

SOME FURTHER THOUGHTS ON CULTURE AND ENVIRONMENT

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Abstract

I begin with a recent book Culture, Architecture, and Design that summarizes my work on culture-environment relations. Three of its important general points are discussed and some possible misconceptions clarified (e.g. that culture is the only, or most important, variable). Some other points are elaborated and developed, and a number of important new developments, concepts, findings and ideas introduced from a number of relevant sciences. In this connection I reiterate the importance of Environment Behavior Studies-EBS being a science, hence developing explanatory theory and, consequently the importance of keeping up with a large number of disciplines beyond those with which EBS started. The relevance of those may not be apparent at first, but becomes apparent at some level of abstraction. Among new topics introduced are the potential role of culture in non-residential environments (so far not much discussed), the question of cultural identity and the possible role of scale in both. The utility of dismantling for a number of the topics introduced is re-emphasized. Among important new concepts I emphasize human universals, the evolution of culture, the role of niche construction and the handicap principle (costly signaling), rule systems (and simulation) and their implications for studying culture-environment relations.

Keywords

Culture; evolution; human universals; explanatory theory; abstraction; dismantling; multidisciplinary.

Introduction

I have recently summarized my work on culture and culture-environment relations in a book.¹ In this paper, therefore, I begin with that book and summarize some of its most important general points. I do this because, in a way, it represents my "last word" on the subject. At the same time there is no need to repeat most of what is in it. My purpose here is to develop and explain some ideas and, most important, to introduce some very significant new developments in the relevant sciences. This is important because the process of updating always continues, so that one needs to keep up with such new ideas. There is also a need to take these new developments further, to consider their relevance to environment-behavior studies (EBS) and to interpret them into existent body of work, i.e. to continue empirical and theoretical research.

I had three distinct purposes in writing the book:

1. The first was general and not related to culture as such. It is the reason that a book summarizing almost 40 years of work is so short. The intention was to show that a strong conceptual framework is of critical importance, and makes it possible to compress a great deal of material, and that this can then be done simply and concisely. Although, as I have long argued, theory can do this very much better and is, therefore essential, *"... a conceptual framework that draws all the necessary distinctions, a framework that organizes the relevant categories into the appropriate structure, a framework whose taxonomy reflects at least the more obvious of the rough nomic categories holding across the elements ... is already a theory"* (Churchland, 2000: p.120).

2. The second more specific (but still general) purpose was to synthesize one part of my work on EBS, that on culture, and thus strengthen my arguments for the importance of synthesis and implication (and generalization) and to suggest how this can be done, by using a strong conceptual framework. Such synthesis, implication and generalization are also an essential step for theory development.

3. The third, most specific, purpose was to develop some insights into the nature of culture, especially as it relates to the physical environments and through this, and above all, to make 'culture' operational, so that one can use it even while a full-pledged explanatory theory of EBS is lacking. This aspect has two components. One is purely conceptual and abstract, and the second is more 'concrete' and pragmatic.

a.) The first of these is the idea that culture is not

completely variable but has major constancies and, moreover, that some apparently variable aspects are expressions of underlying constants or universals. This is important conceptually, not only regarding culture, but regarding EBS generally, by emphasizing the existence and role of human nature and human universals (Brown, 1991, 2000; Goldsmith, 1991; Pinker, 2002; Rhoads, 2004; new journal: *Anthropology and Human Nature*, to begin soon). This also has practical implications: It may reduce the variability that one needs to consider and deal with, may suggest alternatives and may help the transferability of research done in one culture to others (discussed later).

A recent very interesting reinforcement of this idea uses the concept of an 'ethnographic hyperspace.' It is possible to visualize a vast number of possible (imaginable) cultures, based on combinations of a restricted number of accepted variables, for example from the human relations area. That number is 12 followed by 52 zeros! In fact, however, the number of human cultures is very much smaller. Moreover, these cultures share many of the universals identified in Brown (1991), and other work (Cronk, 1999). These developments provide an important corrective to much work on culture and environment (and in the social sciences) which in emphasizing the role of culture tends to concentrate on variability and neglect constancies.

