schnore point out, is able to deal with the phenomena of change.

How does one keep wary and alert when dealing with “environment”? Following Bates (1961: 553), we might with profit distinguish between the *operational environment* (“the sum of the phenomena that directly impinge on the organism in some way at some time”) and the *potential environment* (“the sum of phenomena that might conceivably impinge on the organism”); and clearly state whether the unit of reference is an individual, a population, or a community.

To maximize the utility of the ecological approach, it would be useful to have a whole set of safeguards that help us to maintain clarity and vigor in the formulation of problems, in the analysis of data, and in arriving at generalizations. One kind of “safeguard,” which can be used where *change of a clear and dramatic nature* has occurred, is doing *natural experiments*. Change of a clear and dramatic nature can be considered as the independent or causal variable in an experimentally oriented study, and its effects can be studied and described. The ecological framework lends itself nicely to such studies since ecological variables can frequently be used as either the independent variable—as in the case of Linton’s famous study of the effects of a change in food production on Tanala social organization (1939: 251-290); or as controls—as in my study of Creole and Indian peasants in Trinidad (1963: 21-39).⁹ It

⁹ It is outside the scope of this paper to provide a detailed discussion of the *natural experiment* and its utility. Such a discussion can be found in my paper, “The Natural Experiment, Ecology and Culture” (1963).

would be helpful, indeed, to have a complete methodology which would include natural experiments where possible: a methodology which would force us to use scientific methods in the midst of temptations to slip into that simplistic environmentalism. I believe that the currently growing anthropological interest in methodology will lead to an ever more profitable use of the ecological approach.

Summary

The current ecological approach in anthropology appears to represent the end point of a Hegelian progression: a *thesis* of environmental determinism, followed by an *anti-thesis* of cultural relativism, followed by a *synthesis* of cultural ecology. The synthesis has within it the possibilities of giving new meaning to the traditional holistic approach in anthropology. In modern terminology, it is possible to do more effective systems analysis by using an ecological orientation than by working within a closed socio-cultural system. However, "ecology" has an Achilles heel. Many of the intrinsic advantages of an ecological approach can be lost through its possible deflection (1) into exercises in barren demography, (2) into simplistic geographic determinism and (3) into a muddled use of the concept "environment." Sociologists appear more susceptible than anthropologists to the trap of "barren demography." However, many anthropologists seem to have an almost magnetic attraction to the trap of simplistic geographic determinism. The developing interest in methodological issues in anthropology—very evident in recent anthropological meetings, and in recent publications—can help to maximize the benefits which can be derived from an ecological orientation.¹⁰

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¹⁰ Among other works, I am here referring to the *Studies in Anthropological Method* series edited by George and Louise Spindler (Holt, Rinehart and Winston). Also, to a forthcoming book which I am editing: *Cross-Cultural Research Methods* (Harper and Row).

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