Journal of the American Institute of Planners

ISSN: 0002-8991 (Print) (Online) Journal homepage: http://www.tandfonline.com/loi/rjpa19

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To cite this article: François C. Vigier (1965) An Experimental Approach to Urban Design, Journal of the American Institute of Planners, 31:1, 21-31, DOI: 10.1080/01944366508978469

To link to this article: http://dx.doi.org/10.1080/01944366508978469

AN EXPERIMENTAL APPROACH TO URBAN DESIGN

François C. Vigier

This paper attempts to clarify the role of urban design, in relation to the other "environmental" design disciplines, through an examination of the applicability of standard cognitive testing techniques to an urban situation. Drawing from the theory of perception as well as from a recent experiment, the author demonstrates what appears to be a close correlation between the spatial qualities of "streets" and "squares" and the responses they elicit. Some doubt is cast upon the perceptual strength of traditional architectural elements, and a strategy for further research is suggested.

Urban design is a relatively new concept within the general field of "environmental design." The term "urban design" has been used widely since 1956, when Harvard held the first of a continuing series of conferences dealing with the problems of shaping the urban environment. Planners, architects, and landscape architects felt that a new term was needed, inasmuch as the three design disciplines have tended to specialize for some years, each in its own direction. Today, urban design has received official sanction: not only do several cities include urban designers on their planning staffs and at least three major universities offer degrees in urban design, but the Urban Renewal Administration and other federal agencies have started a program of awards intended to promote better urban design in federally assisted projects.

Since we are dealing with a new and still rather amorphous field, it may be useful to try to establish a terminology for it. I would define urban design as "the willful, three-dimensional interpretation of planning decisions." As such, it is concerned with every aspect of shaping the environment—from the establishment of vehicular and pedestrian movement to that of the architectural character of individual buildings and their stylistic control; from the design of street furniture to that of grandiose perspectives. But urban design does not usurp the traditional functions of other design disciplines or duplicate them: it is closely related to them. Following are my definitions of the four design disciplines:

Planning consists primarily, but not exclusively, of those long-term functional decisions which affect the overall structure of the community, such as transportation, land use, and the policies to effectuate them.

Architecture consists primarily, but not exclusively, of the detailed design of individual buildings or groups of buildings.

Landscape architecture consists primarily, but not exclusively, of the design of the environment between buildings, groups of buildings, or built-up areas.

Urban design links all three to the extent that it fills whatever gaps may exist among them. If we think of the design of human settlements as a continuum of specialized efforts, the end product of the planning-to-urban design sequence is *a readily perceptible image of the environment, illustrative of its functions and generally satisfactory (or pleasing) to the observer.*

The implication of these definitions is that urban design is more than mere decoration, as has sometimes been suggested. It is an indispensable part of the planning process since it allows the participant-observer to understand his relationship to the environment and, thereby, to operate more efficiently within it, with less frustration, with more personal satisfaction.[1] Whatever the level of abstraction at which planning decisions are made, they must eventually be translated into a three-dimensional environment. This end product is very much the concern of the planner;

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his policy decisions will affect the final shape of every urban element, and he is directly responsible for its quality. While it would be unrealistic to expect every planner to be a talented designer, it is irresponsible *not* to expect every planner to be aware of, and concerned with, the designs resulting from the planning process.

Planning can be defined as a culturally oriented activity which reflects a society's current system of goals and problems—social, economic, and functional. Like planning, urban design should be considered and evaluated within a cultural context. Its physical format, at any instant in time, is shaped by a combination of cultural and ecological forces. In addition to the transformation of cultural values into aesthetic symbolic systems, it incorporates natural factors present in the environment, such as climate, topography, vegetation, and natural resources. It is evident that the degree of their relative influence will vary over time, perhaps as a function of the level of cultural sophistication reached. Improvements in building technology, for example, have tended to negate local styles through the standardization of building materials; climate, through the introduction of economical air-conditioning techniques; topography, through more powerful means of transportation and advances in structural techniques.

But, however these relationships may vary over time or from place to place, I would argue that there exists one underlying constant in urban design: the innate motivation of man to impose a sense of order, related to his scale, upon his natural environment. This is exemplified historically not only by actual projects—from the technical *tours de force* of ancient cultures to our carefully nurtured suburban gardens which have tamed nature out of any semblance to reality—but also by the pervading concern to record environmental conditions, analyze them, and transmit this knowledge to future generations. In particular, there exists today an extensive literature dealing with the aesthetics of urban form, ranging from analytical descriptions of historical sites and buildings to conjectural conceptualizations about the ideal city form. A short listing of recent commentators would certainly include Gibberd, Giedion, Le Corbusier, Mumford, Nairn, Rasmussen, Sitte, Tunnard, Wright, and Zucker. Should one wish to include specific proposals—largely of a utopian nature, insofar as they would necessitate extensive changes from current social, economic, and functional norms—such a listing would grow quickly beyond manageability. Indeed, man's concern with the perceptual clarity of his environment goes back to his earliest efforts at urban settlement. Similarly, dissatisfaction with existing urban forms, at least on the part of a small but loquacious elite, is evidenced by the persistence of the ideal-city concept, from Plato and Hippodamus to Ebenezer Howard's *Garden City* and Le Corbusier's *Ville Radieuse.*