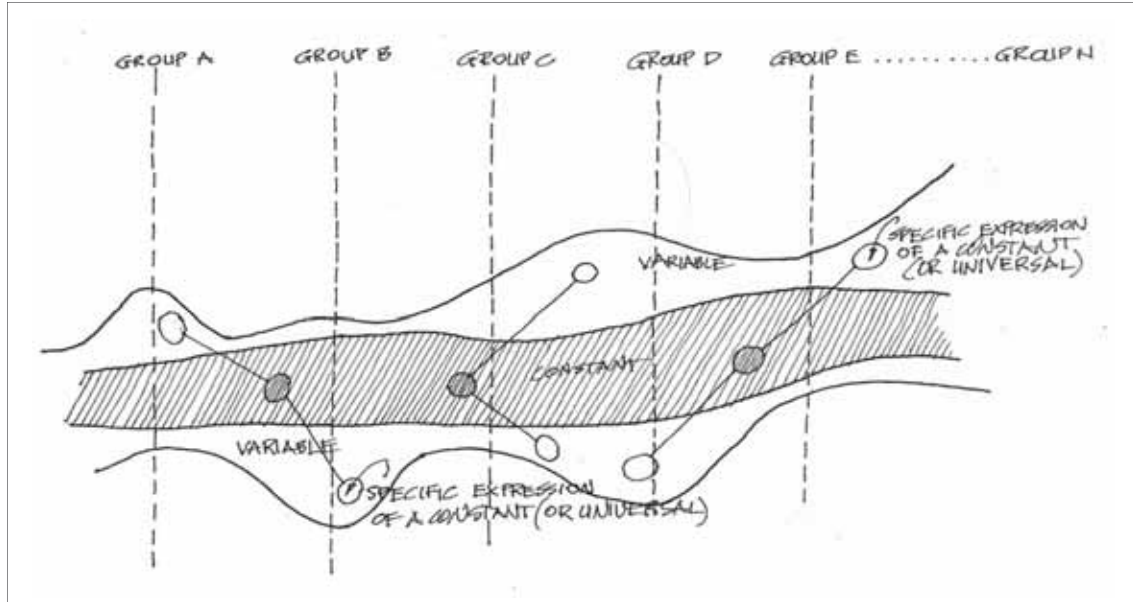


Figure 1: Constant and variable aspects of 'culture,' with the possibility of specific expressions of constants. (Based partly on A. Rapoport, *History and Precedent in Environmental Design*, New York, Plenum, 1990, Fig. 3.12, p.111; "Using 'Culture' in Housing Design," *Housing and Society*, Vol. 25, No. 1&2, 1998, Fig. 7, p. 14; "Architectural Anthropology or Environment-Behavior Studies," in M.-J. Amerlink (ed.), *Architectural Anthropology*, Westport, Conn., Bergin and Garvey, 2001, Fig. 2.1, p. 32; 2003, Fig. 39, p.81 (Source: A. Rapoport, 2005).

b.) The second component is based on the argument that the concept of 'culture' has proved to be much too broad and abstract to be usable, at least in connection with the environment (which is also too broad and vague). The solution which I have proposed, which I use frequently and which is highly general I call dismantling (the term 'unpacking' is also used in some literatures). I have used this approach for environmental quality, vernacular design, tradition, ambience, spontaneous settlements and meaning, and found it both useful and enlightening in each case. The

dismantling that I have developed and now use in connection with culture is best shown by a diagram.

Each expression and component of culture can be examined separately and links established with specific aspects of the environment. Such a process can also lead to a better understanding of the whole system, since dismantling a complex system yields an understanding of how the whole system works (Poon and Ferrell, 2007).

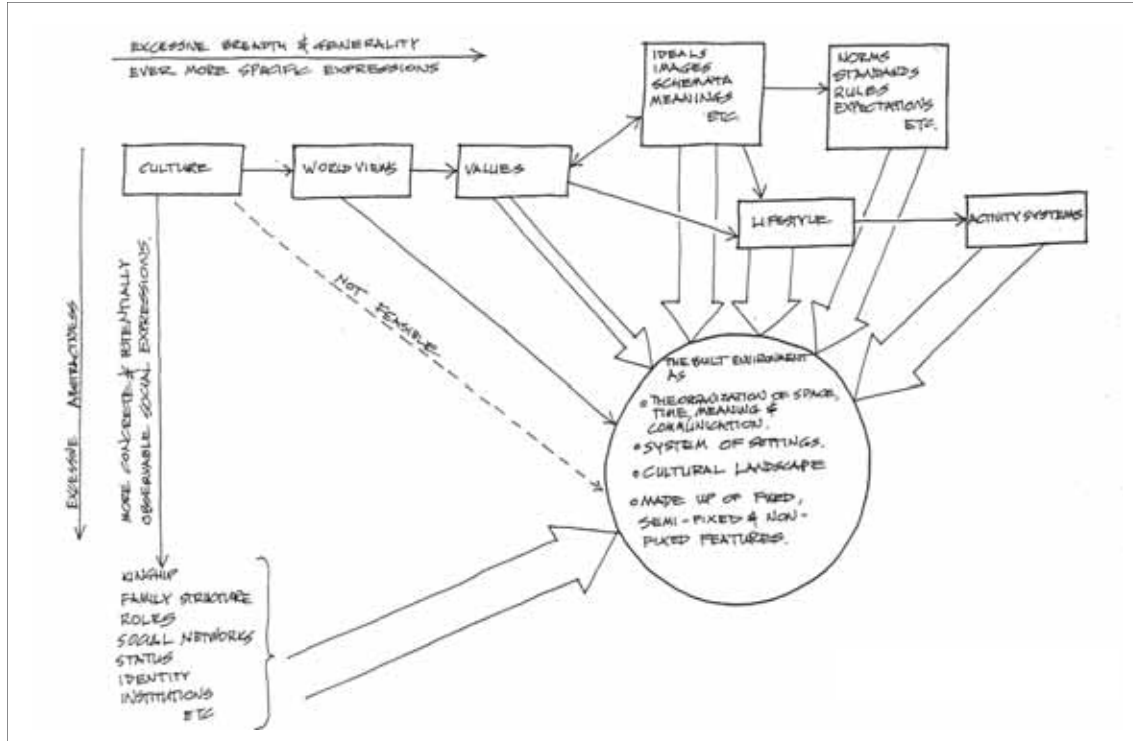


Figure 2: Combined diagram of the Tub Dismantlings of 'culture,' relating its expressions to the built environment (e.g. housing). The width of the arrows corresponds approximately to the feasibility and ease of relating the various elements. (From A. Rapoport, "Theory, Culture, and Housing," *Housing, Theory, and Society*, Vol. 17, No. 4, 2000, Fig. 4, p. 149; "Science, Explanatory Theory and Environment-Behavior Studies," in S. Wapner et. al. (eds.), *Theoretical Perspectives in Environment-Behavior Research*, New York, Kluwer Academic/Plenum Publishers, 2000. (Source: A. Rapoport, 2005).

I have recently given an example of how this can be done for housing, an environment where culture probably plays the largest role (Rapoport, 2002 a; Rapoport, 1998). This approach was also used, with different components and expressions for housing in a developing country and provided useful insights (Jabareen, 2005). This reinforces my argument

that this dismantling is useful in the studying of most aspects of culture-environment relations. For example culture change among rural migrants can be studied by examining changes in social expressions and components (such as images); one can study the role of rule systems (discussed later); the specifics of culturally supportive environments and the role of cultural

competence (Rapoport, 1983).

Note also that this particular dismantling can also be linked to other formulations. These are often not only compatible with it but, I would argue, can be derived from it. One clear example is provided by the approach of Mazumdar and Mazumdar (1994). It would be useful systematically to look for, and analyze others to see if they can be related to, and derived from, the proposed dismantling.

