PERSONAL AND SITUATIONAL FACTORS IN JUDGMENTS OF TYPICAL ARCHITECTURE

by

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Abstract

Architects, their clients, users and other observers of public architecture commonly render differing judgments of any given building. Scattered univariate studies have related personal and situational variables, such as design education and weather conditions, to this variation in judgment. The present study examined by multivariate means whether and to what extent a variety of personal, external, stable and transitory variables is related to the description and evaluation of building characteristics.

To initially determine whether building judgments are predictable from this extra-architectural information, 2 pilot studies were conducted in which small groups of university students (total n = 60 and 58) rated a campus mall and office on the Hershberger-Cass Base Set (descriptive ratings, study 1) and on a unipolar revision of the Base Set (evaluative ratings, study 2). Stepwise regression was used to predict these judgments from previously selected personal and situational variables.

About 60% of the judgments were significantly predictable from one or more of the items. The amount of variance accounted for ranged up to 38%. Prediction was slightly better in the evaluative style rating study. Weather, age and sex were the most useful of the dozen predictor items. In one instance, for example, older, male and extraverted judges felt the mall was too large and bright while, conversely, younger, female and introverted judges felt it was too small and dark. Warm, sunny weather generally resulted in more favorable judgments. Despite relatively

few patterns of predictability across the different judgments and buildings, the results indicated the necessity for more detailed investigation.

In a larger study, 116 judges of diverse age, education and place of recruitment toured 6 "typical" public places in North Burnaby. The tours were conducted at 3 times of day under various weather conditions in groups ranging from 4 to 11 judges. A hotel lobby, pub, restaurant, recreation center, library and the van used for the tour were judged on 13 characteristics and an overall rating of pleasingness. 21 predictor items were used, representing 3 classes: Personal Stable (personality, sex), Personal Transitory (mood, familiarity with the building being judged) and External Transitory (weather, size of rating group).

About 62% of the matrix of 84 judgments (6 places X 14 ratings) were significantly related to one or more predictors. The maximum amount of variance accounted for, in the evaluation of the temperature in the van, was 49% accounted for by 6 predictors. Weather, educational level, age, mood, time of day and familiarity with the building were the most frequently significant predictors. Significant predictor-judgment correlations once more were not universal across buildings or attributes, but they were almost always in the same direction each time they occurred. Thus, judges in good moods and older judges tended to rate buildings more friendly, beautiful and pleasing. Those with more education rated them as vaguely designed, ugly and disagreeable. Judges who were more familiar with a building rated it pleasing and friendly but vaguely designed. Sex was not so frequently useful as predictors as in the pilot studies.

Future studies should determine whether personal and situational variables excluded here, or a small fixed set of the better predictors used here can increase the magnitude and the consistency of prediction across buildings. Analyses of variance showed that the judgments of building modernness, sound quality, temperature, illumination, aesthetics and overall evaluation were most related to personal and situational variables across buildings. Some recommendations and cautions for the designer and design researcher are given.

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I am firmly convinced that architecture as a form of expression can be considered an art only when it reflects an understanding of the perceptions of the consumers of the designed environment.

Kiyo Izumi, 1971

Chapter 1: Perception and the Environment

The perception and evaluation of complex objects often seems to result in differing verbal reports. Because the field is so packed with information when one perceives a painting, performance or city street, people apparently select from the panorama to create somewhat idiosyncratic impressions. In architecture, for example, the building is presumably a static thing, yet one encounters quite different reports of its appearance and value. While much of the experimental tradition in the study of perception has concentrated on the elucidation of the stimulus' role, this study examines the possible influence of personal and situational variables on observers' verbal reports.

Two related themes in the history of perception require some discussion in order to place this study in context. One is a difference in approach to the problem and the other concerns the nature of the stimulus or perceptual field in the experiment.

Object perception and environmental perception

Ittelson (1973) has characterized two approaches to perception research, "object perception" and "environmental perception". In the relatively atomistic object perception tradition, which has dominated psychology for eighty years, research paradigms tend to utilize symbolic displays of small dimensionality and size. The primary interest is on perceptual change as a function of object variation.

By reducing informational complexity, the investigator expects to gain firmer and more unequivocal knowledge. Two considerations militate against the success of this procedure. A restrictive environment, first, is not "no environment". Soundproofing the laboratory may isolate the ears from everyday distraction, but it is not therefore correct to assume hearing plays no role in the subsequent perceptual experiment. All perception occurs in a context; the literature of sensory deprivation shows that something, indeed something striking, occurs instead of nothing when the senses are restricted.

Second, the artifical reduction of information is just that. The assumption is made that the perceptual process under study will function under the atypical conditions in a manner similar to typical functioning. If this assumption is not made, the experimenter is pursuing a theory appropriate only to laboratory conditions. Many would question the worth of such a theory, given the contemporary ethic of scientific usefulness.

Yet the laboratory study of perception is not inherently worthless. The same categories of variables apply as in the more complicated natural situation, and many of the comprehensive experiments requisite to a comprehensive theory could be done in a laboratory.

What environmental psychologists question is an approach which aims for a general perceptual theory solely through performance of restricted-environment experiments.

Many years ago the Gestaltists began to enlarge object perception when they showed that the context in which the object was embedded could affect perception. But the Gestaltists failed to fully delineate the contextual concept, adhering to a strict interpretation of perception as an immediate neurological process. Individual differences were not an important part of Gestaltist perceptual theory. Workers in the environmental perception tradition recognize a wider variety of influential factors in perception.

A comparison of representative object and environmental perception research paradigms may illustrate how these approaches lead to different conceptions of perceptual theory. If an investigator chooses to study color detection under the usual conditions of a laboratory, he may ask subjects to attend especially well to a small lighted target. Experimental instructions imply or specify that other stimulation is to be avoided. Should it impinge, the subject will be inclined not to report it, knowing the experimenter is concerned mainly with the micro-environmental display. Similarly, each subject is usually treated as if (s)he is identical to every other subject except as the research design permits. Thus, such potential sources of variation as ambient light, temperature or other environmental conditions are deliberately diminished both by design and later in statistical analysis ("error" variance). Individual differences in personality, mood, experience, attitude toward the experiment and experimenter are similarly ignored, held constant, or confounded.

In a perceptual study of, for example, the roadside environment, the subject is more obviously a part of his or her surroundings. Perception as a contextual whole is easier to imagine, if not easier to investigate. The senses are more apt to overlap instead of seeming to operate in isolation. That the perceiver is selecting from a huge potential array of information is clearer. Simple-stimulus experiments tend to create the over-simplified impression that people absorb all information presented. Consequently they usually conclude variation is primarily a function of stimulus variation and physiology. A theory based on environmental perceptions will necessarily be broader. In addition to variables so far considered by environmental perception- individual differences, ambient environment and information selection- others may play a part in certain situations. These, also, have generally received little attention until recently. Included are perception while moving, the role of exploration of the display and experience with it (e.g. simple viewing vs. handling or walking around the display), peripheral perception, possible effects of social action in the display arena, and accrued meaning and motivational messages in the display (Ittelson, 1973). Proponents of a broader approach argue that more experimental studies of multi-dimensional stimuli are necessary to redress an imbalance between restricting exactitude and looser but more holistic approaches.

What is perceived?

A concept which requires some attention, and has been defined in many ways, is environment. In a simple traditional view, the environment is the external source of stimulation. This view is inadequate. In the case of humans, environment is available stimuli, to borrow from Gibson (1966).

No skin boundary is implied. Naturally, there are subsets of environment, the definition of which depends on how one wishes to carve up the emanations of energy which strike us. One may speak of the designed environment and the natural environment, or the material and ephemeral environments, or the internal and external environments. Distinctions within the amorphous definition "available stimuli" must be made with particular purposes in mind.

A theory of perception which aspires to completeness ultimately depends on the nature of the displays in its experiments. Stevens (1966) went so far as to state "there is only one problem in all of psychology - the definition of the stimulus". While this position may be overstated, it is self-evident that "informationless perception", as Gibson (1966) calls it, is impossible (although sensationless perception is not). In many situations, information can be extremely variegated, as well as multi-modal. The challenge of natural complexity in the perceptual field must be met.

Prospects for research in environmental perception

The largest single obstacle to a broad approach to perception has been lack of an adequate method for design and analysis. Perception should, according to Ittelson, be seen as a broad process (1) relatively free of stimulus control, (2) forming part of a spectrum including such kin-processes as cognition and memory rather than as an isolated phenomenon, and (3) appropriate and responsive to environmental conditions. The combination of a need for theoretical completeness and the realization that socio-psychological research must be socially useful (Lewin, 1946) poses major problems. Fortunately, several developments have favored

research in this holistic vein. First, societal pressures for relevant research are accompanied by some willingness to support it. Second, the development of powerful multivariate statistics and the electronic means of handling them have facilitated simultaneous treatment of many variables and many subjects and displays. The lack of such procedures, rather than actual narrow-mindedness on the part of earlier perception students, may have been the chief reason for the late entrance of the study of more complex situations. Third, a relatively few men of genius and perspicacity have suggested and adapted strategies and techniques for dealing with large-scale settings in ways appropriate to the traditional scientific manner of inquiry.

The experimental tradition

The study of human perception of the molar surroundings has two main roots. One force behind its conception was a consortium of non-psychological disciplines involved in building and planning. As these architects and other designers moved further from the traditional close relationship with their private clients into an increasingly distant, public and temporary relationship, strong needs arose for theory and methods to understand client perceptual processes. On the other hand, these professionals lack research traditions and methods to investigate perception. This knowledge has largely been supplied by psychology.

The methodology of environmental perception is almost entirely based on techniques adapted from the psychological study of meaning and perception. Appropriate theoretical bases too, like field theory, information theory, adaptation level theory and even personality theories (e.g. Kelly, 1955) have been waiting in the storehouse of psychology and

are now being used to account for findings of the new experimental environmentalists. While many tools have been adapted, the most important in the literature so far has been Osgood's semantic differential. The area of person perception has been useful as a model paradigm. Cognition and mathematical psychology have also had effects on the development of the "new" field. The following paragraphs will summarize the development of environmental perception in terms of content and technique.

Environmentalists in psychology can trace their heritage through a number of theorists, including the Gestaltists and Kurt Lewin. Since the fifties, theories have been more explicit about the influence of the environment, but the tendency has always been present, even in the thought of such disparate thinkers as John Watson and Henry Murray. Classical studies like the series with inverting lenses testify to a certain experimental tradition which was concerned with the process by which organisms "keep in touch" with the world around them. Often, however, the investigation of the interplay between man and his surroundings tended to dwell on extreme, unusual or impoverished conditions such as sensory deprivation. This state of affairs prompted one pioneer environmental psychologist to remark: "We now have the interesting paradox of a large amount of knowledge about rare and esoteric environmental conditions along with a lack of information about typical environments" (Sommer, 1966).

This statement is noticeably less true now. Studies of variable quality have proliferated immensely since 1966. Journals have sprung up, books have appeared, new departments have been created and regular conferences have begun. The variety of settings so far studied is huge; nevertheless one reviewer (Kameron, 1973) has endeavored to classify them

into four content types: cities, highways and streets, architectural forms and natural settings. This classification probably says more about the magnitude than the actual diversity of settings investigated.

Measurement techniques invented, adapted, used and abused have also proliferated. Besides the ubiquitous semantic differential, adjective checklists, Q-sorts, free-form cognitive representations (mental maps) and simple declarative impressions, hidden observations and devices for measuring museum traffic by recording pressure on floors have been pressed into service.

In the most complete article on the general methodology of environmental psychology, Craik (1968) outlined the elements in studies of "the comprehension of the everyday physical environment". The first element, observers or raters, may be a) special competence groups (such as professional architects, real estate appraisers, highway engineers, etc.), b) clients and users, c) naive subjects or groups formed on the basis of some theoretical notion, such as introverts or field dependent people. The second element, which Craik called environmental displays, may be presented live, on film, video, or even not at all. Dependent variables could involve judgmental techniques such as some of those already listed, thematic apperception analysis ("What would a person do/feel here?"), simple amount of viewing time or information based on paradigms involving role-playing. The last element, validational criteria, range from expert opinion to physical measurement.

It may be fairly charged that students of environmental perception have usually employed the path of least resistance through this plethora of possibility. A tendency to seek the immediate gratification of utilizeable building or planning information has superseded the chore of carefully designing experiments in the service and development of a comprehensive theory. However, the goals of experimenters have been so diverse that, despite the large number of combinations of Craik's elements, some portions of the theoretical map have been filled in. Although many of the studies are less than rigorous, a tenacious reviewer might be able to begin sketching a theory and specifying where future work is most needed.

Rating scales for architectural description

Among studies already reported in the literature, rating scale approaches have been predominant. Rating scales give the subject an architectural vocabulary he would not otherwise have. There is a danger of putting words in subjects' mouths, but there is also an intuitive feeling that subjects take in much more information than they express. Providing them with a framework for expression may have priority in the early stages of a study: one would rather have a little "extra" information than miss extracting something important. Rating scales are a convenient, standardizable method of handling relatively large numbers of responses.

The prototypical North American study of the apparent effects of the surroundings on perception is that of Maslow and Mintz (1956). In studying the effects of exposure to "beautiful" and "ugly" rooms, they had subjects rate photographs of faces on several scales. In the beautiful room, the faces were rated as more energetic and emotionally well-off.

Despite the limited nature of this experiment, it has a number of significant implications for buildings and design, as well as the nature of perception. Nevertheless, a dozen years passed before anyone published further related results. Kasmar, Griffin and Mauritzen (1968) performed an experiment on the effect of surroundings on mental patients. They exposed 115 out-patients to a twenty minute interview with psychiatrists in each of two rooms which were arranged to be clean and modern vs. dirty and barren. The clear effects found initially by Maslow and Mintz, and subsequently found to persist up to three weeks (Mintz, 1956), were not confirmed by Kasmar et al. The rooms were seen differently, but self-ratings of mood and ratings of the psychiatrist were not different. Some interactions between characteristics of the subject and ratings were found; the older the patient, the more accepting, understanding and authoritarian he rated the psychiatrist. A significant tendency for males to rate psychiatrists more authoritarian, especially in the "ugly" room, complicated matters. In sum, the results suggested that the effect of the surroundings is not always present, but that it is more complex than the earlier study seemed to imply.

In a similar early study of psychiatric settings, Moos, Harris and Schonborn (1969) discovered that six experimentally rated rooms were viewed differently by a sample of patients and hospital staff. This confirmed that rating scales do at least differentiate places. But Moos et al. also found that the staff viewed the rooms reliably differently from the patients. The patients who used the rooms most saw them the least positively. In this sample of 100 Ss and six rooms, more variance was due to the subjects than the room. The investigators concluded that

unless it was because their rooms were highly similar, subject variation is more important in predicting response to the environment than surroundings variation.