It has become a cliché to vaunt the high standards of design achieved in the past. The exciting juxtaposition of volumes and colors found in the fishing villages of the Greek Islands or in the Italian hill towns has become the model of every romantic attempt to create a so-called "human scale." Similarly, classical precision in proportion and detailing has returned to the fore in business offices and embassy buildings, continuing in a modernized form the neo-classic respectability of Victorian emporiums. Regardless of the appropriateness of these architectural forms, their persistent use exemplifies an oversimplified trust in the design abilities and symbolic forms of the past.

It is my contention that perceptual clarity in urban form is largely accidental. This does not deny the existence of a certain empirical knowledge of emotional responses to urban form stimuli. But it is based in its entirety on the responses of a small group of aesthetically inclined individuals (architects, urban designers, planners, artists) who have tended to institutionalize their perhaps atypical reactions into intuitive formulae. The Greek and Renaissance fascination with the application of mathematics to architecture and, more recently, Le Corbusier's *Modulor* are examples of these intuitive rationalizations.

Similarly, it can be argued that the historical examples of town planning that we admire today for their clear formal unity were due largely to the impact of a small group of utopian thinkers, at least to the extent that they were built to rather rigid conceptual requirements. The medieval *bastide* and the grand avenue of the Baroque period, for example, tended to materialize the ideologies, and often the ideals,

of the time. But whatever unity can be found in those parts of the urban fabric intended for other than symbolic or ceremonial uses can be ascribed mainly to technological limitations and to stylistic fashion. As such, their perceptual "goodness" is largely haphazard rather than intentional. On the other hand, the "goodness" of public or symbolic spaces that were designed skillfully can be thought of as resulting from a conscious organization of spatial elements known to elicit specific responses of awe, admiration, fear, or delight. But the proof of the existence of a knowledge of definite cause-to-effect relationships in the organization of an urban environment is circumstantial at best. Even today, there is little knowledge of either the general, or average, response patterns to a given urban stimulus situation, or of the constitutive role played by specific architectural elements. Indeed, the designer still is at an alchemistic level of knowledge. Should he be dissatisfied with the appropriateness of past solutions and eager to experiment, he is unable as yet to predict the consequences of his decisions with any degree of accuracy. He is forced, if freed from the stylistic shackles imposed by his peers, into a continual search for new forms with his personal taste and perceptive skill as the only available, and not always adequate, guide.

PERCEPTUAL RESEARCH AND THEORY

That this need not always be so is evidenced by recent findings in "cognition"—that branch of psychology dealing with the selection and manipulation of outside stimuli. Extensive testing of persons subjected to a variety of perceptual inputs indicates striking consistencies in techniques used to perceive the environment. It seems that the selection of individual strategies arises from one basic principle: the desire to reduce emotional stresses due to uncertainty about the state of the environment. This aim is achieved by rapidly constructing alternative hypotheses ("a thing; a shape; a square shape; a building") on the basis of scanty and often inaccurate information. These tentative hypotheses are tested and revised on the basis of additional information until a satisfactory resolution of all logical conflicts has been reached.[2] The resulting "image" is then stored for future reference and used to construct subsequent hypotheses.

Moreover, the human ability to comprehend and process environmental clues seems to be limited genetically. Miller[3] found that the median number of "bits" of information that could be assimilated and processed, regardless of the sensory channel used, was equal to seven, with a variance of two. Once this number was exceeded, recoding occurred, and generalized, and often less accurate, "chunks" of information were used as operating clues. Consequently, recoding, and particularly linguistic recoding, may well be of prime importance in understanding cognitive processes, since the amount of information that can be carried in seven elementary bits is obviously limited. Miller suggests that behavior may become predictable through the specification of recoding methods.

It seems likely that a more finite knowledge of the perceptive responses elicited by urban stimuli can be gained by exploring the applicability of both psychological theory and testing techniques to urban situations. It is evident that both mental processing strategies and an innate maximum comprehensive ability have direct design implications. The tendency to generalize, to abstract parts of the environment, to use selective judgment, perhaps according to purpose or motivation (as shown in much of the work by Kevin Lynch and his associates), may well be traced back to the inherent characteristics of the processes of cognition. In order to investigate some of these factors, I conducted an exploratory experiment in the spring of 1962 at the Harvard Center for Cognitive Studies.[4] The immediate purpose of the experiment was to test whether those methodologies previously developed to isolate specific factors contributing to "primitive" form perception could be adapted to more complex "real" situations. The results were surprising enough to warrant reporting at this early stage.