One important aspect of this approach is not only to dismantle 'culture' into aspects and expressions that can be studied, but also to study how these (still invisible/intangible) aspects and expressions become visible in the tangible physical environment. However, they may not necessarily become visible in the fixed-feature realm (the concern of designers). They may be expressed by aspects of environmental quality, particular organization of settings, specific penetration gradients, or flexibility—which makes possible tangible (and hence visible) semi-fixed and non-fixed features of environments which are supportive of culture, express cultural identity, and so on. This will be discussed in more detail later.

New Developments, Concepts, and Ideas

In research, however, there is rarely a 'last word,' especially in a relatively new field. This is even more the case in an interdisciplinary field, and when one relies on new work in different disciplines. I will, therefore, now turn to some developments, ideas and additions to the book which emerged during further work and further synthesis. These seem important for a more complete understanding of culture-

environment relations (and EBS more generally). These I discuss in no particular order.

First, however, a general observation, it seems clear that much of the literature on culture and environment (including much of my earlier work) has been concerned primarily with arguing for the important role of culture, trying to demonstrate it through examples mainly cross-cultural comparisons, showing differences among environments. In my case, this has been accompanied by trying to explain this variability, e.g. by emphasizing meaning (and hence latent aspects) as a most important function.

As a result, 'culture' may sometimes have been over emphasized in that literature, and the impression created that it was the only variable, since others were not discussed. That was never the intention. The sole role of culture is as unlikely as the view that it has no impact and can, therefore be ignored. Clearly it cannot, since culture is a major, indeed defining, attribute of humans, with deep evolutionary roots. The importance of its role must then lie between these two extremes. How important it is generally, and in any given case, is an empirical question and can only be answered through research. Its role may (and probably does) vary with the type of environment, overtime, for different groups, in different situations and contexts and so on.

Consider types of environments. The examples used are usually of housing (in the broad sense of systems of settings for living, including neighborhoods, their urban spaces, other setting types, etc.). This is because the role of culture there is particularly strong. Moreover,

a large number of these examples tend to be of traditional and vernacular where the role of culture is stronger still. In this sense, these become model systems for studying culture-environment interaction (Rapoport, 2006 a). Also frequently used are spontaneous settlements—today's vernacular (Rapoport, 1988 a).

The question, can be asked, one hardly discussed or researched, is whether culture also plays a potential role in other types of environments, if so—how, which components/expressions of culture and their relative importance, regarding what (identity, image, expressions of hierarchy, how tasks are performed, people involved, etc.).

It seems worth-while, therefore, to consider and do research on the role of culture on the full range of environments, i.e. the non-residential environment. I have long wanted to look at this but have not gotten around to it. I have, however, suggested that in the case of universities,² airports, scientific laboratories, office buildings, sport arena and stadia, etc, the role of culture may be minimal or even insignificant (see photographs of Infosys in Rai 2005, and *New York Times*, April 15, 2007, p.4). This hypothesis may be wrong and, consequently research and evidence are badly needed.

This raises another issue. If, for some reason, one wants non-residential environments to express cultural identity, what physical elements would do so? Such attempts are not based on any research or evidence and are dubious. Thus oriental roofs on skyscraper office buildings, as one sees in China do not seem to work (cf. Barnard, 1984). Consider a recent attempt to make a high-tech research

building in Bangalore 'Indian' (Rai, 2005 b). Two assumptions are made implicitly: 1. that steel and glass represent the west, are global. 2. that, therefore, solid buildings with few windows and particular colors are 'Indian.' This is very doubtful. If, in the photograph, one takes away the people and their dress that could well be a building in Scandinavia or anywhere else.³

The role of culture in non residential environments could possibly vary with scale. For example, while office buildings as such might not be able to be culture-specific, interiors, the organization of settings, expressions of hierarchy, expressions of status, and so on might well vary with culture (Doxtater, 1994; Choi, 1986; the obvious differences among offices in the US, France, India, China and so on). Although culturally specific ways of dealing with disease, especially psychiatric disorders is well known (and briefly discussed later), the environmental implications have received hardly any attention. There has, however, been anecdotal evidence for quite some time. Early in the 20th Century Albert Schweitzer patient wards in his hospital in Africa in culturally specific ways (and was severely criticized for it). He argued that wards should respond to the fact that the patient's whole family moves in, cooks and cares for him etc. I observed similar issues in Papua New Guinea in the early 1970's. There has, however, been little research on it until a recent doctoral dissertation in Sweden about Namibia (Nord, 2003). I would argue (as a hypothesis) that while patient areas might need to be variable, more technically dominated settings—operating theaters, X-ray, MRI, CT scanning areas, laboratories, etc would hardly be influenced by the local culture (a point made below about urban areas).

There is evidence that facilities for the elderly (admittedly an institutional form of housing) vary cross culturally both across countries, and for different groups within countries. Drinking and eating patterns may also vary i.e. at the scale of bars and dining settings. For example, culture change, and changes in the components and expressions of culture has been shown to have major impacts on the English pub (Vassey, 1990). Cultural differences are also considered in the design of visa sections of US diplomatic buildings (T. Rosenheck; *personal communication*).

Consider shopping. The display of goods and how vending occurs may influence the character of streets and portions of buildings, i.e. at the scale of the street level (Liu, 1994; Fernando, 2007; Rapoport 2000 b). A 'quick and dirty' way to do research on ethnic and cultural groups (at least in the US.) is to use the types of products on sale and how they are displayed. An example of display in a different context shows high-tech electronic products being sold in a typical outdoor market in Indonesia (photograph in Erard, 2004). However, even the adoption of high-tech may be culture-specific. One thus finds the high-tech industry using anthropologists to study the role of culture in the spread of technology. In the particular case described 19 cities in 7 countries of the Asia pacific region were studied to see how technology was being adopted (Erard, 2004) (The differential adoption of technology has been known for some time, e.g. Foster's study on Latin America starting in the 16th Century, cited in Rapoport, 1983). If this is the case in a high-criticality domain like technology, it is to be expected that more variability will be formed in shops, markets, open spaces in neighborhoods etc.