Incidentally, both studies used a scale developed by Kasmar (nee Vielhauer, 1965), which has had considerable heuristic value. In her dissertation she had set out to develop a standard set of adjectives useful for describing environments. Realizing that semi-random choice of items and the use of the semantic differential were at best stop-gap measures, Kasmar tried to create a scale which was relevant, meaningful and similarly usable by architect and layman. Kasmar began by making a pool of 500 adjective pairs, gleened from students, architectural journals and art criticism. To reduce them to a manageable set for the description of architectural space, she first eliminated all synonyms. Then she had undergraduates imagine their most and least liked architectural space and rate the remaining pairs on their clarity and appropriateness to those places. The 197 pairs left were re-rated for their general utility and clarity. The Environmental Description Scale (EDS) with 66 pairs of adjectives, was the result. Later, Kasmar (1970) reported a "live" test of the EDS. Three typical university rooms were rated by 500 Ss. A retest three weeks after the first rating showed a Pearson r stability coefficient of .68 ($p < .01$). Mann-Whitney and Kolmogorov-Smirnov tests of room similarity showed that the three rooms were indeed rated differently. A factor analysis of the 66-item scale resulted in five factors: esthetic appeal, physical organization, size, temperature-ventialtion and lighting.

The EDS has been the point of origin for a number of attempts to create a definitive scale for the efficient and complete description of architectural forms.

In England, Canter and his associates have been involved in the appraisal of various public buildings. Canter and Wools (1969) successfully distinguished buildings on ratings of friendliness, harmony and inspiringness. In another study, Canter (1969) was among the first to document differential perception based on professional orientation; he found architecture students rated some buildings differently from non-architecture students. Similar results have been obtained by Appleyard (1969), Lansing and Marans (1969), Payne (1969) and Hershberger (1968). The psychologist Beck (1967) had already shown that symbol preference is based on developmental trends as well as professional identity. Beck's large study (611 subjects of all ages) also showed sex differences in preference for the geometric forms in his Spatial Symbols Test.

In the period 1968-71 at least six major efforts were made to extend and improve Kasmar's EDS, in order to put environmental perception measurement beyond dependence on the Semantic Differential (e.g. Lamm, 1965). Besides the impetus from the EDS, other evidence (Collins & Seaton, 1971) suggested that architectural forms (objects) do not have the same basic factor structure- activity, evaluation and potency- as Osgood's measure (which was intended for non-material signs rather than objects). Some effort was made, if not to actually combine research forces for what Collins and Seaton (1971) call the "definitive and final 200+ variable

study involving some 1,000 subjects chosen from populations other than Introductory Psychology courses", to at least co-ordinate the work by treating the various experiments as samples in one grand study.

The primary effort has been by Hershberger (1972, Cass & Hershberger, 1973). Reviewing his own work, and that of Kasmar, Collins (1968, 1969), Craik, Canter and others, Hershberger has evolved a set of semantic scales of reasonable durability which he calls the Hershberger-Cass Base Set. This set of ten Primary and ten Alternate Scales is the result of close perusal of the studies and repeated factor analyses. The ten factors represented by the primary and alternate scales (there are also nine Secondary Scales, which do not represent factors but "might be relevant") were chosen because they repeatedly emerged in the investigations despite quite different item pools and because they are all roughly orthogonal.

Hershberger (1970) and others tried to spell out clearly the reasons for developing a "comprehensive set of semantic scales for the assessment of building attributes". Ultimately, it is desirable to be able to predict user response to a building. This requires a knowledge of the relations between completed edifices and simulations (Wood, 1972) and knowledge of the relationship between formal properties of design and evoked attitudes (Hershberger, 1970). Scales are needed which correspond to characteristics of buildings. Investigation may then proceed in a more detailed manner toward the elucidation of how given characteristics elicit given attitudes. Among finished buildings, such a tool would be useful

for performing evaluations (Collins & Seaton, 1971) on any of a variety of criteria (utility, beauty, design, originality, etc.) To some extent, building plans might be based on knowledge of future clients' responses to existing structures of a similar nature.

Several practical requirements must be met for such a scale. The list cannot be nominal (i.e. door, window, carpet) because (1) all buildings do not have the same elements and (2) the set would be inordinately long. Yet it must be comprehensive; thus factors are sought which will tap all relevant information and condense, with a minimum of overlap, a large number of bits of information. In practice, individual scales may bite off more or less information. Light-dark is a more elementary construct, we may assume, than beautiful-ugly. Another consideration is communality of meaning, both across users and between professionals in the design field and clients. Thus, the word "archaic" is excluded, because it has a connotation of "bad" to most people, but to a student of architecture simply refers to a historical idea which may not now be fashionable, but could become so at any time. Scales need not, on the other hand, be too specific or physical; mechanically measurable features are more fruitfully handled by appropriate devices such as exposure meters and rulers.

In view of these demanding considerations it is not hard to understand why most workers in environmental perception have concentrated primarily on the development of better scales. Critics of the research may point out that no study has dealt with anything like a representative sample of even North American buildings. Most studies have only exposed the subjects to simulations (usually photographs), not so much out of

interest in simulations, but for convenience. The employment of simulations is open to several obvious sources of distortion if one hopes to apply the findings to a theory of environmental perception. Scale, atmosphere, restriction in point of view, limitation to an experimenter-chosen viewpoint, distortions in the photography, lack of freedom to explore the display and the elimination of possible effects of external conditions such as the weather are a few of these sources.

No study except that of the architect Wood (1972) has reported consideration of external factors like the weather at the time of rating, the season, time of day or ambient temperature. Yet Wood's findings, though relegated to a table in the appendix, suggest that buildings are rated more favorably in good weather.

Individual differences in the perception of architecture

A most important factor in the perceptual equation may be the rater himself. Many researchers have either speculated on this or investigated one or another sort of individual difference. Architectural sophistication, age, sex and cultural background (Sonnenfeld, 1967) have been found to be important. Wood (1972) showed that the size of a rater's home town was related to preferences for urban buildings. Peterson and Neumann (1969) report that education was significantly related to preferences for types of beaches in a Chicago study. Thus, the original Maslow and Mintz study began by suggesting that different rooms produced different perceptions and later work has tended to suggest that inter-rater variation is also a source of perceptual variance. In fact, Moos et al. (1969), as will be remembered, assigned more variance to the rater than the building, although such conclusions may be dependent on their sampling of subjects and buildings.

Such evidence led McKechnie (1970, 1971) to postulate the existence of another class of individual difference, of a higher order. He has developed a multiphasic inventory for the measurement of "environmental dispositions" on the model of the MMPI. Other, more traditional personality conceptions have been little exploited, although several (Bechtel, 1970, Wools & Canter, 1970, Kates, 1971) have speculated favorably on the possibility that such constructs may have predictive utility. In some cases, these variables have even been said by their originators to relate to person-environment interaction. Jung (1971) stated many years ago: "Quite apart from the variable acuteness of the sense organs...there often exists a radical difference, both in kind and degree, in the psychic assimilation of the perceptual image. Whereas the extravert continually appeals to what comes to him from the object, the introvert relies principally on what the sense impression constellates in the subject. The difference in the case of a single apperception may, of course, be very delicate, but in the total psychic economy it makes itself felt in the highest degree..." (p. 374).

In general, previous research has been more devoted to scale construction than broad theoretical considerations. Yet the patchy weave of studies has revealed an intriguing variety of ways we see the world differently.

Large gaps in the theory of the perceptual equation remain, and future work must pay as much or more attention to the choice of subjects, displays and techniques, to serve theory, as to solving the practical problem at hand. Yet in order to know where the gaps are, some idea of the theory must be clarified. The next chapter attempts to outline a theoretical framework for perception of the environment.

Chapter 2: Theory and Hypotheses

On theory and strategy

The study of the environment has often proceeded without the guidance of adequate theory. Frequently research is reported which does not refer even to a rudimentary model. If there is a hypothetical statement, it sometimes appears to have been generated by hunches or speculation rather than through a deductive process. That is the appropriate mode for a new area. However, at some point effort must be devoted to conceptualizing the early and usually scattered findings into coherent form so that later research may proceed with some sense of direction and with more efficiency. Environmental psychologists have recently been extremely aware of the theoretical lacuna in their discipline. This awareness has generated a good deal of discussion (vide the recent Clark University conference) and sessions at EDRA, The Environmental Design Research Association (e.g. Frazier, 1975).

At least one substantive effort toward an organizing theory has emerged (Mehrabian & Russell, 1974). This attempt to make sense of general human-environment relations stresses the use of the "primary emotional responses", pleasure, arousal and dominance as intervening variables between the environment and behavioral responses. Whether or not their bold stance, claiming that all human-environment relations can be conceptualized as functions of these three emotions, is borne out, Mehrabian and Russell typify the new earnestness with which the theoretical gap is being attacked.

When perception of the environment is considered, the problem of theory construction has the advantage of a rich history of theorizing on perception in general. The psychologist who wishes to consider alternatives for a theory of environmental perception has much to choose from. Yet a close reading of a survey such as that of Allport (1955) shows that a large part of the literature is of little use for present purposes, for various reasons. Some older theories have been superseded by later, more thorough approaches. Others are restricted in their scope, tending to emphasize one or another aspect of perceiving or the perceiver to the virtual exclusion of other aspects.

A comprehensive theory of perception would amount to a theory of environmental perception. Any theory of perception which fails to include all the relevant psychological processes, situational factors and the nature of the stimulus information itself is not complete. Those three broad classes of variables are exactly what a valuable theory of environmental perception will probably have. Naturally, in a given instance, some of the factors will be more or less salient than others.

This may explain why two apparently contradictory trends in psychological theory-building may be observed. In certain areas, theories are shrinking to mechanisms. Hunger and thirst are pictured as cellular level sequences of a relatively invariable biochemical process by some workers. Yet it has been shown that hunger has a social side too; witness for example the classic experiments showing that seemingly satiated chickens placed with hungry chickens will eat more. Meanwhile, another approach to theories has been to sketch them wider and wider.

Students of complex behavior like person perception and clinical judgment especially have tended to draw in a wide variety of variables for consideration. The development of multivariate methods may have stimulated this approach just as the development of precision laboratory equipment may have stimulated the mechanists.

The archetypal split in this regard occurred in Wundt's laboratory. When the discovery of individual differences in reaction times and other basic processes was made, Wundt assigned the new variance to "error" and set about devising better ways to measure and began to try to control this variation. Wundt hoped that through precise measurement and total control he would be able to measure behavior in a pure sense, not unlike the chemist who wishes to isolate a discrete element with invariant properties. But Wundt had a student with a different approach to the "error" of individual differences. James McKeen Cattell began treating the individual differences as "real" variance (Wiggins, 1973). This was akin to the Heisenberg principle (which, incidentally, was not articulated in the physical sciences for another quarter of a century) in that Cattell tended to use the differences between individuals together with main effects, and dispensed with attempts to measure a pure reaction time as essentially unobservable and unfaithful to real situations.

This digression has a place in the discussion of perceptual theory, for the successors of Wundt and Cattell have proceeded to take divergent courses, with necessarily divergent conclusions. A number of factors have kept the two groups apart, not the least of which is type of

tools used (e.g. rating scales vs. tachistoscopes) and chosen level of analysis (from the cellular to the sociological). Despite attempts made at scientific objectivity, it may be the two camps are of predominantly different temperament and training (Boring, 1950).

Nevertheless, the experimentalists and the correlationists, as Cronbach (1957) has called them, are speaking of the same phenomenon. When pressed, they will agree they differ only in the scope of their activities; that the chicken has biochemical and social reasons for eating and the main differences are merely in the emphasis of one aspect over another. The experimentalist will grant his or her correlationist colleague the wide range of impinging variables, only expressing doubts they can all be measured well at the same time. The correlationist will offer in return that detailed physiological studies are useful, if only to fill out the correlationist's own grand schemes. Cronbach, echoing Dashiell (1938), sees signs of an emerging detente. Some traditionally experimentalist topics are receiving correlationist attention, and vice versa. A mature psychology will approach a topic with whichever method, or mixture of methods, best suits the particular hypothesis at hand, rather than let the analytical tail wag the topical dog as sometimes has been the case.

With this brief background in mind, let it be known this study will proceed along correlational lines. One reason lies in its purpose, which is partly to investigate the importance of quite a number of factors in architectural perception suggested by earlier research. A second reason is the difficulty of achieving experimental controls in a

study involving in situ viewing of buildings. A third reason is a preference for holistic, relatively untampered study. Fourth, in the early phases of investigation in a new area, correlational methods are more suitable; generally the precision possible in the experimental study seems better suited to resolution of finer hypotheses after the framework of the theory has been roughed out by correlational methods.

This study sets out to examine the utility of a wide range of variables in the prediction of response to buildings. Thus, the model to be developed in this chapter is a model of the macro-sources of variation in environmental perception rather than one focused sharply on a certain aspect of the process.

Toward a model of environmental perception

This section will describe the development of the model used in this study. The most basic elements of a perceptual equation will represent the perceiver and that which strikes his sensory system. Additionally, we require some form of response on the part of the perceiver for measurement purposes. In its most primitive form, then, the model to be developed resembles:

input ⟶ processing ⟶ output.

Naturally, this equation is easily complicated. The stimulus input, whether in a classical study of psychophysics or this study of public architecture, should include all information reaching the subject. It does not mean all information sent by a stimulus object (Gibson, 1966). Perhaps a more appropriate and unambiguous term would be "environmental information". One of the implications of Gibson's stimulus-stimulus

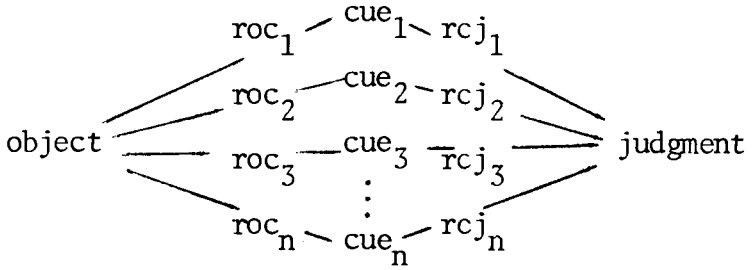
information distinction important for the present study is that of potential differences in reception or processing of the information.

Processing is what happens between reception of the information and response; it is mediated by individual cognitive characteristics and by ambient physical and social conditions, broadly speaking. In this particular sense of differential combination of received information, "processing" is perhaps more aptly expressed by "impression formation".

Output, the response, is in this case a verbal report. With these considerations the model has become:

environmental information ⟶ impression formation ⟶ verbal report.

Before this rudimentary model is elaborated, a slight digression is necessary. The model being developed is, in one sense, only half a model. An idealistic predictive model of perception, such as Brunswick's Lens Model (Brunswick, 1956, Hammond, Hursch & Todd, 1964), includes a representation of the stimulus itself. As adapted from Wiggins (1973, p. 156), this complete model appears as follows:



In this model based on Brunswick's probablistic functionalism, cues form the basis for what has heretofore been called environmental information. However, in this study the word cue will not be used, because of its unfortunate connotation that information is composed of basic, discrete, individual units of energy. Here it is assumed that information is highly contextual and interwoven. In place of Brunswick's "cue", a term reflecting the interdependence of energy, "configuration", will be used.