The theoretical background supporting the transfer of primitive techniques[5] to an urban setting is based upon the assumption that a complex input situation such as the city results in manipulatory simplification in order to facilitate rapid comprehension. The assertion that purification through selectivity does, in fact, occur is substantiated by the work of the *gestalt* psychologists. For example, Vernon

subdivides the perceptual process into three phases beyond the sensory excitation stage:

(a) a constructional process wherein the sensory qualities are suitably weighted and combined, *each in its appropriate degree of importance,* into a more or less clearly differentiated formal structure;
(b) an assimilative process whereby the present percept is related to past experience—compared, accepted, or rejected—and is then referred back to *some part of the external environment from which it is assumed to have originated;*
(c) a response tendency, indicating the observer's reaction, overt or implicit, to the full implications of the percept.[6]

Bartlett[7] states more explicitly that selectivity in perception is demonstrated constantly and that relatively constant sensory patterns elicit a wide range of responses in individuals at different times. In no event is perception a passive reception. The unity of a perceptual experience is achieved only after motivated organizing forces have elevated some aspects to dominance and depressed others into submission.

The constructive nature of visual perception was confirmed experimentally by Douglas in an extensive series of tests.[8] She found three readily identifiable stages, corresponding roughly to Vernon's:

One. A beginning sensory stage of a purely descriptive nature where the presence of the sensory data is acknowledged;

Two. An intermediate exploratory stage where preliminary hypotheses are tested and operated on; and

Three. A final interpretive stage where the tentative possibilities of stage 2 have been discriminated among and a choice made.

AN EXPERIMENT WITH PHOTOGRAPHS OF CITY SCENES

The hypothesis of my experiment was that responses to an urban situation would occur in a manner similar to those aroused by other complex situations; that is, a pattern of attention shifting among specific aspects of the stimulus,[9] as well as among perception proper (the search for cues) and action-oriented behavior (say, moving within the space). It can readily be seen that a better understanding of the integrative process of perception, particularly the constitutive role played by specific elements (shapes, colors, forms, or voids), would be of use to the designer. Further, the relative strength, or order of emergence, of identifiable elements becomes of prime interest.

Using subjects with design and non-design backgrounds, the experiment consisted of a tachistoscopic presentation of wide-angle photographs of Boston streets and squares.[10] This type of presentation flashes the stimulus material for a very short time (a range of exposure from 50 to 200 milliseconds was used), and forces the subject consciously to decompose his search pattern. He reports on what he has seen after each exposure, making it possible to follow and plot the search pattern three-dimensionally, as well as to identify elements found dominant.

The subjects' responses were analyzed from several different, though interrelated, aspects:

1) Density of response, that is, the number of items mentioned after each exposure. Density profiles then were obtained by plotting density of information against time, both sequentially and cumulatively. The profiles indicated the readily perceptible items in the stimuli and thus, their relative richness. When analyzed from the point of view of the subjects rather than the stimulus, density profiles reflect also individual or group differences in perceptive skill under identical stimulus conditions.

2) *Saturation,* that is, the point at which most subjects declared that further exposure to the material would not contribute significantly to their comprehension of the stimulus. The measurement in milliseconds was used as an index of the complexity of the stimulus and/or its intrinsic interest; the later saturation occurred, the more complex and/or interesting the stimulus.[11]

3) Ambiguity was defined on the basis of the emergence of a major constitutive element (or elements) which became the starting point of a recognition pattern.[12] Where there was a choice of constitutive elements, the stimulus was defined as ambiguous. When the same constitutive element(s) were used by 80 percent or more of the subjects, the stimulus was unambiguous.

OBSERVED RESULTS

To summarize the results, some behavioral differences existed between subjects with and without design backgrounds; streets and squares yielded substantially different recognition patterns, and some rather surprising ambiguities started to emerge. The major difference between subjects from the design disciplines and those from other backgrounds (metallurgy, economics, sociology, and the liberal arts) was of a quantitative rather than qualitative nature. While similar strategies were used and identical elements were recognized as dominant, density profiles were generally lower for design subjects and saturation occurred earlier. The hypothesis that training in visual analysis may be largely responsible for the designers' ability to conjure a tentative image on the basis of fewer cues than nondesigners is tenable. Designers tended to give less complete descriptions, although it would not be fair to say that this ability to conjecture on the basis of incomplete information resulted in a lesser understanding of the stimulus. They were also less likely to reject their first assumption on the basis of further inputs (which accounts for earlier saturation). If accuracy of perception of an urban environment depends upon the identification of its major components only, there was no marked difference between the two groups of subjects; if accuracy is related to a broader perception pattern, nondesigners generally did better than the designers. If the ability to recognize and conjecture quickly on the basis of scarce information is important, subjects with a design training had a definite advantage.