Consider the latter. Scale can, and does, play a role in the urban realm. For example, downtown areas, business centers, main streets and avenues tend to be non-culture specific, having the same character everywhere, as in the case of Jakarta, Nairobi, Kampala, Saõ Paulo, Shanghai and other Chinese cities, and elsewhere. That is the case at the level of fixed features. Differences may still be found in the semi-fixed feature realm and, especially, in the non-fixed feature realm, and in non-visual senses. Entertainment areas are often much more culture specific both by their very existence and through semi-fixed elements such as signs (e.g. China, Japan, Istanbul etc), intensity of use, use outdoor areas, behavior, etc.. At the neighborhood scale, especially streets and other urban spaces, cultural specificity may be very marked indeed (but see the discussion of global suburbanization later).

In *Human Aspects of Urban Form* (Rapoport, 1977, Fig 5.A. p. 263) and in *On Cultural Landscapes* (Rapoport, 1992, Fig 2, p. 39) I used what I considered an abstract diagram. But this is in fact, the case in many cities (India, the Kamprings of Indonesia, the Sois of Bangkok, and the highly traditional areas just behind the streets and avenues of the new centers of Chinese and African cities). For example, just two months ago as I write this, as I photographed a 'Western' downtown in Kampala, Uganda, by turning 90° I photographed a Cow and Calf being led down a dirt street, vendors ox-drawn carts, bicycles carrying huge branches of plantains—a highly culturally specific scene. (cf. Rapoport, 1977; 2000 b; 2004 a, in press).

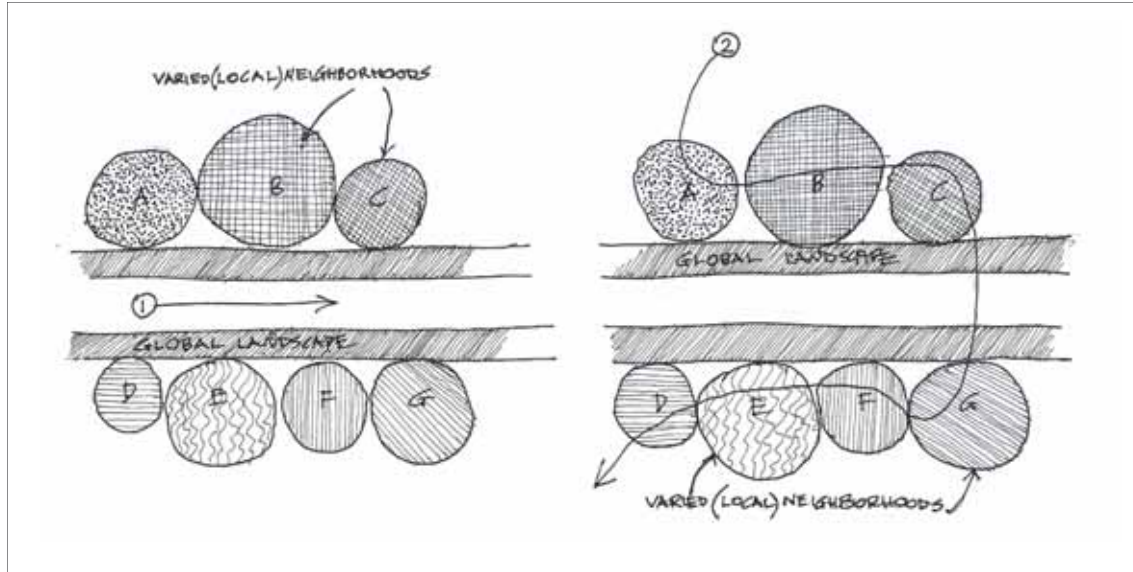


Figure 3: Neighborhoods 'behind' a main artery. Following route 1 only global landscape is visible; route 2 reveals neighborhoods A-G. (Source: Redrawn from A. Rapoport 1977, Fig. 5, p.263; 1992, Fig. 2, p.39).

Figure 3 relates to a more general point which I made about the relation of high-style frameworks and vernacular infill in cities (Rapoport, 2002 a, Fig. 5, p. 43). This can be shown to apply quite widely, including the present discussion about local and culture-specific smaller scale urban areas in modern cities. The modern framework can be seen as machine (mainly car) space, the smaller scale neighborhoods as slower speed human spaces providing a good fit with human behavior, activity systems and so on and, as a result vary more with culture (for a more detailed discussion, see Rapoport, 2004 a, in press). The prevalence of such areas may also be related to the earlier discussion of human nature.

In many cases, however, these more culture-specific areas seem to conflict with the desired image and meanings—that of modernity. The images and meanings of culture-specific environments are often negative (see examples in Rapoport, 1994; cf. Shrestha et al, 1997 on Kirtipur, Nepal). As a result, in design and planning and among users attempts are made to get rid of these many examples can be found. In Seoul (Korea) while visiting a traditional neighborhood, I was prevented from photographing it, and experienced great hostility, because the residents wanted it redeveloped. In Taipei (Taiwan), quite recently, I visited a neighborhood group trying to save their culture-specific area that the city wanted

to redevelop (Note the residents contradictory attitudes!). In Jakarta (Indonesia) the city threw becaks (bicycle rickshaws which work extremely well in the kampungs) into the sea—their image was wrong for a capital city. At the same time, the redevelopment in-place of kampungs has been accepted. Currently, São Paulo (Brazil) is banning the rather colorful signscape which is highly culture-specific (Jorge Willheim, *personal communication*) i.e. semi-fixed elements may also be eliminated. Thus a question already raised comes up again—to what extent fixed features is important vs. semi fixed features and hence open endedness in design (Rapoport 1990; 1991; 1995 a; cf. O' Donnell, 1995) and the role of non fixed features (and appropriate settings).

I now return to the dismantling and the operationalization of culture and consider another aspect of it. This also shows the importance of continuing synthesis and of keeping up with research in other fields which may, at first seem rather remote.

