

# PERCEPTUAL ECOLOGY AND THE ORGANIZATION OF PHYSICAL ENVIRONMENT

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## Abstract

Cross cultural research attempts to determine whether the perceptual ecology of the environment actually shapes an individual's perception and to what extent. If indeed the perceptual environment shapes or contributes towards the formation of an individual's perceptual ability, then the immediate man-made environment created by architecture acts directly upon human behavior. These observations must be correlated to the studies concerned a. with the degree of complexity of the environment, b. with the importance of the processes rather than the objects for the organization of the visual, and generally, the perceptual environment. The role of the physical environment as a "field of learning" is then stressed.

The practical importance of these observations is made obvious by two examples.

Observations on the effect of ecological factors on environment perception, form part of a broader effort which attempts to avoid subjective judgment and employ, instead, objective methods and criteria in studying the perceptual environment. There is a serious obstacle in working towards that goal; problems relevant to perceptual environment are traditionally considered almost intractable to objective judgment so that views, trying to explain them by scientific method, are often met with distrust. The relevant data provided by science, for the study of the problems of visual environment, either arts or space structures, are not yet sufficient for the formulation of a cogent theory and it is even more difficult to use them in an applied capacity. It becomes obvious from relevant studies, however, that processes, such as relationships, priorities, interactions, rather than the objects themselves are more important in organising a visual environment. If this view is combined with social and cultural factors, we are in a position to explain even what the tradition calls the symbolic importance of some objects. In order to understand these processes and the interaction of the individual with environment, one needs curiosity of intellect or cognitive awareness. Moreover, in

order to make possible an original as well as productive individual activity, this awareness needs advancing to a more complex level, that of creativity. Organising the perceptual environment can precisely help to generate some of the conditions necessary for cognitive awareness and development of individual creative ability. Part of this process consists of the ecological factors which this paper attempts to examine.

A whole series of cross cultural research activities has been trying to establish whether ecological factors indeed, modulate to any degree the individual's perception. If perceptual environment contributes to any degree, to the perceptive ability of humans, then the man-made near perceptual environment, affects a substantial function of human behavior. If, moreover, this influence is not restricted to perception but extends, in a broader sense, to the cognitive and emotional processes of the individual as well, then the importance of the organised perceptual environment forming part of the individual's direct experience (2) is stressed even more. Since architecture means organising a specific visual and generally perceptual environment -satisfying defined uses, of course- then, it becomes a method which can be used for advancing or diminishing the cognitive capability of the individual. Based on this hypothesis, in an earlier paper, we tried to show that the physical environment functions as a field of learning (9,10).

Crosscultural research has mainly sought to establish whether various visual illusions hold true to cultural conditions other than those of the western world (3,4,6,7,8,12,14,15,16).

One of the first projects of this kind involved the Zulus as regards the Müller-Lyer visual illusions and it showed that members of that tribe were not aware of the difference in length: researchers hold that this is due to the different visual environment in the region inhabited by the tribe. Zulus live in an environment with a long tradition of round-shaped constructions; their hut-residences, the doors, the arrangement of residences in settlement's etc. have all a rounded form. The landscape in which they live is almost flat without vertical protrusions, and tends towards a "non-carpentered", non-angular visual environment. Similar research in Zambia and elsewhere shows, once again, the influence of the immediate visual environment and of the cultural conditions.

Segall, Campbell and Herskovits (14) have, moreover, been led to suggest that the difference can be attributed to whether individuals live in a "carpentered" environment, or not: "we would predict on the basis of the carpentered-world hypothesis that people who live in non-Western environments would be less susceptible than Western\* peoples to the Müller-Lyer and Sander illusions" .

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\* "European and American city dwellers have a much high percentage of rectangularity in their equipments than any resident of non-Europeanized cultures" (14).

Even when the "carpentered" factor does not have a priority it remains, none-the-less, an important factor (4). As regards the "vertical-horizontal" visual illusion, there does not seem to exist any difference among individuals living in different cultural conditions.

Finally, a great deal of research has shown that visual illusions decrease with the advent of age in the individual, especially that of Müller-Lyer and, to a lesser degree, the "vertical-horizontal" type.

The above observations may allow the hypothesis that the least that might be taking place is an influence on the perceptual reaction of the individuals by their environmental upbringing, when the object observed is located in equivocal conditions, i.e. when the object or the observer are in motion or when the former is not well-defined (3). This view means that the individual, when in the above conditions, "sees" differently and so "decides" differently on visual elements.