When faced with a street rather than a square, all subjects used recognition

Method of Plotting Response

Average response densities for each exposure were plotted in a two-dimensional matrix having the following format:

	L	*C*	*R*
B	1	12	22
M	11	11	5
F	5	25	2

where *B:* background
M: middle distance
F: foreground
L: left
C: center
R: right

The number in each box corresponds to the cumulative number of elements mentioned within that quadrant. For example, if six subjects mentioned the church steeple in Figure 4, a score of 6 would be given to the "left-middle distance" box. Although the differentiation between "left," "center," and "right" was somewhat nebulous at times, most subjects tended to take the alignment of the street as the central area and this perhaps arbitrary definition of space was used in plotting responses.

A separate plot was obtained for each exposure and these were then joined together, one above the other, to obtain the complete pattern for the stimulus (figures 1 through 5). The points of heaviest and second heaviest densities of response were joined together in order to obtain a graphic representation of the primary and secondary search patterns over time. The area circumscribed by these two lines was defined as the area of prime recognition.

FIGURE 1 *Average Street Recognition Matrix and Density Profile*

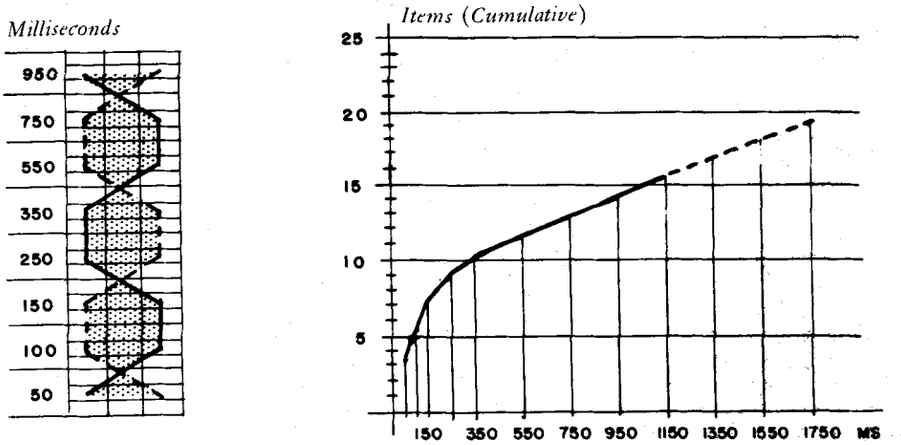
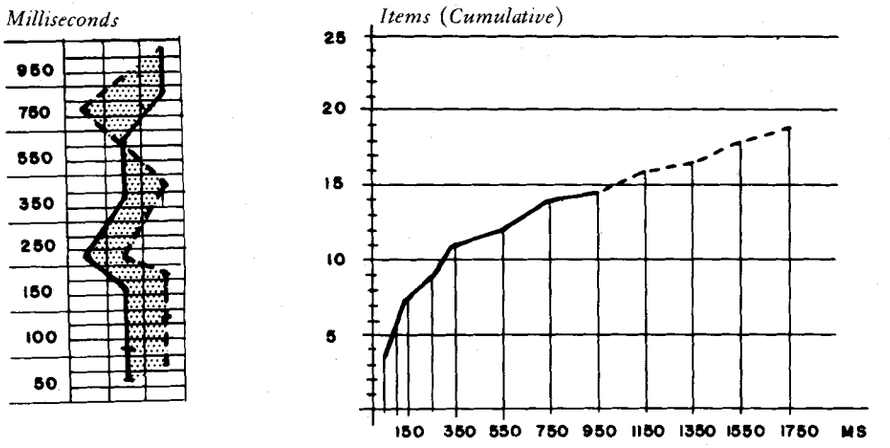


FIGURE 2 *Average Square Recognition Matrix and Density Profile*



strategies that corresponded closely to the spatial qualities of the stimulus. *Streets* showed an absolute distribution of attention left and right, both for primary and secondary search patterns, with a shift of attention across the stimulus on each succeeding exposure. Attention was always centered in the middle distance for both primary and secondary search patterns (See Figure 1). The average density profile is a smooth curve with a steadily decreasing slope. Starting with an average response yield of 3.75 bits of information after the initial 50 milliseconds exposure, the response yield drops to 1.7 bits per exposure after 150 milliseconds (even though each exposure had been increased, first to 100 and then to 200 milliseconds) and oscillates about this value until saturation is reached after 1,150 milliseconds.

Squares, on the other hand, tended to focus attention in a fairly narrow band, oscillating about the center of the stimulus. Primary attention occurred both in the foreground and middle distance, while secondary attention was more evenly distributed between foreground, middle distance, and background. This somewhat nebulous recognition pattern (see Figure 2), perhaps indicative of the non-directed spatial quality of squares, tended to be reflected in the density profiles as well. Starting in a manner almost identical to that of the streets, they showed a higher density after 250 milliseconds, decreased substantially after 750 milliseconds, and then manifested a cyclical tendency of alternate increases and decreases of yield at each successive 200 millisecond exposure. Unlike the smooth street profiles, those of squares tended to be composed of a series of *S*-curves, probably reflecting the need for supplementary information resulting from their less well defined character.