In the model, correlations (r_{cj}) refer to the process of selective and differential cognitive behavior herein called impression formation. But, it will be seen, Brunswick's model also includes the object itself ("reality") and the correlations between it and the configural information (r_{oc}). The point is that in this study only the right half of the Lens Model is included.

The apparent beauty of the complete Lens Model is that comparisons among object, cues and judgments may be made. A validity check between the actual stimulus object and the judgment seems possible. If an objective measurement of the stimulus is possible, it may be compared with the judgment, presumably to test the skill of the observer. The nature of the task is not so much a rating, but an attempt by the judge to match reality, that is, correctly estimate r_{oc} with his r_{cj}.

But the left half of the Lens Model does not appear in the present version, despite its apparent completeness and provision for validity testing. With the stimulus itself absent, the relationships remaining are only those between configuration and judgment. Why has this choice been made?

The response to this brings in a number of important issues. In the first place, one should not overlook the possibility of understanding buildings by the behaviors they evoke rather than by their specific configurations. Situations, in general, as Frederickson (1972) and Rotter (1955) have suggested, may be classed in behavioral terms or in attributional terms; for some purposes in both terms. Magnusson, in dealing with stressful situations, has reminded us that the distinction is an important one, for situations which are attribute-similar may not be behavior-similar, and vice versa. Magnusson and Ekehammer (1974) compared four types of situations as classified by perceptual data and by behavioral data. Three types of situations were highly congruent in a multidimensional scaling analysis, but the fourth type was not. Within a rating scale design, the difference between the two methods is that in the perceptual approach, subjects are asked to rate the characteristics of the situation, while in the response approach they would be asked to rate their own feelings in the situation (or an outside judge might note their behavior).

The present study concentrates on the perceptual approach. Subjects are asked to rate various aspects of the buildings they experience. The other approach would also be of value. It is related to the oft-heard design maxim "form follows function". If form really does follow function, then behavioral and perceptual ways of describing buildings should correlate highly. Incidentally, some modern utilitarian architects, in a "radical" revision of traditional methods, have advocated the design of buildings from the inside out, that is, by starting

from the behavior and designing an envelope to perfectly complement this contemplated activity. This approach seems like an alternative way of studying perceptual-behavioral responses to situations. The success or failure of buildings in terms of the form-function criterion has been the subject of much recent discussion (e.g. Sommer 1969, 1972).

Within the perceptual approach, one main obstacle to research has been the lack of a standard set of building qualities or attributes. Architectural literature is littered with terminology, but much of it represents a lingo known only or known in a special meaning to architects only. Further, no one has successfully rounded up all the attributes to create a complete and non-redundant set. However, considerable effort has been expended by environmental psychologists towards such a set. Most of these studies, which are exemplified by the work of Kasmar and Hershberger (Chapter 2), have factor analysed large item pools taken from laymen and architects. Cass and Hershberger's (1973) Base Set of attributes is the product of several of these intensive factor studies in fairly diverse populations and settings, and it is a significant beginning toward a standard scale of architectural attributes. Eventually, this set should be logical, rational, comprehensive, minimally overlapping and similarly comprehensible to laymen and designers, as well as applicable across a variety of building types.

Meanwhile, the Base Set and common, abstract architectural attributes such as beauty, expressiveness and utility have very little in the way of specifiable correlates. Although Canter, working in England, has reported studies (Canter, 1969, Canter & Wools, 1970) in which he was

able to establish some relation between such specifiable parameters as ceiling angle and window shape and ratings of room friendliness, very few other such studies have been reported.

Therefore, the "real" world, the left half of Brunswick's model, is not certainly represented by any set of attributes, nor are relatively specifiable correlates such as window size well-established as attribute-related.

Expert judgments might be considered as adequate representations of reality by some psychologists, assuming they have reasonable reliability. Yet one of the more established findings in architectural perception is that experts and laymen see architecture differently. Appleyard (1969) has looked into the problem of the separation of planner and user in the instance of Ciudad Guyana. This project was organized to build a large, instant South American city- somewhat reminiscent of the more famous example of Brasilia. A group of planners from various developed countries were imported. The local government officials and the planners, who together built the city, shared much more in social, educational and living standard terms than either did with the inhabitants of the city. The planners tend to look at the overall, future picture- Ciudad Guyana as it will be. The inhabitants tend to see the present status of the area. Where the planners see on a broad scale, the inhabitants see on the immediate, functional, smaller scale. Planners' visions were induced by their fast modes of transport, quality living arrangements during construction, blueprints and objective data. The inhabitants move slowly, live in muddy streets and use subjective

impressions for data. Thus, two conflicting pictures of Ciudad Guyana existed side by side: the glittering, planned metropolis of tomorrow and the muddy-streeted construction shacks of the day. No doubt such differences are common to most in-progress construction sites. If the inhabitants happen not to be future-oriented, there may be serious problems between planners and future users.

The user-planner relationship could be improved, in part, by co-ordinating their visions. In order to co-ordinate their visions, dialog is necessary. And in order for them to communicate across barriers of training, difficulties of arranging meetings, and vocabulary, a language common to them both must be developed.

The Kasmar-Hershberger project has been oriented toward this goal, at least in part. If a clear, complete and mutually comprehensible set of descriptors applicable to a reasonable range of buildings could be found, then a beginning toward user-architect dialog is achieved. Surveys of user reaction to similar existing structures, to models or other simulations could be gathered and input to the design process- although such surveys are merely a part of what should be done toward communication. Surveys are the easiest method of mass communication, but not the only or the best method. But even this elementary step is only occasionally taken by the architect and commissioners of public buildings. From a user's point of view, the planners are like cuckoos who lay their eggs and abandon them (Wools, 1970). There should be more of what Collins (1974) has called "autopsies" of buildings-post-construction assessment- which could assist future planners greatly.

Since users and experts see buildings differently, and expert opinion is, for the moment, being taken as correct, discrepancies between the two groups may tend to be seen as equal to the layman's lack of perceptual skill, experience or even aesthetic taste. But does the expert have any greater claim to accuracy in this matter? He may design it, but the user must spend a great deal of time in it. It may be argued that the expert has even less claim to the truth of the building's value; certainly the user has a substantial claim.

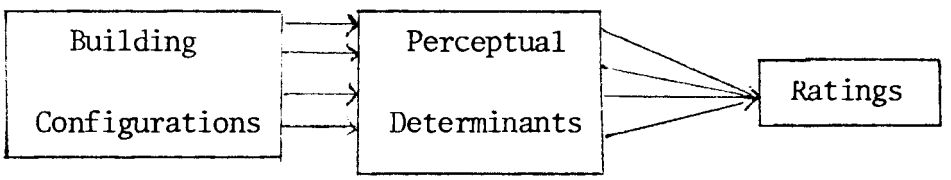
Of course, ratings of laymen and experts may be compared without reference to correctness. This is, in fact, one purpose of the present study. But the position taken here is that in the case of architecture at least, expert opinion does not really have a greater claim to the representation of how beautiful or useful or well-lit a building "really" is. Therefore, taking this factor together with those mentioned earlier, the left half of the Lens Model is just not possible to construct in the context of environmental perception at present.

The expert-laymen problem, incidentally, is a many-sided problem. As Wools (1970) points out, the modern architect tends to work for a client who does not actually use the building, but who is, by political or professional right, the spokesman for the actual (future) user population. In the absence of user input, the architect must guess or impose his will on the building or he may design it with the wishes of the political or professional client before him; rarely has a large building been built after consultation with actual users-to-be. A case could be built that this distance forms part of the explanation for

common dissatisfaction with urban renewal, architecture and for alienation in general.

If and when further research clarifies abstract architectural qualities in terms of measurable properties, the left half of Brunswick's model may be approachable. Even then, the stimulus-stimulus information point made by Gibson may be a serious barrier; perhaps this point is precisely why such clarification cannot occur. All observers will not agree what information is emanating from the building. Possibly, the left half of the Lens Model is a practical impossibility.

For the present, there is enough to learn about the right side of the model. In that model, the three basic elements are the information, the impression formation and the verbal report. The psychologist is most drawn to the processing portion, although information and ratings also are intriguing. The following elaboration of the model will concentrate on the nature of the determinants of impression formation. Building configurations per se are not important to the conclusions of this study, and various problems with architectural rating scales will be handled in Chapter 3. Meanwhile the rudimentary model, as developed so far for the purposes of the present study, is as follows:



Taxonomic elements of the proposed model

What comprises the perceptual determinants section of this model? They are factors which, in statistical terms, contribute to explanation of inter-observer variance in ratings. A "complete" experiment or series of experiments would vary a rather large collection of such factors, while most studies can only vary some of them; the remainder are presumably the same for all subjects. Nevertheless, a speculative taxonomy might be possible which could handle all the known meta-determinants of perception.

Such a taxonomy might be constructed by simply employing names of disciplines traditionally claiming hegemonies over the usual spheres; physiological, social, psychological factors in perception. But a closer inspection yields the thought that a) these disciplines are not so exclusive as they used to seem and b) this kind of splitting-up has little to recommend it beyond the naming. A taxonomy must serve a useful purpose or it will be forgotten. The taxonomy needs, at an early stage, to be broad rather than narrow; it should risk over-inclusiveness rather than over-exclusiveness; it should not attempt much sophistication before it has been used for some time.

Given that few relevant taxonomic guidelines exist, it is advisable to begin with derivations of the most basic parameters known. Duration and location, the extensions of time and space, seem likely candidates. When we speak of a factor in perception, we can fairly well place it along these dimensions. It must not be forgotten these are continua rather than categories, though the variables will be classified

into categories in this study to emphasize their relative placement along the continua. Thus, duration has two extremes, Stable and Transitory. Location may range from Personal to External. Any given variable may be placed along these two continua and may be classed, depending on experimental purposes, into one of the four categories Personal Stable, Personal Transitory, External Stable and External Transitory.

Let us examine some potential variables and attempt to classify them. Stable Personal factors would include ones supposed to be durable individual characteristics, where durable is a flexible term meaning "stays the same at least for the projected period the experiment relates to". Such factors would include personality, experience and sex. Personality is indexed by scores on reliable, established tests. Experience is indexed by education, cultural background and, in this study, familiarity with buildings. Experience can be measured very crudely (as by age) or more precisely (as by monitoring the exact length of time and type of activity or interaction a subject has with a target building), with many intermediate or supplementary variations. Gender has so often been related to individual differences that it must be considered a possibility as a Stable Personal factor of value in architectural perception. Another Stable Personal factor, representative of a number of them which are not often salient in experiments, would be perceptual ability.

Stable Personal factors blend, to the extent that time is continuous, with Transitory Personal factors. Mood, for example, is usually considered capricious. The final decision as to whether mood is stable or transitory would depend on the lability of the subject and the purpose of the experiment. If the experimenter wishes to assess or predict how someone will respond to a building over a substantial length

of time, mood must be considered a transitory factor; if fleeting impressions only are the topic, it might be considered a stable factor. Similarly, experience with the target building would be a stable factor in a one-time-only evaluation and a transitory factor in a continuing evaluation. The measurement of mood is difficult except by self-report; one can only hope to encourage accuracy by asking for the rating in a confidential way.

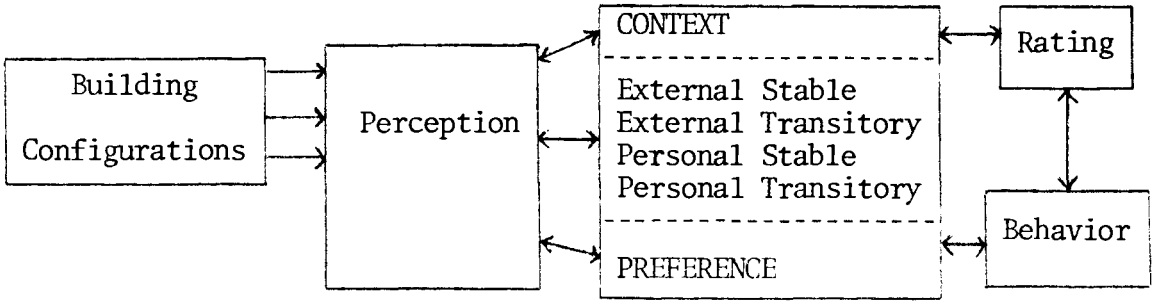
Most factors subsumed under the Stable External class are that portion of the perceptual equation so obvious as to be taken for granted. This has also meant that the factors have been under-represented in research. In broad terms, once again, these factors would include the culture in which the experiment is embedded, or the cultural difference between the building and the rater, and the climate of the district. Less important in normal studies, but sometimes of consequence for investigating the basic parameters of perception, are such things as gross similarities in buildings (all usually have floors, ceilings, roofs, etc.), upright perceiving rather than sideways or from a headstand, transparency of the atmosphere, and other aspects of the framework of perception. The stimulus itself falls into this class.

The typical variables of a situational analysis form the core of Transitory External factors. Weather conditions, including temperature, amount of sunshine and precipitation may reasonably be suspected of influencing a subject's viewpoint. Many other factors may be included depending on the investigator's aplomb or foolhardiness, as well as his familiarity with the fringes of the psychological literature. It is in

this sector that the experimentalist will experience his strongest urge to control variance, while the correlationist will delight in the possibilities of letting the situation contribute to the study, albeit under a watchful eye. Transitory External factors should include that scourge of experimental psychology known generally as demand characteristics. Much evidence supports the thesis that experimenter-subject relations and subject expectations can alter results.

Before the model receives its final elaboration, a comment is necessary about the inter-relations among the four classes of variables just elucidated. At first, one might tend to treat these factors separately, as independent predictors of architectural ratings. But, in the same way that information is configured rather than cued, response to information is probably multiply determined rather than by any one variable. In this study, it is not difficult to imagine that impression formation and rating behavior might be influenced by representative variables of more than one of the four factors. Further, this multiple relationship may be characterized by several variables simultaneously but independently affecting behavior or by the several variables interacting to affect behavior. Much recent attention has been given to relative proportions of variance explained by independent and interacting factors (e.g. Bowers, 1973, Mischel, 1973). There seems to be little doubt that both play important parts in behavior; exact proportions seem to depend on the type of behavior, variables employed and population sampled. However, standard forms of data analysis in the predictive situation (i.e. multiple regression) tend to favor independent variables

by giving them first opportunity to account for the variance, while interactions are forced by the nature of the procedure to deal only with the variance left over after the independent variables have accomplished what they can. Relatively simple experimental situations can be fairly examined for the contributions by the competing types of variables with analysis of variance techniques, but more complex situations are more suited to the biased regression method. However, in certain instances it may be possible to examine the utility of interactions in regression equations without the presence of the corresponding independent variables. Therefore, in the model which follows, the probability that interactions form a significant proportion of the structure should be borne in mind.