In 1983, in dealing with the impact of rapid culture change on the built environment in developing countries, I proposed a distinction between the culture core (changing little, slowly, or not at all because it is central to the group, its identity and, possibly, its very survival as a distinct group) and the culture periphery (changing quickly, easily, and even eagerly) (Rapoport, 1983). I also pointed out that even if the core is retained, for example to communicate identity, which elements of the core are retained may vary. One example used was the Navajo and the Tswana. In the case of the former the settlement pattern was primary, for the latter the spatial organization of the

dwelling. In all cases general, global elements are used to achieve desired results, such as comfort, environmental quality and, especially meaning as communicated by the appropriate image as discussed earlier.

Some recent work on the human mind (Nunn, 2005, esp. p. 83) introduces the idea of an “enduring cognitive object,” of which culture is, I think, a good example. This allows us to use the core/periphery distinction not only in studying and understanding patterns of culture change but in understanding culture more generally. ‘Culture,’ described by its components and expressions of its dismantling, has a core and periphery, so that in any given case, depending on context, scale, group, setting type etc, different elements become important. Which these are then becomes an empirical question.

The idea of a culture core, and its potential role in maintaining cultures, is also supported by other work. In one case, it was shown that there exist “keystone species” among animals and plants that may be critical for the stability of human cultures and communities overtime (Cristancho and Vining, 2004).

In the above discussion I mentioned the possible role of groups. This leads to a further development both in the book and elsewhere (e.g. Rapoport 2000 a; 2002 a). This development, which I regard as extremely important, is the small scale of culture, the fact that groups defined by culture tend to be small and hence numerous. This has become even clear to me during some extensive recent travels, e.g. to Burma, Laos, Melanesia, Papua New Guinea etc. It follows that in studying culture-environment interactions one

cannot look at countries, but need to consider numerous lifestyle and other groups (See Figure 1). This, of course, also becomes important when trying to use cultural variables in design, i.e. in application. Not only do we find an increase in the number of lifestyle groups, but also the revival of cultures (e.g. Kanaks in New Caledonia; Basques, Catalans and Galicians in Spain; Maori in New Zealand; Bretons in France; Aborigines in Australia and so on). The increase in migration and the consequent presence of many immigrant groups, with different levels of acculturation in many countries also play a role (thus, at the moment 12.5% of the US population are immigrants from very many different places) (Preston, 2007).

It should be noted that in such cases and in the expression of core elements generally, there is often an emphasis on a single symbol, what has been called defensive structuring (Siegel, 1970)—a concept I have found useful since 1970's. It should also be emphasized that these do not have to be architecture or the built environment, although they may be. They can be semi-fixed features such as plants or landscaping, objects, colors, art, furnishings etc. They do not even have to be part of material culture, and may be non-fixed features, such as language, music, behavior, manners, hairstyles, food, religion, rituals, clothing, the use of costumes, dance and others (Morell, 2001 b; Navarro, 2004). Of course, in some of these, design interventions may play an important role by providing appropriate settings, supportive of these non-fixed features; these are often found in the culture-specific small scale areas discussed earlier, but not available in the new global areas and frameworks (e.g. French, 2004 b). Another role of designers (as I have redefined them) is

also to provide open endedness for the semi-fixed and non-fixed features used in defensive restructuring.

Even when material culture is involved, it may be unrelated not only to architecture but even to semi-fixed features of living or other environments. To give one example, among the Chumash (S. California Indians) cultural revitalization has emphasized the Tomolo as its symbol—a wood plant-built boat important in indigenous North America (Jones and Klar, 2005, p. 461).⁴ To reiterate, one cannot and must not assume that environmental design is always essential, critical, important or even significant.

The growing importance of culture in many fields, which I emphasized in the book, continues. Examples include medicine, business, military studies, fashion, psychiatry and many others. In the case of psychiatry in the US, for example, with the increase in migration, new types of illnesses are found, in this particular case among Chinese, Koreans, Malaysians, and Indonesians, which are even being discussed in the media (e.g. Kershaw, 2003). This changes how psychiatry needs to be practiced and provides an analogue of how environmental design might need to respond. This is also happening in medicine, with much research by medical anthropologists, and new journals (e.g. *Ethnicity and Health*, starting in 1996). As discussed earlier, whether these changes have implications for the relevant settings needs research.

This shows not only that culture is increasingly being recognized as an important variable, used and researched in many disciplines. It also

reinforces a point that I have emphasized for some time—that many new disciplines and new findings in those and others, are increasingly becoming relevant to EBS generally, and culture-environment relations specifically. This, in turn, reinforces the potential importance of keeping up with these including those that seem remote, or excessively abstract and theoretical (Rapoport, 2000c; 2004 b).

As an example of the above (before concluding with a few more new ideas) I consider, very briefly, some important developments at a highly theoretical level and from apparently unlikely sources. It needs to be emphasized that the relevance of these developments only becomes apparent at some level of abstraction (the need for which I have long emphasized).

I refer to a large and growing body of work on the origins and evolution of culture among animals. This work is often linked to work in genetics (e.g. Jabolanka and Lamb, 2005) and neuroscience, illuminating human psychology; cognition, the role of emotions, social development and leading to ideas, which even have implications for design. (See references in Rapoport, 1990 a, 2004 b; Cohen, 2007; Emery and Clayton, 2004; Holden, 2005; Miller, 2005; McGrew, 2004; Morell 2007 a; Pennisi, 2006; Prenack and Prenack 2003; Raby et. al. 2007; Shettleworth 2007; Templeton et. al. 2005; Van Schaik 2004; 2006 among many others).