Two of the four streets and one of the three squares presented yielded ambiguous recognition patterns. In all three cases, a search pattern was constructed around a major constitutive element, which represented a choice between an architecturally prominent feature and an area of intrinsic interest. When either was selected the other was either ignored or recognized late and its importance minimized. For example, Charles Street, at the foot of Beacon Hill, elicited an ambiguous response pattern. The view showed the left-to-right curvature of the street with an even distribution of four-story buildings on either side. A church with a pedimented facade projecting beyond the building line and a prominent Georgian cupola is clearly visible in the left middle distance. The right-hand side of the street is composed of numerous small shops and of signs advertising the commercial nature of the street; parked cars and a fairly dense flow of people added to its busy character.

The architectural features of the church (cupola and pediment) were recognized quickly by 40 percent of the subjects (Figure 3, pattern A). While some subjects mentioned the commercial character of the right foreground, most attention focused on the left-hand side, as shown in the recognition matrix. The alternative pattern used by 60 percent of the subjects, emphasized the animated right foreground (Figure 3, pattern B). While attention did shift to the left-hand side of

FIGURE 3 *Charles Street, Boston: Ambiguous Response*

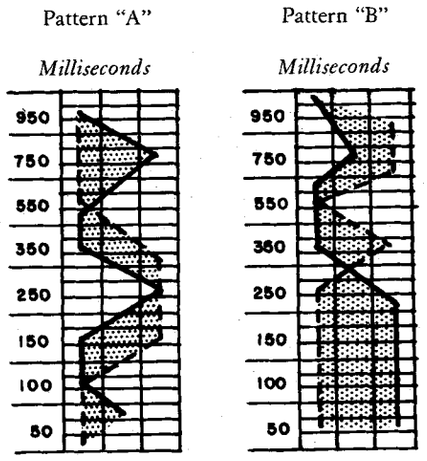
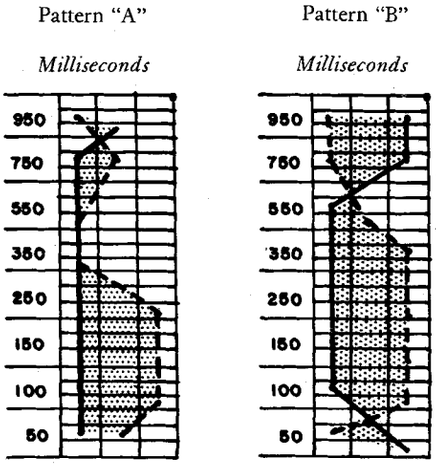


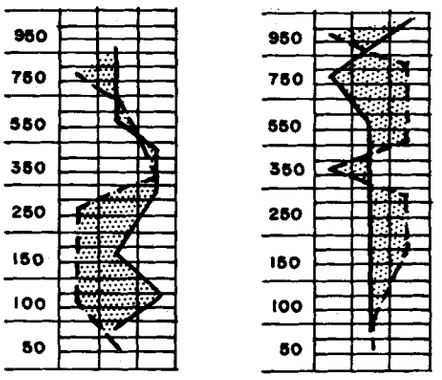
FIGURE 4 *Clarendon Street, Boston: Ambiguous Response*