This model is meant to stress two facets of the process which may not be clear. One is the non-linear nature of it; reverse arrows indicate where feedback mechanisms of one sort or another may be expected. Also, the four broad factors of stability and location should be seen as affecting not only reactions to the building, but also the rating of them and, presumably, other behavior that occurs in them. The model, as presented, is a rudimentary representation of a very complex situation. It is hoped that further research can differentiate the crude boxes into accurate and useful constructs for behavioral prediction and understanding.

Purpose of the investigation

The essential purpose of this study is to investigate the utility of three of the four classes, Transitory Personal, Transitory External and Stable Personal in the perceptual equation for predicting ratings of typical public buildings. The Stable External class is not represented in this study. It is proposed that these classes might have demonstrable influence in the evaluation of architecture. In the event that some or all of the factors are important, it may be concluded that, within the limits of the sample of subjects and buildings, personal and situational factors play a role in the determination of architectural ratings.

In the event little relationship between these factors and ratings is found, that is, the null hypothesis is supported, the evidence would lead to the conclusion that determinants of building ratings are not to be found among personal and situational variables (unless the useful ones were excluded from the study) and the most likely source for the variation would be in the characteristics of the buildings themselves. Some recent studies seem to conclude this. For example, Peterson (1967) showed 140 subjects photographs of 23 residential settings in a U.S. city. The settings varied from the suburban mansion to the row tenement. Ratings of nine visual attributes, such as amount of greenery, open space, age of the dwelling, etc. were completed by each subject, who then indicated a preference for each setting. Peterson factored the visual attributes and used four factor scores to predict preference. Factors called physical quality (52%), harmony with nature (34%), quality of the

photography (2%) and "noise" (7%) accounted for 95% of the variance. Therefore, only 5% of the variance, or less, seems to be due to factors other than rated visual attributes.

In another study, Neumann (1969) studied preferences for beaches in the Chicago area. Individual differences received slight consideration: Neumann performed separate regression analyses for two groups, those who preferred scenic, natural beaches and those who preferred, populated, urban beaches. But for these groups, once again visual attributes seemed to account for nearly all the variance: in the scenic natural preference group, rated crowding and greenery (alone!) explained 98.8% of the variance, while in the urban populated preference group, sand quality and building attractiveness explained 93.7% of preference variance.

A similar study (Shafer et al., 1969) obtained preference rankings of 100 diverse U.S. landscape photographs by 250 Adirondack camper-subjects. Each photograph was then scrutinized by placing a clear plastic quarter-inch grid overlay on it. Each of the resulting 114 squares on a photograph was classified according to a number of visual attributes such as perimeter vs. interior, water vs. sky vs. land, greenery near vs. greenery far, etc. Each square was rated for its tone. Then sums were computed for total water, sky, vegetation, etc. This procedure yielded 46 variables.

Shafer et al. then factored the correlation matrix and used the highest loading variables and all first-order interactions to predict preferences. They found six significant predictors, and these explained 66% of the variance. This investigation, more meticulous (if not

obsessive!) than the others, yielded a lower estimate of preference variance explained by stimulus characteristics alone. It was similar to the others, however, in excluding personal and situational factors. The authors list weather in their conclusions as a variable they feel might warrant study. They also acknowledge the limitations of photographic stimuli.

Peterson does report in a subsequent paper (Peterson, Bishop & Fitzgerald, 1969) that among the 140 raters in his study, five groups could be found, using a hierarchical grouping technique, and these groups differed in residential stability and in "life objective".

The above studies are the only known investigations attempting multivariate prediction of environmental preference. All authors acknowledge the limitations of their methods, especially in photographically representing the target and excluding non-visual attributes and external conditions. They find various personal measures to be relevant but do not include them in their models. An improved simulation of the achitectural judgment process requires examination of these variables.

Chapter 3: Pilot Studies

While some multivariate evidence (Peterson, 1967, Shafer et al., 1969) seems to indicate that environmental perception is essentially predictable from stimulus characteristics, a number of other studies reviewed in Chapter 1 found that perception of places was correlated with a variety of extra-architectural variables. It would seem common sense that opinions of buildings would be much more uniform if the only influences were the physical structures themselves. That people create diverse living and working places itself suggests variation in perception of and preference for architectural forms; not only economics, but culture, climate, regulations and personality play a part. In addition, Peterson and Shafer themselves acknowledge their limitations in excluding these influences. In terms of the model developed in the last chapter, those who limit their predictors to physical building characteristics tap only part of one class, the External Stable, which includes not only the stimulus but certain aspects of the basic "framework" of perception.

The pilot studies have the basic purpose of assessing the predictability of building judgments by personal and situational information. The information to be used is not exhaustive, but rather based on previously reported relationships in usually univariate studies and some speculation about the relevance of a few measures which might, in general, monitor a rater's environmental orientations. These studies take a few items from three of the four classes (Personal Stable, Personal Transitory and External Transitory) and neglect many others, as well as a whole class

(External Stable). Yet if these preliminary studies reveal some relationships of note between non-building factors and building judgments, more extensive research can be productive.

METHOD

A number of limitations of earlier studies prompted the design of this study. The too-frequent use of photographs is one. Pictorial representation is not true to the environmental display in question for obvious reasons: it is static and purely visual. Tactile, auditory, kinesthetic and olfactory sensations are not directly available. It might be true these senses have nothing to do with ratings, but this has not been demonstrated. Pictures are always selective with respect to the display, forcing raters to see what the photographer saw. The general art of photographic reproduction (processing, printing, etc.) also imposes itself between the rater and the environment. Early in the planning of the present study it was decided that whatever advantage photography has in uniformity of stimulus presentation and economy is heavily outweighed by these disadvantages.

Earlier studies concentrated on ratings of preference. In part this was because the authors looked at a series of displays of the same functional class, i.e. houses, beaches or landscapes. In this study, the emphasis is on public architecture, with less restriction on functional types of buildings. Preference in a series of unrelated functional types has little meaning.

Beyond that, however, is simple preference not limited as a rating? Preference is a complex summing-up and evaluation of display configurations. It is relative to the alternatives offered and dependent, we may surmise, on individually different weightings of more elementary qualities (such as heating, lighting and perceived beauty). Especially in the early stages, of this research area prudence would seem to dictate the choice of multiple attributes, each one closer to singularity of concept, rather than the relative and diffuse "preference". Further, if a rater is asked, rather point-blank, his preferences among a series of displays, his response is apt to be more arbitrary and unreliable than if (s)he were somehow more prepared for the rating. Preparedness can come through experience in the setting and through a gradual leading-up to the preference rating. The latter might be accomplished by asking for several ratings of more specific attributes.

The pilot study sites chosen, Simon Fraser University's Mall and Registrar's Office, seemed like diverse and complementary public places. They do represent unusual architecture, in that SFU's design has won a number of awards in architectural competitions. Photographs of these buildings, as seen by the raters, are in Figures 1 and 2.

The subjects were university students, groups taken from tutorials. The choice of subjects was not purely for convenience; it was planned to obtain a sample with a range of experience with the targets. 60 students served as judges in the first study.

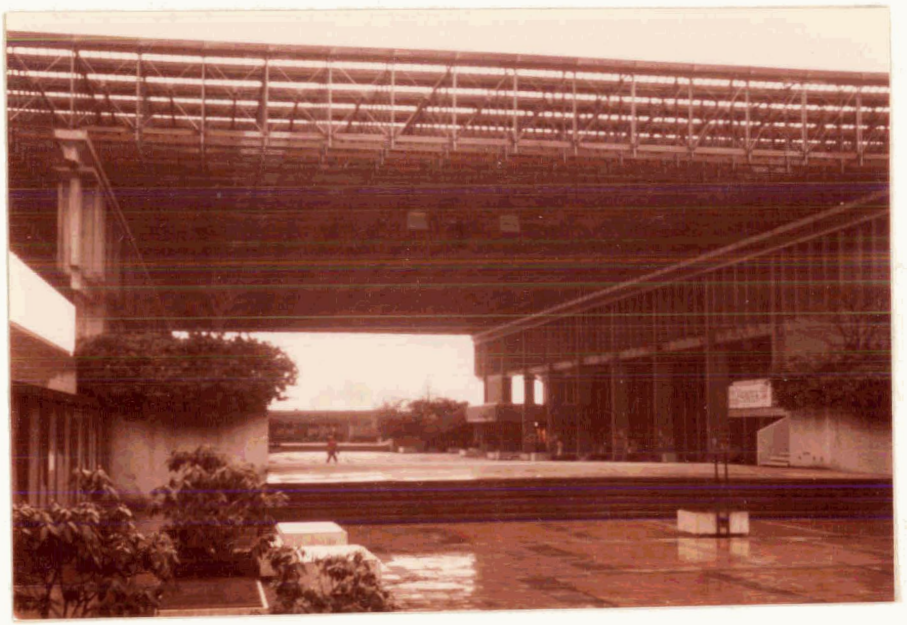


Figure 1: The Mall

Figure 2: The Office

The procedure involved the author taking tutorial groups (n = 8 to 15) first to the Mall and then to the Office, after introducing the experiment as "a study of how people experience the buildings and design of Simon Fraser University". The raters were told to perceive the place carefully for at least a few moments before beginning the ratings. They were always shown the places from the same vantage point. After the rating period they were asked to fill out a questionnaire and a personality inventory (see Appendix for these forms.) During the rating period, the author made covert weather ratings.

The most likely candidate for a series of building ratings was the Hershberger-Cass Base Set, of architectural descriptors which is specifically designed to be comprehensive. A considerable amount of item pooling, factor analysis, common sense and discussion has gone into this project, begun by Kasmar (1965). The Base Set (Cass & Hershberger, 1973) comprises the latest development in the search for a complete set of semantic scales for the descriptive assessment of building attributes. The Base Set consists of a primary and alternate bipolar scale for each of ten hypothesized factors in building semantic space, plus nine secondary scales known to be of some value but not presently related to the ten main factors. The ten factors are General Evaluative, Utility Evaluative, Aesthetic Evaluative, Activity, Space, Potency, Tidiness, Organization, Temperature and Lighting. In the first pilot study, one scale for each standard Base Set factor was chosen, and six secondary scales were chosen. The seven-point scales, as administered, may be seen in the Appendix. Table 1 shows how they represent Base Set factors.

The choices of predictor or independent variables to represent the four hypothesized classes of personal and situational factors was primarily guided by earlier univariate and multivariate research. The sense of the choices was that of "rounding up" variables previously shown, in one site or sample or another, to be related to differences in environmental perception, for a co-ordinated effort of prediction. Thus, measures of age, sex, education or experience and weather were selected.

Little guidance was available for the selection of some classes of factors. Personal Stable measures such as personality have little history in this area. In choosing Personal Stable measures, it was decided to use those which could be construed to have relevance for environmental studies. Another consideration was the reliablity of the measures; this meant a bias for the more established tests.

One might speculate at length on the utility of each of the thousands of measures of allegedly stable personal traits, and on the architectural preferences of each extreme type they represent. The claustrophobic clerk will not enjoy a closet-sized office; the acrophobe will not choose a desk near the window if (s)he works on the sixty-first floor. But very little specific research has been reported on building preference and personality.

For the first pilot study, two tests were chosen which seemed to meet the criteria required, the Eysenck Personality Inventory (Eysenck & Eysenck, 1963) and Rotter's (1966) scale of Internal-External Locus of Control. Both are established and relate to a person's way of conceptualizing or behaving toward the environment. The Neuroticism

Table 1

The Hershberger-Cass Base Set
as selected for Pilot Study 1

Factor Represented	Scale
General Evaluative	pleasing - annoying
Utility Evaluative	useful - useless
Aesthetic Evaluative	interesting - boring
Activity	complex - simple
Space	private - public
Potency	rugged - delicate
Tidiness	clean - dirty
Organization	ordered - chaotic
Temperature	hot - cold
Lighting	light - dark
	old - new[1]
	expensive - inexpensive
	exciting - calming
	colorful - subdued
	safe - dangerous
	quiet - noisy

[1]the last six scales represent no factor but are among those scales recommended by Cass and Hershberger (1973) "when in doubt".

scale was included for less valid reasons than the Extraversion scale: it comes along free. Rotter's scale was divided into Personal Ideology (items with personal pronouns) and Control Ideology (third person items) after recent research (e.g. Reid & Ware, 1973) indicated that separate factors are present, corresponding to personal experience and the experience of people in general.

In addition, two "measures" (questions) were invented for the first pilot study to more directly tap the "environmentality" dimension aimed for. They were phrased like Internal-External Control items (of the dummy type) and added to the Rotter scale. The first was: "Generally, I don't bother much with the surroundings, I'm more interested in myself and other people" vs. "For me, the setting is important and I pay quite a bit of attention to the surroundings". This item, termed Focus in subsequent discussion obviously attempts to distinguish interest orientation in a forced-choice manner. The other item read: "When I am not forced by circumstance one way or another, I prefer to rise early because I work better in the mornings" vs. "I'd rather sleep in when it's up to me, because I operate better late in the evening". This item attempts to tap diurnal activity preference in the event such a dimension is related to rating behavior (especially ratings done at different times of day), and is subsequently termed Diurnal. These measures and the method by which they were coded are in Table 2. Inspection of the measures shows that some classes from the model were more frequently represented than others. The External Stable dimension was not represented;

culture, normal upright vision, climate etc. were not specifically varied in these studies. Personal Transitory measures include experience and age. The remainder are Personal Stable variables. The whole test, as administered, is in the Appendix.

RESULTS OF THE FIRST PILOT STUDY

Basic Data: Building and Rater Characteristics, Rating Conditions

The individual differences in the raters and the rating conditions are shown in Table 2. The weather mean indicates "medium" weather for Burnaby. The actual range (see codes in Table 2) was from 1 to 7, out of 8 possible (for the worst weather). Two-thirds of the sample was between 17 and 30 years of age. They were less extraverted and less neurotic than Eysenck and Eysenck's (1963) standardization sample of university students. They were about the same on the Internal-External Control scale as another sample of 112 Greater Vancouver respondents (Collins, 1974). About half claimed to be "morning people" and half "evening people", with the same proportions reporting greater interest in self and friends as opposed to the setting.

The attribute profiles of the Mall and Office (see Figure 3) may be compared by the reader with their personal experience or the photographs. These descriptive ratings seem reasonable: the Office is rated as brighter, warmer, more useful, noisier and more annoying than the Mall. The two buildings are very close on such items as newness, expensiveness, safety, cleanliness and publicness. Numerical means for these judgments are given in the Appendix, Table 1.