There is, of course, a very large literature on the evolution of culture in hominids and humans, and its relation to material culture, art etc. (e.g. references in Rapoport, 2004 b; Mithen, 1996, 2006; Shennan, 2002; Wong, 2005 among many others). In addition, there is a large and rapidly

growing body of work on the role of culture in human evolution, the evolution of societies, etc. (e.g. Richardson and Boyd, 2005). In other words, not only has evolution led to culture, but culture (including built environments) has, in turn, affected evolution. This provides a link to my suggestion (Rapoport, 1990 a, 2004 b) about the potential usefulness of looking at the development of animal architecture (Von Frisch, 1974; Hansell, 1984; Gould and Gould, 2007). In fact, this, in turn, can be generalized through the important new idea of Niche Construction (Jones, 2005; Odling-Smee et. al, 2003; Vandermeer, 2004). This emphasizes the crucial importance of the (often constructed) environment within which even very primitive organisms, such as earthworms, and even parasites, live and evolve (e.g. Combes, 2005). This has very important implications not only for human evolution (which is still ongoing) but for the role of the built environment as one aspect of culture in this. In turn, this has important implications for the study of the history of the built environment (Rapoport, 1990 a) showing how new ideas from other fields lead to further developments and synthesis. It should also be noted that, because of the appropriate level of abstraction involved, the same concept can be used for very different purposes for example for the development of aspects of ecological psychology (Heft, 2007).

Another new concept emerging from evolutionary science seems to have major implications for EBS, the role of culture in the built environment and through the role of meaning (and hence latent function) has major explanatory potential. I refer to the handicap principle (Zahawi and Zahawi, 1997). The suggestion is that among animals the

sometimes extravagant, and counter-intimate in terms of fitness and survival, sexual displays (e.g. the Peacock's tail) have an important function—to display fitness by showing that they can be afforded. I have recently used it in developing EBS theory and subsequently, discovered that it has been applied in archaeology as costly signaling (McGuire and Hildenbrandt, 2005). Although, as is often the case with new ideas, there is criticism of this and not everyone agrees (e.g. Codding and Jones, 2007; McGuire et. al, 2007). (This is also the case with Niche Construction. The idea has been applied to the development of art and music (Miller, 2000)). Also, I find it very useful both as an example of what, on the face of it, seems unlikely linkage and as an explanation of monumental, extravagant and 'wasteful' construction. How it explains a large number of examples of different environments and periods is most impressive. Note, that as in other cases of non-verbal communication through environments, cultural variability of a universal is achieved through specific expressions (see figure 1 of Rapoport, 1990 c).

In its application to built environments the handicap principle suggests that environments can become a form of "propaganda" (Diamond, 2003). It explains why certain environments are created at great expense and effort—to communicate the ability of the builders to muster resources, labor, etc, to communicate power and impress people. Thus, with the revival of Sufi Islam in Chechnya, a new mosque is being built. It will hold 10,000 worshippers (the largest in Chechnya) and its minarets will be 179 ft. high, "*it will speak not just of faith, but of power*" (Chivers, 2006).

A starting point for the examples to be given is my discussion of capital cities (Rapoport, 1993; examples and references in Rapoport, 2004 b; cf. Kehoe, 2002). It is significant that examples come from archaeological studies of pre-state societies to the present day. Once the idea is there, evidence is found everywhere. In pre-state societies it is often the use of much labor that is the significant variable (cf. Hammond, 1972, cited in Rapoport, 1993). Thus, at Poverty Point, LA., 4000 calendar years B.P., we find a 3 km² complex of earthworks, 750,000 m³ of mounded earth in 6 elliptical half-rings, 2 massive mounds, smaller cones and flat topped earthworks (Kidder, 2006, p. 195). Great Zimbabwe is a structure 100 m. by 70 m., where the outer wall alone contains 900,000 stone blocks and parts of it are 11 meters high, with a double chevron decorated 85 meters long. This immediately communicates the intended message, especially in the context of African typical residential huts—the contrast of scale (cf. Haus Tambarans in Papua New Guinea; Maya dwellings and ceremonial centers) and material (stone) is highly significant, powerful and inescapable—it immediately communicates the intended meaning. The role of material is also seen in Madagascar tombs and memorials (which use stone), and may even help explain Stonehenge (Parker Pearson and Ramilisonina, 1998). In other cases it is the organization of environments, for example making an otherwise intangible sacred order; concrete and visible (see Fig. 1). I have given many examples elsewhere (Rapoport, 1990 c, 1993). (for a series of examples from the Maya, see Ashmore, 1991, 2004 a and b; Ashmore and Sabloff, 2002). What we find in all those examples is a culturally specific expression of

a universal, general means of communicating a single message.⁵

I would suggest that in the contemporary world certain images are what is being communicated, for example in developing countries one of modernity. But, the underlying principle is the same—the ability to mobilize major resources e.g. the competition to build the world's tallest tower, to have glass skyscrapers, freeways and so on, and the 'disdain' for traditional environments and materials discussed earlier. The handicap principle/costly signaling is useful in understanding all these, beginning to relate culture to the non-residential environment. A dramatic example which well illustrates the value of this approach is provided by the Beijing Arts Center, several aspects merit attention (Kahn, 2007).

The complex cost \$ 400 million, and proved difficult to build; it has a "dazzling interior" and demonstrates "mechanical wizardry." At the opening it was described as "a concrete example of China's rising soft power and comprehensive national strength." The architect (who is French) employed "provocative aesthetics," at the same time the center is having problems lining up performances, i.e. there is little need for it. There are other, similar projects: the Olympic Stadium, the China Central Television New Headquarters which have "remade" the Beijing skyline and I would add, that of Shanghai and many other Chinese cities, and the process is going to continue "as other cities pour hundreds of millions of dollars into their own cultural showcases" in order to project "the soaring ambitions and bulging coffers of the communist party leadership." (Kuhn, 2007).⁶

The handicap principle/costly signaling can also help us understand striking changes occurring in residential environments. I refer to the fact that as the resources available increase even housing becomes less culture specific. The reason, I believe, is that with prosperity images of modernity and of difference (which currently are those of US suburbia) begin to dominate, and are found everywhere. In a housing class, I showed students slides of housing in Africa (Nairobi, Mafekeng etc.), Asia (Tokyo and Bangkok). They were usually identified as being in the US. One photo of Russia was correctly identified by people's faces (non-fixed features) (cf. Myre, 1997; Varoli, 2000). Other examples include billboard for housing projects in Bangkok, Shanghai, and Beijing, and a booklet of a new housing development (Merapi View—in English!) in Jakarta (Indonesia) (cf. Rapoport 2000 a). A former student (Dr. Vehbi Tosun) took me around a number of new housing developments around Istanbul. These were walled and gated communities, with large green spaces and water features, golf courses, tennis courts and bridle-paths, houses often indistinguishable from their US equivalents and street and directional signs in English. The handicap principle/costly signaling is expressed through the extravagant use of resources, i.e. emphasizing expense. This is also shown by the extremely high prices.