It is useful to be reminded here of the function of the language; on the one hand it reflects the way in which the individual comes in contact with the ecology of its perception (2,11,17), on the other hand we do not just see things but, since we express them in a definite lingual form, we see them in terms of the latter (3). Still two more observations are useful; it has been shown by Munday-Castle (12), Derogowski (7,8), Stacey (15) that, in some african tribes of a particularly low cultural level, there are serious difficulties in perceiving, in seeing depth in a painted picture and in defining orientation, i.e. the relative position of an object to another, always in the same picture. Finally, the observation that education has a positive effect on depth perception (8) points out the relationship between improvement of cultural level and development of perceptual ability, in this case the development of faculties connected with discrimination and comparison. All these observations give definite pointers to three directions: (a) up to which degree cultural conditions influence the way we see, (b) that the cultural environment is certainly important in the interpretation of environment by the individual and (c) that problems of visual communication arise among individuals belonging to different cultural groups.

Such cases of ability and communication differentiation are not evident only in extrem differences of environment and culture, but in less pronounced differences as well. Such differentiation, with all its concomittant problems, is observed even among inhabitants of the same country, belonging, however to population groups of different circumstances of perceptual and cultural environment (14), such as between isolated peasants and inhabitants of advanced urban centers or between inhabitants of the same urban center but of different circumstances, such as between negroes of very low income living in ghettos and whites of high income quarters.

These observations will be more fully understood if they are viewed in the context of the studies referring to the degree of com-

plexity of the environment. The degree of complexity involves among other aspects, perceptual organisation of the environment and interpersonal relationships. Research sets out from very simple and primary situations, such as individuals living under extremely weakened stimuli or even in total absence of a category of stimuli, e.g. staying in the dark. Exclusion of the individual from one or more kinds of perception, and more generally the adjustment of an individual's perceptual stimuli -e.g. restricted movement space, reduced area or particular proportions of living space, particular acoustic environment, etc.- has been used, to a lesser or higher degree, by totalitarian regimes as a method bending or channeling, to a desired direction, the way of thinking and the reactions of an individual. We have, thus, in a negative sense, a measure of the dynamic potentialities of the influence of the physical environment on the individual. Research, dealing with the importance of the perceptual environment, aims at establishing (a) precisely which elements of the perceptual environment have a part in the individual's various psychological processes, and (b) how much and in which context they affect the individual. Studies, such as those of Berlyne (1), Dember (5) show that the overall human behavior is influenced not only by the quantity of perceptual stimuli but by the way stimuli are organised, as well; moreover, the latter aspect seems to be the most important factor in the man-environment interaction.

The way of organisation consists, precisely, of the processes and the way with which elements are interconnected. Both these characteristics of the environment influence the overall development of the intellectual faculties of the individual and not merely the formation of better or not visual abilities.

Research on artists and particularly gifted people, shows convincingly that the complexity of environment is a means of developing the creative ability of the individual (9,10).

A remark by Piaget is of help in integrating the above hypothesis. According to Piaget (13), the need felt by the individual for stimuli is not a simple "hunger for stimuli" but a need for "functional nourishment" (aliments fonctionnels), i.e. for stimuli which can be correlated and cross-fertilised by the cognitive "schemata" or patterns of the individual.

If the goal of the perceptual organization of the environment which is mainly the architect's work, is to organize physical stimuli, which include objects and distances and leads to different degrees of complexities and interrelations then architecture, in each specific case, must consider the eventual "reception" of these stimuli, i.e. the cognitive "schemata" of the user.

The practical importance of all mentioned observations is made obvious by two examples :

The perceptual organization of a school is different from that of a hospital because other considerations notwithstanding, the cognitive patterns of young students are different from that of an

adult. A school for instance may be organized with cells and a complexity of different levels and a variety of openings and colours. All these characteristics cannot be used in the same degree, all combined together in a hospital.

For the same reason, the perceptual organization of a primary school in an isolated rural area has to be considered in a different way than that of an urban area. The materials used in a rural school could be more "striking" than in an urban one, in order to provide a finer and more sophisticated cultural environment. In accordance with the same hypothesis, the materials used in an urban school may be less finished, creating a less clear-cut visual organisation and providing a different cultural environment. Also particular elements, such as the complexity of the structural frames, the subdivision of the surfaces of the walls and different leveling structures might not be proper for a rural school since the "visual background" of the students is different and may be provide a "confusing" degree of complexity. Following the same line of thought a different treatment would be necessary for the visual organization of the open-air spaces for the two kinds of schools.

It is important to point out that all these different characteristics which constitute in each case a special perceptual environment represent an objective system of interaction between man and the built environment in which what is called aesthetics are included. Thus aesthetics is not speculative any more but is the result of specific human needs, organized according to specific rules.

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