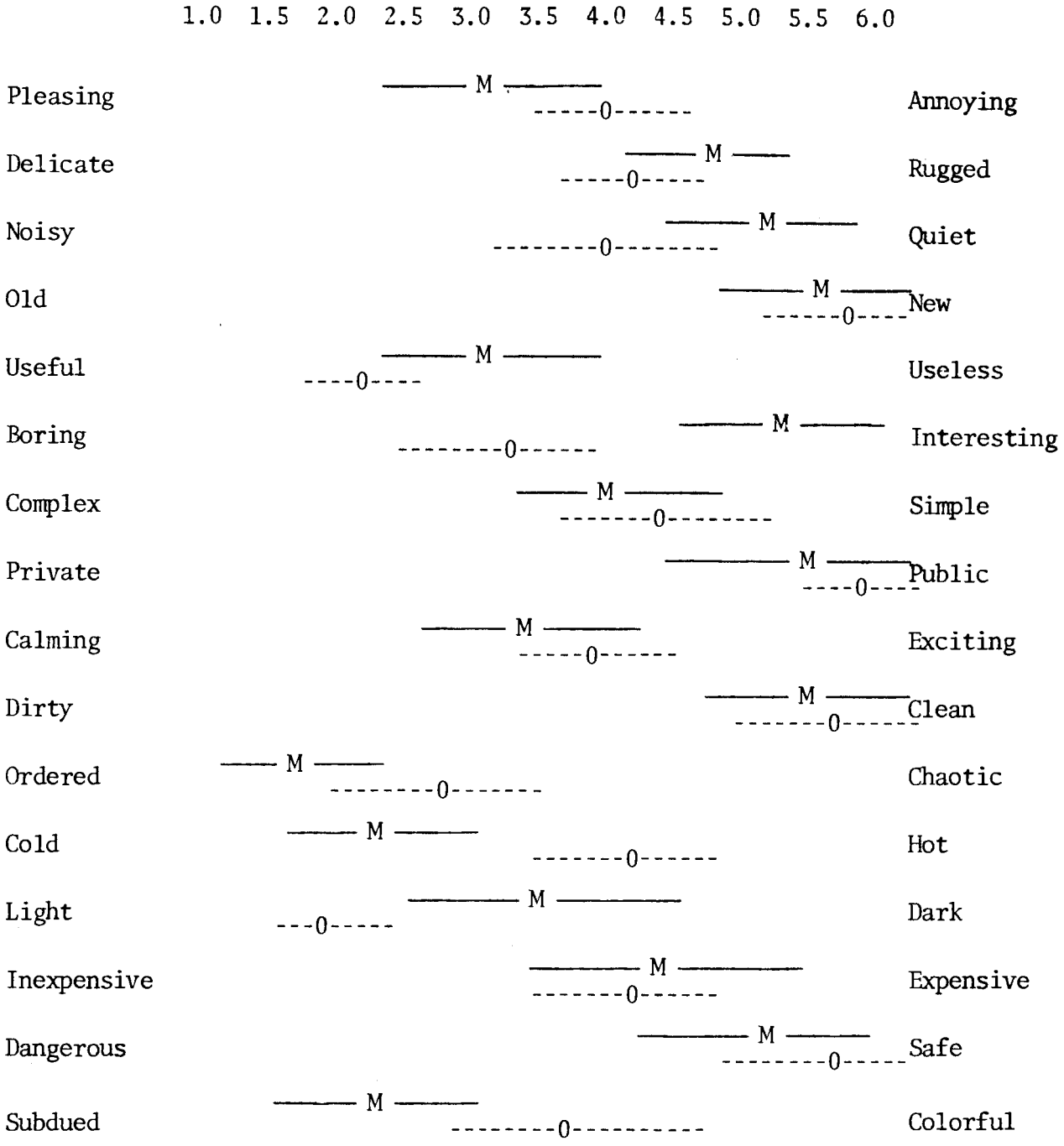
Table 2

Personal characteristics of the raters and situational characteristics in the descriptive-style pilot study

Variable	Class	Mean	Standard Deviation	Coding
Age	Personal Transitory	22.70	5.09	as given
Experience	Personal Transitory	1.63	.48	number of semesters at Simon Fraser University
Weather	External Transitory	4.12	2.14	0 = sunny, hot, dry, mistless, windless to 8 = cloudy, cold, wet, misty, windy
Extraversion	Personal Stable	11.98	3.68	0 = least extraverted to 24 = most extraverted
Neuroticism	Personal Stable	11.90	4.78	0 = least neurotic to 24 = most neurotic
Personal Ideology	Personal Stable	2.00	1.38	0 = least external to 6 = most external
Control Ideology	Personal Stable	8.78	3.17	0 = least external to 16 = most external
Focus	Personal Stable	1.57	.50	1 = self and friends or 2 = surroundings
Diurnal	Personal Stable	1.55	.50	1 = morning or 2 = evening
Sex	Personal Stable	1.63	.48	1 = male or 2 = female

Figure 3

Ratings of the Mall and the Office in Study 1



Analysing the Data: Correlation and Stepwise Multiple Regression

A stepwise multiple regression routine used the 10 independent variables to predict the dependent variables or building attribute ratings individually. The choice was made to include only predictors whose beta weights (raw regression weights standardized to compensate for differing scales) were significantly ($p < .05$) non-zero. Table 3 summarizes the results of these analyses. For the 32 judgments of building characteristics (2 buildings X 16 ratings), variance accounted for ranges from zero to 23%. Altogether, 12 of the 32 ratings were not significantly predictable by the present predictor set, and the mean of non-zero predicted variances is about 14%.

Some predictors appear more frequently than others overall, and to a certain extent, some predictors appear more often in one building than the other. Weather and sex were the most frequently appearing significant predictors, and age, diurnal, focus, experience or education and extraversion were occasionally significant. Personal Control worked better than Control Ideology, which is interesting in the light of Reid and Ware's findings that Internal-External Control scales contain two factors. Neuroticism was not important, which is understandable in the light of the insubstantial reasons for its inclusion.

So far no description of the specific ways the predictors are related to the individual attributes has been given. The reader may deduce these relationships by inspection of Table 2, the coding patterns of the variables, and the direction of the signs attached to predictors in Table 3. Some of the relationships found in this descriptive study

Table 3

Regression equations in the first pilot study (descriptive scales)

Item	Mall R^2 [1]	Mall Significant predictors ($p < .05$)	Office R^2	Office Significant predictors ($p < .05$)
Pleasing-Annoying	.229	Weather	.051	Focus
Delicate-Rugged	.080	Weather	.098	-Extravert
Noisy-Quiet	.188	Sex and -Diurnal		
Old-New	.098	-Weather		
Useful-Useless	.210	-Age, -Sex and Extravert		
Complex-Simple	.114	-Age		
Private-Public				
Dirty-Clean	.105	-Experience	.154	-Personal Control and Diurnal
Ordered-Chaotic			.132	Focus and -Weather
Cold-Hot			.153	Diurnal and -Experience
Light-Dark	.083	Weather	.179	Personal Control and -Sex
Inexpensive-Expensive	.101	-Weather	.181	-Sex and -Focus
Dangerous-Safe	.113	-Experience		
Boring-Interesting	.159	Age		
Calming-Exciting			.091	-Extravert
Subdued-Colorful	.116	Personal Control and -Sex		

[1] R^2 is "single shrunken" - an estimate of the population R^2 .

are as follows: good weather is associated with ratings of pleasing, delicate, new, light and expensive in the Mall (rather than the opposites of these attributes). Females rated the Mall as quiet, useful and subdued; the office as light and inexpensive. More experienced students rate the Mall as more dangerous and dirty while older students rate it as useless, simple and boring.

The independence of the predictors and the attributes should be mentioned. The predictor set was quite independent; for example it is even true that older students are not the same as experienced students (a slight negative correlation).

The attributes were not so independent, although the Hershberger-Cass Base Set contains bipolar descriptors representing ten allegedly orthogonal factors. In the Mall, for example, about half the intercorrelations among the judgments were significant.

DISCUSSION OF THE FIRST PILOT STUDY

This study was intended to be a testing ground on several counts. First, the predictors were drawn from diverse sources and their concerted efforts had no prior examination. Second, so far as is known, the Hershberger-Cass Base Set of descriptors had never been used as criteria in a predictive analysis. Third, in keeping with the Base Set format, bipolar Semantic Differential style format was used. However during the study several criticisms of the Base Set emerged. Before these and other considerations are discussed, it should be noted that one purpose of the pilot was fulfilled: building judgments are often significantly related to personal and situational variables. The results

may be improved by attention to the criticisms to follow, many of which are incorporated in the second pilot study and the main study.

A critique of the Hershberger-Cass Base Set

The limitations of and reasons for the consequent revision of the Base Set in the second pilot study should be examined. The first such limitation is the bipolar format. This is a holdover from Osgood which presents difficulties in prediction. Some of the scales have an implicit "good-bad" dimension which corresponds to the descriptors themselves, that is the extremes of the scale, while others have "good-good" extremes with a "bad" middle, while others have "bad-bad" extremes with "good" middles. One ends by trying to predict "ends" in some cases and "middles" in others, and the theoretcial issues are muddied.

Second, although one of the earliest goals of the architectural descriptors project was to develop clear and unambiguous scales, the Base Set is deficient in this respect. For example, the extremes of the scales sometimes do not really represent opposite ends of a continuum. Hershberger's Set is not so glaring as the scale used by one researcher- "blue-orange"- but one wonders if "rugged-delicate" are really opposites. More important, the Base Set seems to lose sight of what is being rated, the building or the inhabitants. "Friendly-hostile" is an example, and it could lead to confusion on the part of the rater in other, slightly ambiguous scales such as "tidy-messy", "formal-casual", "warm-cool" and "quiet-noisy". There is nothing wrong with rating people, but when the rating is not clearly one or the other misunderstandings can develop.

Another unclarity is in how the descriptor relates to a building. Adjectives chosen must be as unambiguous as possible. In this sense, what meaning does a scale like "ordered-chaotic" have? Does it refer to architecture or janitorial matters? Other examples are "active-passive", "rough-smooth" and "clear-ambiguous".

Third, the scales in the Base Set are very loosely anchored. In the case, for example, of "large-small", will the rater use it in context or absolutely? If he is rating a closet, will he call it "large-for-a-closet" or "small-for-a-building"? This is true of several Base Set scales, such as "old-new", "private-public", and "useful-useless". In some way it is necessary to be sure every subject is using the same metric.

For these reasons a number of changes were made in the scales for the second study, generally with the idea of improving clarity, anchoring and specificity. Bipolarity was discarded in favor of unipolarity. Unclear descriptors were discarded. Each of the seven categories of the scale would be labeled. Finally, the wordings would be chosen so that ratings were made on an evaluative basis rather than on an ambiguous or descriptive basis. That is, a rater would be asked whether the lighting was very deficient, deficient, or satisfactory rather than whether there was little or much light. Absolute amounts of some quantities can be measured by mechanical means; the psychologist and the designer are more interested in whether the user is satisfied with whatever quantity is present. Thus, a subject may rate, on a descriptive scale, heating as "very much". But he may, in fact, <u>like</u>

very much heating. But the investigator may interpret this rating as meaning that the rater feels there is too much heating.

The Hershberger-Cass Base Set remained the basis for the rating scales in pilot 2, but it was altered to take account of these criticisms. Sometimes this meant simply using half an old bipolar scale, as in "pleasing" for "pleasing-annoying". Other times a slightly more extensive change was made, as in "illumination" for "light-dark". Every scale does not lend itself to the evaluative revision. "Useful" and "pleasing" are not attributes for which the end-point "excessive" makes much sense. These scales require a different structure- like the old descriptive style. These scales were given end-points "not at all" to "very much". To avoid rater confusion, such scales were grouped together on the rating form and headed by special supplementary instructions on their use. Labelling every alternative choice should increase chances of the whole sample employing the same metric. Additionally, the scales were arranged in a specific-to-general order (i.e. Illumination and Ventilation early and Pleasing later) under the hypothesis that better, more considered general ratings would ensue due to increased attention to at least some of the many attributes of the buildings. Indeed, a number of subjects told the investigator after the experiment they never would have been able to think of "all those dimensions" had the scales not been provided.

The final change in procedure on the rating form for the second study was the addition of a "suggestion space" at the bottom of each page. This called for the subject to write in "any aspects of this place ignored by this set of scales".

The choice of predictors and their performance

In terms of theoretical class membership, Weather was the most successful variable and the only representative of the External Unstable class. It was most important in the open-air Mall situation, where a correlation between better weather and ratings of "pleasing" accounted for 23% of the variance. It was decided to expand this variable in future work by splitting it into component variables and to let the subjects rate the weather to reduce bias due to experimenter ratings of the weather.

The Personal Unstable class was represented by Age and Experience. These two predictors performed moderately well, although the predictive validity of Age was restricted to the Mall. Therefore it was decided to continue with these two and to expand the Personal Unstable class. This expansion amounted to the addition of a self-rated mood variable, since much discussion has centered on the effect of mood on ratings.

The Personal Stable class variables ranged in predictive quality from very good (Sex) downward. Personal Ideology (PI) appeared several times but Control Ideology (CI) failed to appear even once. Since PI is also a more compact set of items, it was decided to drop CI and continue only with PI in the future. Extraversion and Neuroticism performed mildly and not at all, respectively. It was decided to continue with these variables (especially the former) because of their important position in psychology, but to change from form A of Eysenck's test to form B.

The invented variables Diurnal and Focus performed moderately. Since their inclusion in a questionnaire is economical, they were to be continued.

SECOND PILOT STUDY

A second pilot study was conducted to examine the effect of revisions in the predictor set and criterion judgments. The method, procedure and sites were the same as in the first study. A similar but different group of 58 university students served as judges. The general format of the scales and post-rating biographical and personality questionnaire was the same. This package as administered may be seen in the Appendix.

Specific changes in the predictor set included the aforementioned splitting of the weather variable into its components (sun, wind, rain, temperature and ground wetness), the addition of a self-report mood variable to bolster the Personal Transitory class and a rater estimate of the weather. Form B of Eysenck's Extraversion scale was substituted for Form A. The mood scale used a presumably less-threatening form in which verbal report is replaced by smiling to frowning faces. Some of the less valuable predictors from the first study were dropped, and the resulting size of the predictor set in the second study was 12 instead of 10. Table 4 contains these variables and the characteristics of the judges.

Changes in the judgments to evaluative style, with rewording and selection for clarity and increased category labelling, have been explained. The form used is in the Appendix.