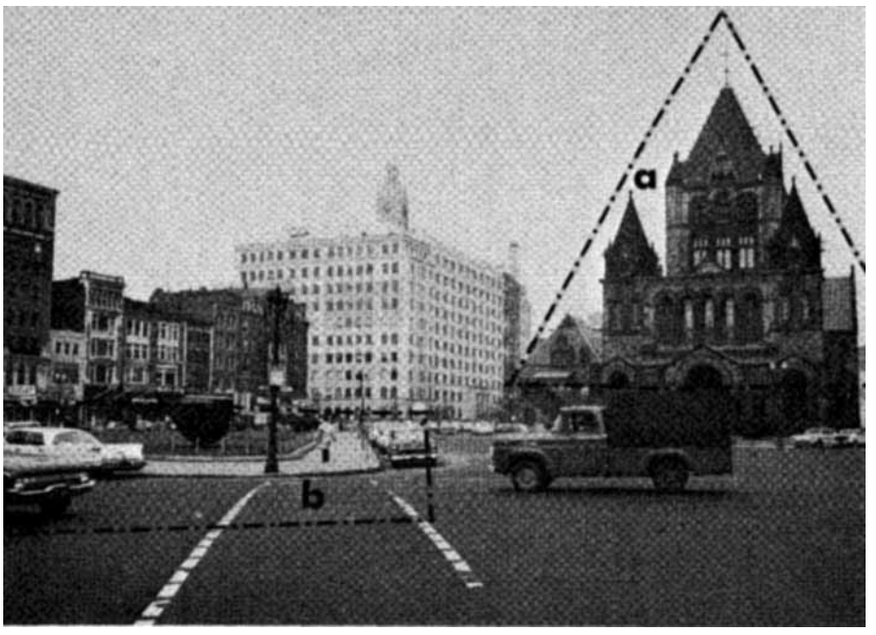


the street, it was attracted by the curvature of the space rather than by the presence of a strong architectural element (only 30 percent of subjects who used this alternative mentioned the cupola or pediment, and then only after 550 milliseconds). The second "ambiguous" street presented a choice between a prominent distant steeple and a partially cleared building site in the immediate foreground. When either of these elements was seen first, the other was ignored or mentioned casually just before saturation (see Figure 4). But in all four of these ambiguous patterns, both recognition matrices and density profiles are obviously related to the "normal" street configuration, though different from similar unambiguous situations.[13]

The ambiguous square presented was a view of Copley Square taken from the front of the Public Library, with the New England Mutual Building and Trinity Church in the left and right background, respectively. The foreground consists of a rather complicated arrangement of open spaces: a street intersection with a

FIGURE 5 *Copley Square, Boston: Ambiguous Response*





prominent pedestrian-crossing, a sidewalk, a landscaped area. In the first of two alternative response patterns, Trinity Church, was recognized immediately. The resulting strategy was a street-like search through the space (Figure 5, pattern A), a balanced recognition between left and right. Starting with the fifth exposure, attention tended to become narrower and more concentrated. The second pattern was markedly different. Though Trinity Church had been recognized in all cases by an exposure of 250 milliseconds, the initial analysis exhibits a narrow area of prime recognition, heavily centered about the open spaces and its activities (people and cars). After the sixth exposure, a broader area is operated on; and as such, this strategy is almost a mirror image of its alternate (Figure 5, pattern B).

IMPLICATIONS FOR URBAN DESIGN

In summary, it seems likely that this experimental technique can yield new insights into the perceptual characteristics of urban space. The striking differences obtained between internally consistent groups of results—that is, between streets and squares on the one hand, and ambiguous and unambiguous material on the other—support this statement. It is, of course, realized that while the sample of stimuli used (70) was more valid than the sample of subjects (10), neither was large enough to estimate statistical reliability. However, the consistency of results obtained suggests that further exploration is warranted.

In particular, the sequential nature of perception was confirmed in a complex "real life" situation. However, it is somewhat more difficult to generalize about the intrinsic qualities of the urban stimuli used in the experiment. There is little doubt that there are perceptible differences between streets and squares per se, which can be measured in terms of the density of response they generate, saturation, and general recognition patterns. *Streets* tend to yield evenly decreasing quantities of information and to have evenly balanced recognition matrices. *Squares* tend to yield more erratic information and to have unbalanced recognition matrices, oscillating about the center of the space; saturation occurs sooner than in streets. Both types of space show wide divergences from the "standard" pattern whenever ambiguity occurs.

Caution must be exercised not to reach a premature judgment on the basis of as yet scanty information. The ultimate aim of the urban designer as I have defined it is to create a controlled environment through a series of architectonic statements eliciting predictable responses. He may be concerned with the "goodness" of a space—that is, its perceptual clarity as a designed entity; its "pleasantness"—that is, its ability to generate a feeling of satisfaction in the observer; its

"symbolism," through the use of recognizable elements having general societal values or illustrating its function. Perceptual clarity or goodness may be relatively easy to measure on the basis of a total or partial listing of all elements in the space, speed of recognition, and effort expended in recognition. But pleasantness and symbolic value are more normative qualities, subject to cultural variations. For example, pleasantness may be dependent upon overall simplicity (which may be equal to goodness), upon the presence of prevailing themes (color, style, vegetation), or upon variety or richness which may detract from the perceptual goodness. Even if it were possible to neutralize cultural and individual variations, it is evident that we are dealing with a series of items whose interrelationships will determine the eventual overall impact of the space.

It can readily be seen from this oversimplified analysis that, unlike primitive perception, the structuring of urban forms necessarily depends upon the correlation among a variety of factors, all of which are not strictly perceptual. Therefore, the manner in which perceptual inputs are manipulated as a result of their own interaction seems more important than the relative strength of any one element. The ambiguity in recognition strategies encountered in three of the stimuli used in this experiment supports my original hypothesis that the perceptual organization of an urban environment is the result of combinative responses to the input through a selective process similar to that described by Vernon. Although still preliminary, my results suggest that recognition patterns are initiated by specific elements whose emergence results from their particular spatial relationships to an array rather than because of any intrinsic characteristic. However, once emergence has taken place, there are striking consistencies in the search patterns that these elements generate.