All these developments are highly relevant for understanding issues of culture change, identity, culture-environment relations, developing countries etc. Once the concept becomes available, examples are everywhere, and the concept becomes explanatory for a large number of environments. For example, a photograph of a copy of a 17th century

French chateau, built to attract buyers to a new development in China, with golf courses, equestrian tracks, etc. (Kahn 2004; cf. French, 2004 and the Westernizing of food, furnishings, etc. also in China).

I have previously given examples of similar patterns of suburbanization in Guadalajara (Mexico) and elsewhere, and its use in attempts to revive an inner city neighborhood in Milwaukee (Rapoport, 1999 c). This latter process seems to be continuing, as in an example from Chicago (Johnson, 1992).

These developments, and their origin, have implications for policy, planning, and design. For example it greatly complicates proposals to improve sustainability by learning from traditional environments. Such proposals tend to communicate the wrong image, the wrong meaning and many users' wants (Rapoport, 1994). This discussion also helps to explain difficulties with the preservation of traditional environments (as discussed earlier; cf. Rapoport 2002 b). For example, in Luang Prehang (Laos), the traditional wooden houses (unlike domestic buildings such as temples) are being rejected for concrete. UNESCO architects are trying to preserve this world heritage site. Locals say this is unrealistic: people are getting richer. They do not want the old things (my emphasis), if they own a wooden house they will move outside the town and build concrete houses (Perlez, 2004; cf. Guillian and Rossi, 1992) on the abandonment of Tuscan hill towns. The locals also claim that traditional wooden houses are hotter than concrete houses. Having recently visited Luang Perhang (and houses) I personally feel that the exact opposite is the case (in the absence of air-conditioning which is also highly

desired). It is more a matter of meaning (cf. Shrestha et. al, 1997).

In terms of design it makes highly questionable recent attempts to design housing in the US based on Mexican spontaneous settlements (quite apart from the purely visual approach) (cf. Rapoport, 1988 a, 2006 a). I refer to the project in California by Cruz (Ouroussoff, 2006). The issue is much more complex than implied, and the above discussion should help to understand both the potential problems using spontaneous settlements as a model and ways of succeeding (should that be desirable).

I do not claim that this process of suburbanization is inevitable, nor that cultural specificity in residential environments is no longer needed or wanted (although it may be achieved through the organization of settings, semi-fixed elements, rules about behavior, etc.). There may, in fact, be two 'conflicting' tendencies. On the one hand, there are many, and more, small groups with an interest in local identity as opposed to global meanings, or with both. There may also be reversals in attitude, with the rise of cultural revival movements and the seeking of cultural identity symbols (as discussed earlier). This may occur especially among younger people who have not experienced the traditional environments (now gone) and tend to romanticize them as seems to be the case in Kuwait (M. Al-Jassar; *personal communication*).

In discussing the handicap principle/costly signaling, I have frequently referred to the role of meaning, which leads to a development of another aspect of meaning. I have always emphasized the important role that culture plays in meaning. It is the culture-specific

nature of settings, which leads to appropriate behavior and makes co-action possible. I have also argued that in order to work the areas in settings communicating such meanings must be noticeable (sufficiently redundant cf. signal detection theory in Rapoport, 1977, p. 180, 221,225) and also comprehensible, i.e. culturally appropriate (Rapoport, 1990 c; cf. the related, but different 'architecture reception theory,' in Robinson, 2006, p. 33-55). Also, if the meanings are too subtle, are not received, or are inappropriate, it becomes easier to impose meanings, the environment effectively becomes like a Rorschach test. This is my interpretation of the multiple meanings imposed by critics on Mies's Barcelona Pavilion (Bonta, 1975).

In the past, I have applied the principle of dismantling, by distinguishing among high, - middle - and low level meanings (Rapoport 1988 b, 1990 b,c. 'epilogue').⁷ But in terms of the handicap principle/costly signaling the possibility of a further dismantling suggests itself. There may be a useful distinction to be made between general and specific meaning, with culture playing a larger role in the latter.⁸

This was foreshadowed in my discussion of Aztec Temples when I pointed out that the Spanish immediately recognized their importance and probably sacred role without ever having encountered the culture. I also discussed some of the variables that might communicate such general meanings. This was developed further in subsequent work (Rapoport, 1993, 2004 b), showing the usefulness of continuous synthesis and incorporating new material (discussed earlier).

Consider the Pyramids; the general meaning has already been discussed. One knows that they are important, and communicate power, authority, and the like without knowing the cultural specifics of Egyptian religion and its gods, the role of death and hence how the dead are treated, the afterlife and so on. These are highly culture-specific. Moreover, most of these meanings are communicated through writing (books, and murals, e.g. The Book of the Dead), statues, paintings, sarcophagi, offerings and rituals (i.e. behavior)—through semi-fixed and non-fixed elements (for which specialized settings may be needed (e.g. funerary temples)). Many other such examples from around the globe make the same point (e.g. the Maya Pyramids, Teotihuacan, Bagan, Dzougs in Bhutan, eastern Islamic states, the Nasca lines, etc.). Another example is provided by Great Zimbabwe, the general meaning of which has already been discussed. Its specific meanings are very complex and need much knowledge (e.g. Huffman, 2001).