Table 4

Personal characteristics of the raters and situational characteristics in the evaluative-style pilot study

Variable	Class	Mean	Standard deviation	Coding
Age	Personal Transitory	24.10	7.92	as reported
Mood	Personal Transitory	5.14	1.31	1 = saddest face to 5 = happiest face
Experience	Personal Transitory	2.28	1.31	semesters at S.F.U.
Sex	Personal Stable	1.71	.46	1 = male 2 = female
Extraversion	Personal Stable	13.81	3.28	0 = least extraverted 24 = most extraverted
Neuroticism	Personal Stable	13.24	4.50	0 = least neurotic 24 = most neurotic
Weather:	External Transitory			
Estimate		3.26	1.14	1 = terrible to 5 = beautiful
Sun		1.28	.96	0 = sunny to 2 = cloudy
Temperature		1.12	.33	0 = hot to 2 = cold
Wind		.14	.34	0 = none or 1 = some
Precipitation		.10	.30	0 = none or 1 = some
Ground Wetness		.34	.48	0 = dry or 1 = wet

The essential purpose of this study was to determine whether these changes resulted in better predictability of judgments of buildings.

RESULTS OF SECOND PILOT STUDY

Analysis of the data was similar to that in the first study. Figure 4 presents the graphic summary of how the Mall and Office were rated. The numerical means may be found in the Appendix. Table 5 gives the significant predictor-judgment relations.

The judgments have a certain reliability between studies. On the scales which are most similar in structure to scales in the first study (useful, pleasing, boring, exciting and safe), the same Mall-Office ordering is found.

The mean predictability of the judgments did increase, from about 14% to about 19%. The proportion of predictable judgments was about the same. There was a strong tendency for equivalent judgments to be or not to be predictable in both studies. The maximum variance explained rose from 23% to 38%. Happily, the several scales which recorded high predictability were those which had been revised, reworded for clarity, or added: witness Size, Illumination and Ventilation in the Mall, all of which were more than 30% explained by the predictors.

The direction of the predictor variables may, as in the first study, be deduced from the tables for any particular instance. A sample of these relationships is: sunnier skies leads to ratings of more friendliness, uniqueness and cleanliness in the Mall, while youth in the judge leads to ratings of deficient size, design complexity, modernness and cleanliness in the Mall. High scorers on extraversion and neuroticism rated the Mall as too quiet and too modern.

Figure 4

Ratings of the Mall and the Office in Study 2

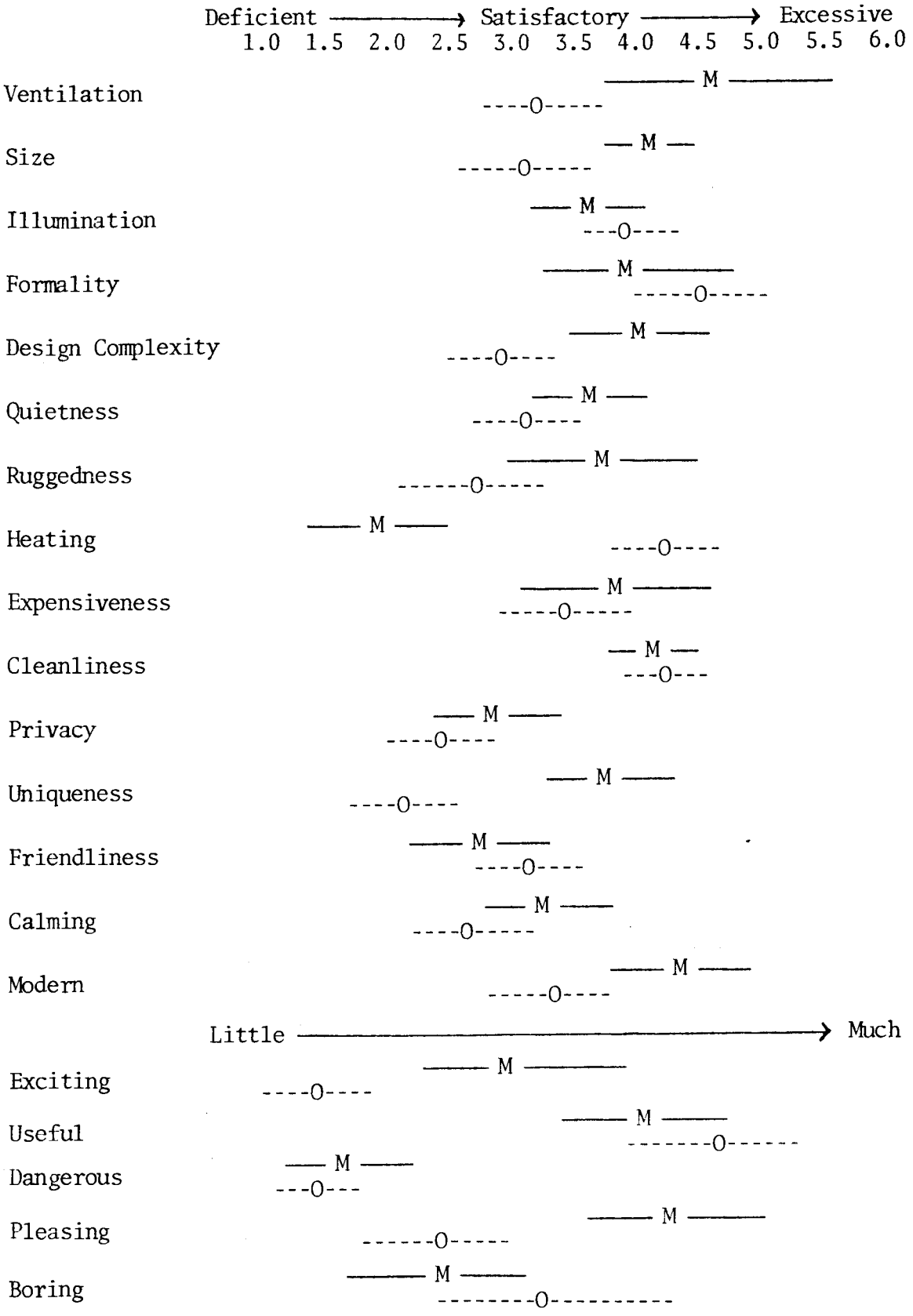


Table 5

Regression equations in the second pilot study (evaluative scales)

Attribute	Mall R^2	Mall Significant predictors ($p < .05$)	Office R^2	Office Significant predictors ($p < .05$)
Ventilation	.318[1]	Mood, -Sun	.226	-Experience, -Temperature, -Sun
Size	.371	-Age, -Sex, -Extraversion	.245	-Temperature
Illumination	.376	-Age, -Sex		
Formality	.053	-Precipitation	.149	-Sun and Ground
Complexity of Design	.135	-Age and Neuroticism	.245	-Sun, -Temperature, -Wind, -Precipitation
Quietness	.094	Extraversion and Neuroticism		
Ruggedness				
Heating				
Expensiveness			.065	-Experience
Cleanliness	.315	-Age, -Sun, -Weather Estimate	.146	Ground
Privacy			.116	Sex and Mood
Uniqueness	.101	-Sun, -Wind		
Friendliness	.192	-Sex, -Sun, and Precipitation		
Calming				
Modern	.186	-Age, Extraversion and Neuroticism		
Exciting			.138	-Experience, -Weather Estimate, -Sun
Useful			.084	-Age
Dangerous	.070	-Weather Estimate	.056	-Weather Estimate
Pleasing	.168	Ground and Extraversion	.133	-Age and Mood, -Weather Estimate
Boring	.090	Sun		

[1] "single shrunken" estimate of R^2.

The most valuable predictors once again came from the weather (External Transitory), which collectively accounted for about half the total number of significant predictors. Sex was again important, and age was even more frequently significant. Extraversion and neuroticism also made a fair showing of several significant predictions of judgments, as did the mood scale and the experience measure.

DISCUSSION OF SECOND PILOT STUDY

The basic goal of the second study, to increase predictability, seems met. Certain reliabilities in the way the buildings were judged and which judgments were predictable were found.

Therefore, the better predictors from these two studies should be combined in a larger study with the slightly more predictable and clearly defined scales which have emerged, to estimate their generality to a somewhat larger population.

Some attention will be given to the issue of descriptive and evaluative scales based on the experience of the two pilot studies.

Descriptive and evaluative ratings: Study 1 vs. Study 2

It is useful to compare descriptive- and evaluative-style scales for the same attribute. In the case of heating, for example, no apparent difference is found in descriptive and evaluative style formats. In the first pilot, the Mall's mean rating is "quite" cold while the Office is between "equal" and "somewhat" hot. In the second, evaluative study, the Mall is rated "deficient" in heating and the Office is rated just above "quite satisfactory" (toward too much). A similar situation obtains for the mean ratings of privacy- both buildings are seen as "quite" public in Study 1 and as "deficient" in privacy in Study 2.

But other attribute ratings begin to suggest that descriptive and evaluative styles do elicit different kinds of responses. In each of the following examples the two buildings are ordered the same way and approximately equal magnitudes of scale units separate them in the two studies. But the ratings are not in the same positions along the scales in the two studies. In the ratings of cleanliness, modernness, expensiveness, quietness and brightness both buildings were rated fairly or very strongly in the direction indicated (i.e. clean, modern, etc.). But on the evaluative-style scale these attributes were not toward the seemingly indicated end-point (excessively clean, modern, etc.) but rather they fell near the middle of the scales, that is, "quite satisfactory". That is, students prefer very clean, modern, well-lit, quiet, expensive buildings. However, had we handed only the ratings of the descriptive study to a designer, he may have interpreted the "very" ratings to mean the students thought the buildings "too" much on these attributes.

Another example of the differences and possible confusion that might have followed is in ratings of calming and exciting. Both buildings were seen as about equally calming and exciting on the bipolar scale of study 1. In study 2 they were rated as "deficiently" calming- apparently the Mall and the Office are no more exciting than calming, but that isn't calming enough.

Returning to the ratings of heating and privacy, it now seems less likely that descriptive and evaluative styles really elicit the same response and more likely that these attributes were just special cases in which "little" or "much" happened to be also "deficient" or "excessive".

In this framework, the two styles are hypothesized to be entirely independent in terms of response elicited- any similarity is coincidental. It is valuable to note one basic phenomenon here- that the two styles do not seem to be confused in any way by university students at least and that the intended metrics seemed to be used.

Chapter 4: The Main Study

The pilot studies just reported provided important information on the value of various independent variables and on the improvement of the judgment scales. This information will now be used in a large scale study of several typical buildings. The purpose of the main study is to assess the relationships between certain non-architectural factors and judgments of architecture which are based on realistic experiencing of the buildings. Such assessments have not previously been made, and earlier work has consisted largely of speculation and anecdotal evidence.

The mutual influence of human behavior and buildings has been recognized for a long time. To select just one famous example from the anecdotal literature, we may cite Churchill's position on the rebuilding of the English Parliament buildings after World War II. He felt that the buildings should be constructed exactly as they had been before the bombing, rather than re-designed, despite opinions by others that the building was deficient in many ways, particularly for communication. But Churchill got his way based on his argument that the "world's greatest democracy" had been developed in the old buildings and to change them might somehow change the style of conduct of Members of Parliament and lead to a deterioration of quality British government.

Belief in the efficacy of building design on behavior has led to extensive speculation on the laws of the relationship. Whole arts, from interior decoration to architecture, have been developed from these speculations. A great and diverse amount of opinion and argument have been advanced for all types of buildings, homes, offices, vehicles and

institutions. It is still largely a literature of speculation, albeit often well-considered speculation, rather than an empirical literature. What empiricism is found in the field is loose, if lucid, descriptive flight by a lay or trained observer, after the building has been constructed. By then it is too late, and if we are to believe the cognitive dissonance theorists, acceptable even when it isn't really acceptable, at least to those who have a financial or artistic stake in the edifice. The users are often heard complaining, but usually only to their office-mate. Like some other professionals, architects have "ethics" against criticism of colleagues' work.

When comment comes from senior levels, it is often ignorant of what research has been accomplished. The psychiatrist Moller (1968) wrote a whole monograph on mental health and architectural environment without a single reference to any empirical study. Moller cannot entirely be faulted; there was not much to report in 1968 along empirical lines, although some useful work existed. This is not to suggest that empirical research should wholly replace the artistic side of design, but merely to point out that at present so little else in the way of information is input, and carefully executed research can assist in the design process. Since 1968, it has become increasingly inexcusable to ignore the research literature. Bechtel (1967) for example suggested that personality variables might have an important part in preference for architectural designs. Accordingly, McKechnie (1970) created an MMPI-style personality inventory designed to assess environmental dispositions.

Another psychologist (Beck, 1967) studied the area of personal influences in spatial preferences. His work uses abstract symbols as stimuli, but it suggests hypotheses for architectural investigations. Beck had 611 subjects each make 67 preference choices between pairs of symbols. Factor analysis of these choices revealed developmental trends; only one factor accounted for children's choices, while 5 factors were needed to account for adult preferences (diffuse-dense, vertical-horizontal, right-left, etc.). Beck also found sex differences and differences related to occupation of the adults.

Findings like Beck's tend to reinforce the evidence of the pilot studies that architectural preferences might be age- and sex-linked. However, one suspects age as a variable. The mere passing of years, in and of itself, does not seem a likely explanatory concept; rather changes associated with the development of the individual seem plausible. Age probably indexes one or more of these shifts in responsibility, experience and physiology accompanying age. In the present study this led to the inclusion of several measures of experience and future effort must be directed toward finding specific age-linked factors associated with architectural preference and perception.

By now it is no secret that psychology in general and judgment theory in particular have underplayed the influence of the situation, at least in their experimental forays. Only recently has the primal psychophysical scene been broadened to include these factors previously thought extraneous or "erroneous" (Galanter, 1962). But even this broadening, so far, has its limitations. Bieri et al. (1966), for example, have made important contributions in the theory of clinical and social judgment.

Yet they contrast social perception with the perception of physical objects on the dimension of constancy. Their research includes hypotheses of non-constancy in the clinical realm; that is, patient perception is not constant, but dependent on a range of factors from the personality and training of the therapist to the demand characteristics of the situation. However, they then state, "In the perception of physical objects, as aspects of the setting or situation undergo change, we can observe perceptual constancies operating, 'resisting' as it were, the changes in situational factors that surround and embed the object".

The results of the first two studies herein, as well as others, show quite conclusively that constancy is not rigid even in buildings. To the extent constancy is applicable, for example one recognizes the library in any sort of weather, it is also applicable to persons- one recognizes the librarian in all sorts of weather too. Constancy is probably not more relevant to person perception than object perception. In the studies just reported, some building attributes were almost 40% associated with personal-situational factors.

The time has come to seriously begin relating non-stimulus variables to building preference. If there are crucial relationships, like those implied by Churchill's arguments, all the more reason for determining their shapes. If there are none, much effort has been wasted by planners, decorators and architects and attempts to design buildings for a client or a physical situation have been folly. Of course, preliminary results have strongly suggested that the observer and the situation <u>are</u> important. The main study draws together the

stronger relationships from the pilot studies to further the understanding of contextual effects on environmental perception.