Although the emergence of specific elements was to be expected in some cases (such major architectural features as a church steeple, for example), the ambiguity of some of the material was rather surprising. In particular, the conflict found between the early recognition of a steeple and the late awareness of a prominent empty lot in the foreground; or the late recognition of the steeple when the empty lot was seen first, tend to raise questions about the intrinsic value of prominent vertical elements as landmarks. Similarly, the ambiguity between the early recognition of a major stylistic element (cupola and pediment) when the busy commercial frontage on the opposite side of the street was ignored generally; and the alternative pattern when the shops and people were seen first, resulting in the late or absent observation of the cupola and pediment, raises some doubts as to the effectiveness of architectural compositions when confronted with intensive human activity.

There is no doubt that many more questions have been raised in this discussion than answers given. That is the nature of an exploratory investigation. But some of the questions raised can be translated into hypothetical answers, largely of a negative nature, First, the value of purely architectural solutions can be doubted as valid contributors to the perceptual clarity of an urban situation. Human responses seem more dependent upon congeries of inputs than upon a major single item. Second, perceptual "goodness" is closely related to the particular character of the urban space—the amount of information needed to comprehend a street is different from that needed for a square. Hence, design strategies should vary. Although this may seem a truism, I see little evidence that this is being recognized. For example, recognition of the perspective element of streets seems secondary to the recognition of facades. This becomes understandable as soon as we admit that normal motivation stresses recognition of one's surroundings rather than the purely sensory experience of space. What is at the end of a long perspective is less meaningful than what is immediately at hand; uncertainty as to the state of the universe at a distant, rather undistinguishable horizon may even be an unpleasant experience—the endless avenues of Manhattan, for example. Yet, most contemporary designers still think of streets as continuums leading to a focal destination; a more appropriate solution would be to treat street facades as a series of discontinuous linear elements.

Third, the level of design specificity that is needed at the urban scale seems open to question. This is due to our lack of a clear understanding not only of

what we want to accomplish in urban design, but also of the means to be used. The evident high information yield of activity-oriented elements demonstrated in the ambiguous strategies described above, can be interpreted in several ways. Assuming that we want to clarify a specific area, that is, ensure its early recognition and its use as an organizing element in the ensuing search pattern, an "undesigned" clutter may be stronger than a carefully structured architectonic statement. Conversely, a designed attention-getting element can be thought of as an *intrusive addition:* a group of trees in a dense urban environment will attract attention; an unusual or unexpected form, the use of color, or a topographical obstacle may have the same result.[14] But the effectiveness and legibility of a minutely designed environment is doubtful—at least in relation to the observer's desire to be informed about its function, quickly and efficiently.

It seems superfluous to close this paper with a plea for further research. Rather, I should like to indicate briefly the format such research might take in future. The most important need is to arrive at a better understanding of ambiguity. If the role of the urban designer is to be limited to the clarification of major urban functions and their linkages ("districts" and "paths," to use Lynch's terminology), the relatively limited human manipulatory ability described by Miller[15] necessitates the careful economizing of a restricted symbolic vocabulary. Thus, the relative emergence of distinct elements, either singly or in some combination, becomes of prime interest.[16]

Second, we need to develop improved research techniques, or adapt them from other disciplines. The experiment described in this paper is exceedingly primitive: its presentation was static, monochromatic, only approximated the normal field of vision, and ignored such environmental clues as noise, odors, and temperature differentials. That it yielded credible results was not only rewarding but suggested the possibility of several technical improvements. More reliable laboratory experiments should incorporate a more accurate simulation of an urban situation, including movement as well as the other environmental clues listed above. Third is the need to correlate results with relevant demographic and socio-economic characteristics of the subjects tested. Factors such as age, education, occupation, place of residence, and cultural background may be relevant to perceptive ability. Since the purpose of urban design, according to my earlier definition, is to clarify the functional role of the environment, the characteristics of our clients—the general public—are of prime importance. How well do people adapt to a complex urban situation requiring quick decisions? To what extent can they be taught a symbolic language? Can their behavior be predicted? All these questions need to be answered for more effective urban design. Finally, we need to evolve adequate methods to pre-test our designs before their construction. It is evident that the simple technique used in my experiment is well suited to obtaining sample reactions from a model. The justifiable importance now being given to computer simulation of urban and regional planning problems warrants a parallel increase of attention to the visual aspects of our cities. Although more sophisticated methods will undoubtedly be perfected in time, it seems that the application of standard psychological experimental procedures to urban design are not only warranted but rich in contributive possibilities.

Author's Note: The author wishes to express his gratitude to Dr. Jerome S. Bruner, Director of the Center for Cognitive Studies at Harvard University, and to Dr. Paul Kolers, also of the Center, for their encouragement and advice in designing the experiment.

NOTES

1 A more limited definition has been proposed recently by the Urban Design Committee of the American Institute of Planners, and is still under discussion. "Urban design is defined as attention to the perceptual elements of the urban environment. Urban design is devoted primarily, but not entirely, to the perception through sight, of urban elements which are primarily three-dimensional, and fixed, but which may include moving objects. *Urban design is focused primarily on aesthetic rather than total perceptual experience—i.e., the kinds of experience that enhance and enrich daily life, rather than those which provide mundane information.*" American Institute of Planners, "Report of the Planning-Policy Committee on Urban Design Methods" (Washington, D.C.: The Institute), February 1963, p. 2 (my italics).