In all these, and many other cases, the general meaning is clear in terms of the handicap principle but the specific meanings are much more complex. There is a relation here with the idea developed by Ekman of display rules, which I used in developing a **non-verbal communication approach to the study of meaning** (Rapoport, 1990 c, p. 101-121). Once again this shows the interplay of universals (in Ekman's case, the anatomical facial expressions of emotions) and the culturally specific expressions—the rules about where, when, by whom and under what conditions they can be revealed (Ekman, 2007). I believe that this further shows the value of dismantling as a general approach to complex topics. It

also reinforces the importance of continuously keeping up with the research literature in many fields and doing comparative research, which is becoming an increasingly important approach in many fields.

This raises another question involving the role of culture in EBS. It arises from the international spread of EBS, EBS research and institutions (such as IAPS, PAPER, MERA, and EBRA, in addition to EDRA). This is the question of the transferability of research done in one culture to other cultures (Rapoport, 2002 c). Clearly in this connection, comparative studies involving replications of findings, methods, and applications will play a major role in studying and answering this question.

I address one final point, albeit very briefly since it opens up a whole new subtopic. This is that one way of thinking about culture is in terms of cultural rules. These can be about behavior, so that its activity systems are the result of rules about who does what, where, when, including and excluding whom (and why).⁹ Rules also play a central role in various components of culture, where choice plays a role, such as lifestyle. It is also a most useful way to conceptualize design—as a set of rules for choosing among alternatives the consistent application of which leads to distinctive and recognizable cultural landscapes.

I developed what I call the Choice Model of Design for a rather brief discussion by an anthropologist discussing pots (Deetz, 1968). (Linkages again!). This model was developed over a number of years (e.g. Rapoport, 1977, pp.15-18, Figs 1.6, 1.7, 1.8.; 2005, pp.64-70, Figs 28, 32,33). The model has recently received support from cognitive neuroscientific studies

of how the brain makes such decisions (Marsh et al 2004, pp.281-283; Science, 2007, esp. pp. 602-606).

Clearly, the criterion used in choosing among alternatives and the alternatives considered (and the values and utility functions involved) need to be studied cross-culturally, since the single process may possibly use very different criteria equally well (although that is an empirical question). Note also that both the alternatives considered and the criteria used vary cross culturally—the constancy is the brain which implements the choice process, the human universals discussed earlier (which may also constrain the range of choices considered).

Rules cannot be seen—only the outcomes (environments and behavior). The underlying rules, however, can be inferred and studied on the basis of various data such as ethnographic records, myths, oral traditions or written records.¹⁰ These latter played a role in work that shows that, at least in some cases, these rules can be identified and studied (Akbar, 1988; Hakim, 1986, 2001 a, b; Hakim and Ahmed, 2006). It is also now possible to test the validity of such findings by using simulation, which has been called the third branch of science (in addition to theory and experiment). One particular, more specific type of simulation, might well be useful—agent based modeling (e.g. Gummerman, 1988; Gummerman and Gell-Mann, 1994; Kohler and Gummerman, 2000; Kohler et al, 2005). For example, it should in principle, be possible to test Hakim's (1986) study of Tunis by starting with a single dwelling, having agents apply rules as other buildings go up and see whatever the medina of Tunis results.

In fact, many fascinating research opportunities suggest themselves.

The idea of rule systems is also potentially highly relevant for design. One can possibly not only study but design rule systems rather than environments as such—but that is another topic (see Rapoport, 1992; 1995 a).

Conclusion

I conclude that understanding culture-environment relations remains an important aspect of EBS. Also, it is much more complex than it appears at first glance. As a result, it needs much more knowledge and further research in order to become usable and to achieve the aim of EBS—to create more supportive environments for people.

Notes

1. *Culture, Architecture and Design*, Chicago, Locke Scientific Publishers, 2005. (completed in 2000). There are also Spanish, French, Chinese, and Turkish versions. A Japanese translation is underway.
2. After all, the name comes from “universal”!
3. Note, however, that even people and their clothing are not an infallible indicator, since there are large Indian immigrant communities in many countries.
4. Note that this is an archaeology journal. Re-emphasizing that role of many disciplines and linkages among them. This is a two-way process and EBS can also inform archaeology so that have recently lectured to archaeology students and published in archaeological publications (Rapoport, 1999, 2006b).
5. This kind of analysis also provides a potential link to a very different topic – the relation of built-environments

to the evolution of social complexity, on which there is a very large literature, especially in anthropology and archaeology.

6. Three personal examples. The tourist pamphlet for the City of Tianjin which I picked up there, emphasizes tall buildings, green ways, the subway, lakes, and parks – nothing Chinese is shown. The importance of Western styles is also shown by a white renaissance building, with a classical pediment, Corinthian columns and a dome; large gold letters identify it as a Chinese restaurant (for a published examples, see the photograph of a company headquarters near Shanghai that looks like the US Capitol in Washington, D. C. (Smith 2002)). A travel brochure I have just received (for a 2008 trip to China) shows the Shanghai Financial District – a most dramatic change image of modernity that could be anywhere.

7. Note that the dismantling into levels of meaning (Rapoport 1988b, 1990b, c (epilogue)) made possible some interesting and potentially useful hypotheses. One is that the relative importance of these levels changes in different environments and also that high level meanings play an insignificant (or no) role in contemporary environments. Among examples I used, recent US churches where one would expect such meanings to remain important. Much new evidence about such churches has greatly strengthened this argument – the many examples seen devoid of any high level meanings (see photographs and descriptions in Brown 2002; Bernstein 2002; Hawthorne 2003; Pristin 2004; Leland 2004, 2005). Note the important role of newspaper accounts in this and other discussions in this paper and my other work generally (cf. Rapoport 1995b (1990)).

8. Because general meanings are not culture specific, it may be easier to impose a variety of meanings on environments in which general meanings currently dominate (specific meanings being uncertain), e.g. “new age” meanings imposed on Stonehenge, the Nasca Lines, etc.

9. Rules are obviously also centered in the display rules

discussed earlier.

10. Note that this important issue about the nature of rule systems, their role and how they operate becomes possible through the dismantling of culture. Like the other components and expressions, they can then be studied, understood, and used.

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