Inevitably buildings contain huge amounts of information. It is therefore necessary to find ways of accurately summarizing this body of information for evaluative purposes. The summary must be as applicable as possible to any given building and also to the whole population of buildings. A delicate balance of specificity and generality is required. We may wince at the thought that subjects include different kinds of information in their evaluation of beauty, for example, but we are also comforted by the thought that at least there is a place for unusual or obscure building elements to be represented short of presenting the rater with a necessarily very extended list of building contents to rate.

This study consolidates earlier findings, again refines rating scales, extends rater and building sample sizes, improves data analysis and selects predictors to maximize the present knowledge of context-attribute relations.

METHOD

The method used for the main study represents an extension and revision of methods used in the pilot studies. Since every part of the method received critical attention, the method is here given in some detail.

Sites

The buildings (a hotel lobby, senior citizen's recreation center, library, fast-food restaurant, student union pub and a 12-passenger van) were chosen according to certain criteria. In the sense that each of them

may be entered by almost anyone in normal conditions, they are all public buildings. They are all public services or commercial in an economic sense. None of the buildings is very large or very renowned architecturally (with the possible exception of the restaurant, a member of the McDonald's chain), leading to the appelation "typical architecture". A study of famous landmarks would be a good companion-study to the present one. The van was chosen to complement the study with a common mobile interior.

The buildings had to be open in the evening, to accommodate a variable hypothesizing differential ratings at different times of the day. The buildings had to be located fairly proximally to keep the cost of transportation moderate; the greatest distance between buildings is about 10 kilometers and the least, less than 100 meters.

Within these strictures, a variety was sought in functional purpose, age, clientele and atmosphere.

Within each building a "room" was chosen as the specific target for the raters. A "room" is not the same as the usual conception of a room in this instance, because public building interiors do not always contain spaces enclosed neatly by four walls. A "room" was therefore defined as an area which may easily be perceptually scanned from a given point within the building. Sometimes the "room" was a fairly large open area of the building, on the ground floor. In the hotel it was the lobby, in the library the reading room, in the van, the pub and restaurant it was the whole interior and in the recreation center it was the sitting and games area. Photographs of the exterior and target interior of each building appear as Figures 5 - 10.

Figure 5: The hotel lobby

Figure 6: The senior citizen's recreation center

Figure 7: The library

Figure 8: The restaurant

Figure 9: The student pub

Figure 10: The van

Subjects

One of the most persistent problems in environmental perception has been the use of restricted samples. In this study some effort was directed toward securing a sample representative of a larger slice of the general population. The sample was quite diverse (see Table 7). There is an unfortunate under-representation of people from about 30 to 65 years of age. A less important exclusion is of children under 15; less important because, if Beck's results are generalizable to the present situation, children are markedly less cognitively complex. A separate study should be done with children. Although considerable effort was made to enlist middle-aged people at the university and at the target sites, only 6% of the sample fell in the 30-65 bracket. Ten percent were over 65 (one was 82 or 83), 13% were 25 to 30 years old, 40% were 20 to 25 and the remaining 31% were 15 to 20.

The problem of age indexing which has been mentioned earlier led to an attempt to split education and experience. In the earlier studies they were the same thing: number of semesters at Simon Fraser. In order to find people experienced with a given target building, the strategy called for recruitment at each place. This was accomplished mainly through the enlistment of the supervisor or manager, who in turn exhorted his workers or patrons to participate. This recruitment program meant that, to attract workers or patrons of different reluctance or busyness, different payment was given, from no fee to four dollars. This strategy was generally successful in obtaining a good range of building familiarity for each building- from those who worked there to those who had never

seen the interior of the building before. Some subjects came "from" one building or another and some came "from" none of them per se. There were marked differences among supervisors and managers in interest, and so some targets contributed more than others to the subject pool. One building, which gave an impression of fear and suspicion, harbored a manager who promised to "do what he could" and ended by forbidding his workers to participate after it was too late to change buildings. That building, a hotel, provided a good contrast in the data at least, as it seemed least liked by the raters as a whole.

Altogether, 116 subjects participated, in groups of four to eleven. They were distributed more equally between the sexes than before- 44% male, 56% female. The subjects had just over 13 years formal education and averaged 27.5 years of age (means). These and other characteristics of the raters and the rating conditions may be seen in Table 7, in the results section.

Rating Materials

The rating sheet retained its form, broadly speaking, from the pilot studies (see the Appendix for a copy). Unipolar evaluative scales were retained. The number of categories was reduced from 7 to 5 because too little difference had been apparent between "very much" and "extremely" in the 7-point scale.

The labeling of the categories was made even more specific than previously. The idea was twofold- to further ensure that all raters used the same metric and to clarify the intended dimension. For example, Usefulness might be interpreted variously if only the endpoints "little"

to "much" were used, so instead the scales were labeled "very clear design" to "very confusing". Each scale was therefore given category labels specific to its purpose, replacing the earlier method of trying to use a single set of labels for all scales. Instead of "deficient" to "excessive", for example, Space is labeled from "much too cramped" to "much too spread out".

As before, attributes were arranged in order of increasing generality. The more elementary attributes like Illumination and Temperature came first and the abstract ones like Aesthetics came later. The last rating is new: Overall Evaluation was included as a revision of Hershberger's General Evaluative factor, but also to obtain data as to which of the more specific items is most closely related to overall evaluation of these buildings.

Although some scales had been re-written, they were still meant to provide coverage of Hershberger's ten factors. The evolution of scales over the three studies has been due to a considerable number of thoughts, criticisms and realizations, which have been introduced at appropriate points. A summary of the transformations the scales have gone through is provided by Table 6. Hershberger continues to include the classic factors of the semantic differential literature, activity, potency and evaluation, despite indications that architectural perception does not reflect the same problem as the semantic differential. As Collins (1971) and Hershberger (1970) have shown, traditional semantic differential scales refer to sign-sign relationships, while environmental perception deals with sign-significate relations; that is, while the semantic differential assesses associations between cognitive concepts, environmental perception correlates

Table 6

The evolution of architectural attribute scales in the studies

Base Set factor title	Pilot 1 scale(s)	Pilot 2 scale(s)	Main Study Scale
General Evaluative	pleasing-annoying	pleasing[1]	overall evaluation (pleasing to disagreeable)
Utility Evaluative	useful-useless	useful[1], friendly[2]	formality (friendly to hostile)
Aesthetic Evaluative	interesting-boring	uniqueness[2], boring[1]	decor (bland to "loud")
Activity	complex-simple	design complexity[2]	usefulness (clear to vague design)
Space	private-public	privacy[2]	space (too spread to too cramped)
Potency	delicate-rugged	ruggedness[2]	quality of materials (too cheap to too rich)
Tidiness	clean-dirty	cleanliness[2]	cleanliness (too sterile to too dirty)
Organization	ordered-chaotic	formality[2]	usefulness (clear to vague design)
Temperature	cold-hot	heating[2]	temperature (too warm to too cool)
Lighting	light-dark	illumination[2]	illumination (too bright to too dim)

continued.....

Table 6 (continued)

The evolution of architectural attribute scales in the studies

Base Set Secondary Scales	Pilot 1 scale(s)	Pilot 2 scale(s)	Main Study scale
old-new	old-new	modern[2]	moderness (too old-fashioned to too modern)
expensive-inexpensive	expensive-inexpensive	expensiveness[2]	
exciting-calming	exciting-calming	exciting[1], calming[2]	
colorful-subdued	colorful-subdued		decor
safe-dangerous	safe-dangerous	dangerous[1]	
quiet-noisy	quiet-noisy	quietness[2]	sound (too quiet to too loud)
		ventilation[2]	ventilation (too stuffy to too drafty)
		size[2]	space
			air quality (bad to fine odors)
			aesthetics (beautiful to ugly)

[1] not at all to extremely

[2] very deficient to very excessive

concepts with real objects. Beyond that, the evidence strongly indicates more than three factors are necessary to encompass building attributes. Therefore it may be time to rename the Base Set factors and stop clinging to traditional Osgoodian names like potency and activity, which are questionably relevant to buildings.

The fourteen judgments chosen for this study include 7 of the 9 "secondary scales" in the Base Set, or their equivalents if re-written. The only Base Set scales excluded then are calming-exciting, which has been identified as probably a multidimensional item, and safe-dangerous. In addition to this coverage of the Base Set and the secondary scales, certain qualities are covered by new scales suggested by response to the pilot studies call for "attributes not covered by this set of descriptors" or the author's reflections. Thus, Air Quality, Decor and Overall Evaluation do not represent Base Set factors but were included because they seemed to complete the existing set.

In sum, the scales used are still based on the Hershberger-Cass Base Set of factors repeatedly found in previous studies, but they appear here refined to maximize the original goals of scale development in the area of architectural perception: clarity, completeness and economy. They were not chosen for their predictability, except as their increased clarity might cause less confusion among raters, thereby generating more reliable ratings. It was thought better to choose a good set of attributes and then to try to find useful predictors, rather than to have predictable attributes and then wonder how relevant or complete the set was.

Personal and Situational Data

In this area good past prediction was related to the selection of items. The most useful variables from the pilot studies were combined herein, as well as a few new items suggested by the experience of the earlier studies. A sample of the forms on which this information about each rater was collected is in the Appendix.

This information included self-reports of weather and mood, sex, age and education, form B of Eysenck's Personality Inventory, items representing the personal ideology factor of Rotter's Internal-External Control test, which were administered interspersed with dummy items and morning-evening (Diurnal) and self-surroundings (Focus) preference measures.

Measures of residential stability and hometown size, found by Wood (1972) to be correlated with building preference, were included. Wood's study was not available to the author in time for the pilot studies. Two kinds of experience were measured: 1) with the target "room" and 2) with building planning, construction etc. in general. These variables relate to the speculation that age merely indexes some other aspect of a person's development. A count of the size of rating group and covert weather ratings were made by the tour guide. Finally, a measure of laterality was included. Cerebral lateralization has received wide recent attention. The general hypothesis is that the two hemispheres have different functions, and habitual "right" and "left" lookers have differential generalized cognitive patterns based on the activation of the respective cross-lateral hemisphere. To test whether lateralization was related to architectural perception, a procedure was borrowed from Bakan and Strayer (1973) which involves proverb interpretation. The test was made as the subject approached the author to turn in rating and personal

information forms at the end of the session. The proverbs used may be found in Bakan and Strayer's article.

Altogether, the three theoretical classes of predictors were represented more equitably than before, at least in number of variables. See Table 7, which shows the distribution of these variables into Personal-External and Stable-Transitory classes.

Procedure

Quite an organizational task was comprised by the design. 116 subjects had to visit 5 buildings spread over a 10 kilometer range, with a maximum rating group size of 11. The latter limit was due to the insurance regulations governing the 12-passenger van, a nearly new vehicle rented courtesy of the Psychology Department. Visits had to take place three times each day on occasions when subjects had an hour and a half to spare. The data collection period was limited to one week (later one more day was added) due to the limited funds available for renting the vehicle.

Therefore a compact schedule was drawn up, and 15 tours were organized by recruiting subjects for particular times. Some managers assisted by encouraging their workers or clients to participate at a certain time, so that the pick-up of subjects was possible at a minimum of locations. Despite efforts to fill tours, various factors contrived to separate potential judges and the experimenter. Three tours were cancelled for insufficient participation (n = 3 or less). The remainder of the tours averaged about eight raters. Since raters originating from any given target place may tend to be a homogeneous sample, tours were scheduled so that subjects from a given place performed ratings on different days and at different times of the day.

At the end of the week (in July 1974) 87 subjects had been run, but the design called for about 120. Therefore one day (in September) was devoted to three additional tours under the same procedures. This set of tours added 29 subjects. This spacing in time also helped secure some variance in the weather- but not the way one might imagine. There had been concern that July would yield uniformly bright sunny weather and no poor conditions would be available, but actually July was largely rainy. By good fortune, the September day was fine weather and the sample of weather obtained was better, if not so true to season.

When each group assembled, generally at the place it had been recruited, the driver explained the rating sheets, pointed out the instructions printed at the top of the page and answered questions. Subjects were told they were going to visit some buildings in Burnaby and that the purpose of the study was to "find out how different people perceive buildings".

The tour then began. Buildings were visited in as random an order as possible (given that mileage and time were a factor) for each tour. Once exception to this pattern was that raters usually rated their "own" building (if they came "from" one) last so that they could disembark afterward without further driving. The van was usually rated after several of the regular buildings had been visited, so that raters had had some experience using it.

RESULTS

Raters and rating conditions

The sample employed in this study, while not representative of the local population, is at least more diverse than earlier studies in this and probably other investigations. Since university student populations were usually sampled previously, it was anticipated that a wider sampling might well change and improve the reliability and validity of attribute-predictor relations.

The means, standard deviations, theoretical categories and coding for the body of personal and situation variables may be found in Table 7.

Judgments of the target sites

Table 8 and Figure 11 respectively contain the numerical and graphic characteristics of the six targets as they were rated by the subjects.