2 For a fascinating, if not always convincing, theory on the actual manipulatory process, see George A. Miller, Eugene Galanter, and Karl H. Pribram, *Plans and the Structure of Behavior* (New York: Holt and Co., 1960).

3 George A. Miller, "The Magical Number Seven, Plus or Minus Two," *Psychological Review,* LXIII (March, 1956), 81–97.

4 François C. Vigier, "A Tachistoscopic Study of the Sequential Emergence of Urban Forms," Cambridge, Massachusetts, May 1962.

5 Previous experiments had been concerned with illumination and exposure thresholds, figure-to-ground relationships, "goodness" of specific forms and configurations, and perceptual motivation. See Rubin, 1921; Werner, 1927; Atkinson and Ammons, 1952 (abstract forms). Wertheimer, 1923; Kopferman, 1930; Musotti, 1931; Helson and Fehrer, 1932 (geometric figures and con-

figurations). Postman, Bruner, and McGinnies, 1948; McCleland and Atkinson, 1948 (words, images, and real objects as related to motivation).

6 M. D. Vernon, *Visual Perception* (Cambridge, University Press, 1937), pp. 5–6 (my italics).

7 F. C. Bartlett, *Remembering* (New York: Macmillan and Co., 1932).

8 Anna G. Douglas, "A Tachistoscopic Study of the Order of Emergence in the Process of Perception," *Psychological Monographs,* LXI (1947).

9 Judd and Cowling report that in a real situation, "attention is from moment to moment fastened upon this or that detail of the figure and there is a corresponding withdrawal of attention from some other part. . . . In most ordinary experiences, the interval between observations is so long . . . [that] we have merely crude approximations to complete and correct concepts." "Studies in Perceptual Development," *Psychological Monographs* XXXIV (1907).

10 A two-field, electronically controlled tachistoscope was used, one of the fields being constantly illuminated to ensure no changes in light adaptation.

11 It should be pointed out that saturation is probably a much more complicated phenomenon than indicated here. For instance, it can be argued that a stimulus may be so complex as to cause a sense of discouragement in the viewer, resulting in an early saturation point. Thus there is the suggestion of a still undefined correlation between complexity and interest.

12 A major constitutive element was defined as any object (or objects) within the space that was recognized within 100 milliseconds (two exposures).

13 The unambiguous street material presented was similar in that it also included either a curved street with one prominent side or a distant architectural feature. In all cases, these elements were recognized immediately and used as search generators.

14 For Lynch's subjects, such "non-design" and perhaps atypical urban elements as Boston Common, Beacon Hill, and Commonwealth Avenue seem to have had a greater imageability than other, more active, more typically urban areas. *The Image of the City* (Cambridge, Massachusetts; Technology Press and Harvard University Press, 1960), pp. 145 ff.

15 See note 3 above and related discussion.

16 I have purposely abstained from defining these elements. But they are obviously not restricted to architectural forms. Colors, textures, planting, signs, and people play an important role. I should like to stress again that interaction and contrast (the *relative* strength) rather than presence per se seems to be the prime factor in recognition.

SOCIALIST CITY PLANNING: A REEXAMINATION

In a special issue of the *AIP Journal* on city planning in Europe (November, 1962), Jack Fisher wrote an interpretation of planning goals and achievements in the socialist countries of Eastern Europe. His article, "Planning the City of Socialist Man," received widespread attention in both the United States and Europe. In Western countries, it helped fill a serious gap in our awareness of postwar planning in Europe. At the same time, it offered an opportunity for a fuller exchange of views with planners from Eastern Europe. Two distinguished planners from Yugoslavia and Poland—the countries covered most fully in Fisher's article—were invited to write comments on the article for publication in the *Journal.* Arh. Miloš Savić, planning director of Novi Sad, Yugoslavia, and Dr. Zygmunt Pióro of the Institute of Town Planning and Architecture in Warsaw, agreed that an exchange of this kind would be valuable and responded with comments from their own points of view. To round out the discussion, Jack Fisher was invited to supply a further note expanding his earlier contribution along lines suggested by the reactions of Arh. Savić and Dr. Pióro. Hopefully, this series of papers will encourage further interchanges on a professional level between Eastern and Western countries.

B. J. F.

Comment by Zygmunt Pióro

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The views of a foreign observer on planning and urban development are often most valuable in identifying elements and relationships that may be invisible to people closer to the scene of events. Recognizing and becoming conscious of these relationships may lead planners to improve their work. In this spirit, Polish city planners have read with great interest the article "Planning the City of Socialist Man," in which Dr. Jack Fisher attempts to present the aims and methods of urban planning in the countries of Eastern Europe, especially Yugoslavia and Poland, and to interpret their effects.