In this sample, some scales spread buildings out over a fairly wide range and others do not distinguish these buildings very much. More detailed attention to the relative contributions of buildings, predictors, judgments and interactions will be reported later. On Space, the targets are lumped together just below satisfactory. On Decor, they range from "too bland" (the van and the pub) to "too 'loud'" (the restaurant). Apparently, however, the consideration by raters of 13 characteristics of each building led to stronger or more extreme opinions on the Overall Evaluation scale, for it was the item with the widest range of means, and the buildings are quite evenly spaced along the spectrum. Inspection shows that Aesthetics and Overall Evaluation order the buildings very

Table 7

Personal and Situational Characteristics of the Sample in Main Study

Variable	Class	Coding	Mean	Standard Deviation
Age	Personal Transitory		27.55	16.48
Education	Personal Transitory	years of formal education	13.37	2.60
General Experience	Personal Transitory	1 - almost none 2 - a little 3 - considerable	1.33	.57
Mood	Personal Transitory	faces: 1 - frown to 5 - smile	3.73	.82
Stability	Personal Transitory	1 - under 3 months 2 - to 1 year 3 - to 3 years 4 - to 10 years 5 - more	2.74	1.43
Building Experience (Familiarity)	Personal Transitory	1 - never been inside 2 - been in 1 or 2 times 3 - been inside several times 4 - been in many times 5 - work here	see Table 8	see Table 8
Sex	Personal Stable	1 - male 2 - female	1.56	.50
Hometown Size	Personal Stable	1 - under 10,000 2 - to 100,000 3 - to 400,000 4 - more	2.73	1.13
Internal/External Control	Personal Stable	higher score (to 5) - more internal	2.91	1.32
Diurnal	Personal Stable	1 - morning activity preference 2 - evening activity preference	1.54	.50

. . . cont'd

Table 7
cont'd

Variable	Class	Coding	Mean	Standard Deviation
Focus	Personal Stable	1 - self-and-friends preference 2 - surroundings preference	1.67	.47
Extraversion	Personal Stable	higher score (to 24) - more extraverted	13.90	3.58
Neuroticism	Personal Stable	higher score (to 24) - more neurotic	13.02	4.55
[illegible] looker	Personal Stable	1 - left looker 2 - right looker	1.49	.50
Weather Estimate	External Transitory	1 - very beautiful 2 - fine 3 - fair 4 - poor 5 - terrible	3.04	1.29
Group Size	External Transitory	n - number on each tour	8.38	2.18
Time of Day	External Transitory	1 - 11 a.m. 5 - 3 p.m. 9 - 7 p.m.	5.38	3.16
Sunniness	External Transitory	1 - all cloud, very cold, raining, wet	1.60	.49
Temperature		2 - intermediate	2.43	.69
Rain		3 - sunny, warm	1.73	.82
Ground Wetness		no rain, dry	2.10	.62

Table 8

Attribute Profiles of Buildings in Study 3

The Hotel Lobby

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	2.70[1]	.61
Quality of Materials	cheap to rich	2.43	.62
Temperature	warm to cool	2.88	.55
Ventilation	stuffy to drafty	2.52	.75
Cleanliness	sterile to dirty	3.23	.57
Sound Quality	noisy to quiet	2.75	.58
Spaciousness	cramped to spread out	2.69	.65
Decor	bland to "loud"	3.06	.93
Modernness	modern to old-fashioned	3.28	.66
Formality	hostile to friendly	2.84	1.00
Air Quality	bad odors to fine smell	2.74	.58
Usefulness	clear design to confusing	3.16	.85
Aesthetics	ugly to beautiful	2.40	.79
Overall Evaluation	pleasing to disagreeable	3.35	.91
Familiarity	never been inside to work here	1.49	.80

The Senior Citizens' Recreation Centre

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	2.76[1]	.50
Quality of Materials	cheap to rich	3.03	.40
Temperature	warm to cool	2.74	.54
Ventilation	stuffy to drafty	2.48	.63
Cleanliness	sterile to dirty	2.77	.50
Sound Quality	noisy to quiet	3.01	.59
Spaciousness	cramped to spread out	2.89	.57
Decor	bland to "loud"	2.89	.52
Modernness	modern to old-fashioned	2.79	.50
Formality	hostile to friendly	3.84	1.01
Air Quality	bad odors to fine smell	2.90	.71
Usefulness	clear design to confusing	2.08	1.00
Aesthetics	ugly to beautiful	3.55	.70
Overall Evaluation	pleasing to disagreeable	1.99	.87
Familiarity	never been inside to work here	1.40	.96

. . . cont'd

Table 8
cont'd

The Restaurant

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	3.03[1]	.55
Quality of Materials	cheap to rich	2.60	.70
Temperature	warm to cool	3.67	.64
Ventilation	stuffy to drafty	3.39	.73
Cleanliness	sterile to dirty	3.22	.79
Sound Quality	noisy to quiet	2.40	.67
Spaciousness	cramped to spread out	2.63	.69
Decor	bland to "loud"	3.59	.86
Modernness	modern to old-fashioned	2.67	.65
Formality	hostile to friendly	3.24	1.08
Air Quality	bad odors to fine smell	2.99	.79
Usefulness	clear design to confusing	2.14	.90
Aesthetics	ugly to beautiful	2.64	.93
Overall Evaluation	pleasing to disagreeable	3.10	1.16
Familiarity	never been inside to work here	2.47	1.45

The Library

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	3.04[1]	.45
Quality of Materials	cheap to rich	2.78	.47
Temperature	warm to cool	3.00	.46
Ventilation	stuffy to drafty	2.87	.47
Cleanliness	sterile to dirty	2.94	.27
Sound Quality	noisy to quiet	2.55	.77
Spaciousness	cramped to spread out	2.74	.66
Decor	bland to "loud"	2.84	.63
Modernness	modern to old-fashioned	3.00	.44
Formality	hostile to friendly	3.51	.99
Air Quality	bad odors to fine smell	3.14	.50
Usefulness	clear design to confusing	2.30	.98
Aesthetics	ugly to beautiful	3.15	.70
Overall Evaluation	pleasing to disagreeable	2.34	.95
Familiarity	never been inside to work here	1.98	1.26

. . . cont'd

Table 8
cont'd

The Student Society Pub

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	3.03[1]	.62
Quality of Materials	cheap to rich	2.72	.51
Temperature	warm to cool	3.09	.70
Ventilation	stuffy to drafty	2.88	.73
Cleanliness	sterile to dirty	3.28	.67
Sound Quality	noisy to quiet	2.63	.67
Spaciousness	cramped to spread out	2.65	.76
Decor	bland to "loud"	2.34	.73
Modernness	modern to old-fashioned	2.81	.62
Formality	hostile to friendly	3.42	.97
Air Quality	bad odors to fine smell	2.97	.57
Usefulness	clear design to confusing	2.79	1.10
Aesthetics	ugly to beautiful	2.71	.65
Overall Evaluation	pleasing to disagreeable	2.85	.89
Familiarity	never been inside to work here	2.50	1.45

The Van

Attribute	Range	Mean	Standard Deviation
Illumination	dim to bright	2.95[1]	.42
Quality of Materials	cheap to rich	2.65	.61
Temperature	warm to cool	2.62	.82
Ventilation	stuffy to drafty	2.59	.71
Cleanliness	sterile to dirty	2.91	.56
Sound Quality	noisy to quiet	2.08	.89
Spaciousness	cramped to spread out	2.74	.64
Decor	bland to "loud"	2.43	.74
Modernness	modern to old-fashioned	2.81	.55
Formality	hostile to friendly	3.14	.96
Air Quality	bad odors to fine smell	2.92	.63
Usefulness	clear design to confusing	1.99	.85
Aesthetics	ugly to beaufiful	2.77	.67
Overall Evaluation	pleasing to disagreeable	2.69	.84
Familiarity	never been inside to work here	--	--

Figure 11

Mean Rating of the Main Study Buildings

Attribute Title	Left-Half Extreme Label 1	2	Satisfactory 3	4	Right-Half Extreme Label 5
Illumination	Too Dim		H S V R P L		Too Bright
Quality of Materials	Too Cheap		H V P L S		Too Rich
Temperature	Too Warm		V S H L P R		Too Cool
Ventilation	Too Stuffy		S H V P L R		Too Drafty
Cleanliness	Too Sterile		S V L R P H		Too Dirty
Sound	Too Noisy	V	R L P H S		Too Quiet
Space	Too Cramped		H P V S R L		Too Spreadout
Decor	Too Bland		P V L S H R		Too "Loud"
Modernness	Too Modern		R P V S L H		Too Old-fashioned

			Average		
Formality	Very Cold, Hostile		H V R P L S		Very Warm, Friendly
Air Quality	Very Bad Odors		H V P L S R		Very Fine Smell
Usefulness	Very Clear Design	V S R L	P H		Very Confusing
Aesthetics	Very Ugly		H R P V L S		Very Beautiful
Overall Evaluation	Very Pleasing	S	L V P R H		Very Disagreeable

H = Hotel
L = Library
P = Pub
R = Restaurant
S = Senior Citizens Recreation Center
V = Van

similarly, leading to the supposition that they are redundant. Their resemblance may also be due in part to their broadness of concept and their proximity on the rating form.

If satisfaction on the first nine scales is defined as the range from 2.5 to 3.5, where 3.0 is the center of the scale, it may be seen that a large proportion of building characteristics are felt to be satisfactory. This finding may be related to the fact that most of the structures are fairly new (except the hotel) and exist to "meet the public". They all house or represent organizations with vested interests in public acceptance. As a counter-example, one might cite a building housing an organization not particularly concerned with courting the public, such as railway waiting rooms, welfare offices and jails.

Another characteristic related to Overall Evaluation appears to be Formality. In this sample, warmth and friendliness approximate the rank-ordering of pleasingness. This raises a persistent problem- are raters attending to the architecture or the people therein? Or is it that friendly people and friendly architecture are associated? One can remonstrate with raters to look only at the building, but when people are present, they probably have some effect on the ratings. One may also ask whether ratings should not include people, if they are workers or "part of the woodwork" as the expression goes.

These and other apparent relationships led to the computation of a factor analysis of the attributes, over all buildings and subjects. Principal components were computed and initially five factors with eigen-values greater than one were subjected to varimax rotation. When the cumulated variances were examined, it was noticed that several variables

experienced large increases after the fifth factor. The apparent optimum number of factors is seven, based on clarity of structure, apparent meaningfulness, amount of variance accounted for (77%) and lack of further large increases in any communality.

Table 9 details the results of the 7-factor rotation. Tentative titles have been given the factors- Appeal, Quality, Climate, Arrangement of Elements, Tidiness, Lighting and Utility. The basic framework of Hershberger has been followed, especially in naming Tidiness, Lighting and Utility, but changes in other factor titles are necessary. Appeal seems a better choice than his General Evaluative, but it means the same thing. Quality and Arrangement of Elements are new, not exactly duplicated in Hershberger. They may also be the least stable factors, although something like a combination of them, one way or another, usually appears in the rotations. Hershberger's factors Activity, Potency, Aesthetic Evaluative, Space and Organization are not directly represented. Several reasons for this may be advanced: scales representing these factors were not used for one reason or another (they were consciously rejected on criteria such as vagueness, inappropriateness, etc.- see earlier remarks), they are subsumed in the new set of 7 factors (as with Space, now in Arrangement of Elements) or they simply did not emerge as separate factors. Still, much of the Hershberger-Cass Base Set and the present set of attributes overlap, even if the number and description of factors differ. The present results seem to confirm Hershberger's, and may represent a second-order factoring of the scales.

Table 9

Varimax rotated factor loading of architectural evaluation scales

Attribute	1	2	3	4	5	6	7	h^2
Illumination	-04	06	-05	01	93	-01	-07	87
Quality of Materials	29	-07	-14	30	-26	-64	-16	70
Temperature	-08	86	00	-14	-05	03	08	77
Ventilation	18	84	05	15	12	-04	08	78
Cleanliness	00	00	90	13	06	11	-14	87
Sound Quality	25	03	09	-13	18	-74	18	71
Space	09	-01	06	60	23	-38	27	64
Decor	09	00	13	87	-10	09	-05	81
Modernness	19	07	65	06	-28	-42	12	75
Formality	85	-23	19	02	01	09	13	84
Air Quality	68	24	-08	21	07	-26	01	65
Usefulness	-06	15	-08	06	-08	-06	92	90
Aesthetics	67	15	15	19	-20	-41	-12	75
Overall Evaluation	-78	-07	04	06	06	33	16	76
Sums of squares	2.50	1.61	1.37	1.39	1.18	1.66	1.09	1.10
Factor title	Appeal	Climate	Tidiness	Arrangement of Elements	Lighting	Quality	Utility	

The results of the factor analysis help elucidate the relationship of the secondary scales. Hershberger noted their value but did not include them in his own study, though others previously had. His "old-new", represented here by Modernness, allied itself with the Tidiness factor. His "clear-ambiguous", represented by Usefulness ("very clear design" to "confusing") seemed to form its own specific factor, Utility, which is slightly different than Hershberger's original Utility Evaluative factor, represented by "useful-useless". His "quiet-noisy" combined uneasily with quality of materials in the factor here named Quality. Quality seems to mean quiet luxury, as in comparing a Rolls-Royce with a Toyota. His old "stuffy-drafty", represented by Ventilation, is strongly associated with the Temperature factor. Temperature needed a better name, reflecting stuffiness as well as simple temperature; perhaps Climate will be appropriate.

Predicting the Attributes

The prediction of judgments was carried out in the third study with a computer program for multiple regression from the SPSS package (Nie, Bent & Hull, 1970). SPSS offers, among other things, various facilities for dealing with missing data. There were scattered failures to report information or ratings by subjects, so the pairwise deletion option of SPSS was used.

Tables 10 - 15, the summaries of all these predictions, are the distillation of a very large amount of information. Their explication deserves careful scrutiny and explanation. The results of this part of the investigation will be explicated in the following lines, but not all the possible conclusions and speculations which might be lurking

Table 10

Regression Equations in Study 3: The Hotel Lobby

Attribute	R^2	Equation
Illumination (dim to bright)	.167	.326(Temperature)+.249(Education) -.172(Mood)+.171(Sex)
Quality of Materials (cheap to rich)	.182	-.328(Sex)-.228(Education)-.197(Gen. Exper.)+.214(Group Size)+.205(Time of Day)
Temperature (warm to cool)	.115	.262(Time of Day)_.219(Diurnal) -.202(Education)
Ventilation (stuffy to drafty)	.181	-.256(Education)+.222(Time of Day) -.170(Sex)-.155(I/E Control) +.162(Focus)-.335(Weather Est.) -.312(Temperature)
Cleanliness (sterile to dirty)	.130	-.222(Town Size)-.175(Time of Day) +.192(Ground)+.167(Diurnal)
Sound Quality (noisy to quiet)	.055	.251(Neurotic)
Spaciousness (cramped to spread out)	---	
Decor (bland to "loud")	---	
Modernness (modern to old-fashioned)	.100	-.298(R/L Looker)-.194(Ground)
Formality (hostile to friendly)	.086	.268(Mood)+.194(Town Size)
Air Quality (bad odors to fine smell)	---	
Usefulness (clear design to confusing)	.108	.291(Diurnal)+.191(Gen. Exper.)
Aesthetics (ugly to beautiful)	.305	-.472(Education)-.276(Sex)+.225(Mood) +.173(Temperature)

. . . cont'd

Table 10
cont'd

Attribute	R^2	Equation
Overall Evaluation (pleasing to disagreeable)	.290	.457(Education)-.161(Familiarity)$_s$ -.238(R/L Looker)-.212(Town Size)$_s$ +.159(Diurnal)+.194(Sex)-.156(Mood)$_s$ -.153(Temperature)-.148(Time)

$_s$ probable suppressor variable

Table 11

Regression Equations in Study 3: The Senior Citizens' Recreation Centre

Attribute	R^2	Equation
Illumination (dim to bright)	---	
Quality of Materials (cheap to rich)	.126	.213(Mood)-.269(Education)+.212(Age) +.201(R/L Looker)
Temperature (warm to cool)	---	
Ventilation (stuffy to drafty)	---	
Cleanliness (sterile to dirty)	---	
Sound Quality (noisy to quiet)	---	
Spaciousness (cramped to spread out)	.293	.460(Age)-.491(Weather Est.) -.511(Temperature)^S+.211(Group Size)
Decor (bland to "loud")	---	
Modernness (modern to old-fashioned)	.142	.276(Familiarity)-.183(Town Size) +.180(Gen. Exper.)
Formality (hostile to friendly)	.088	-.310(R/L Looker)
Air Quality (bad odors to fine smell)	.044	-.227(I/E Control)
Usefulness (clear design to confusing)	.339	.710(Familiarity)+.453(Age)+.185(Focus) -.195(Education)+.183(R/L Looker)
Aesthetics (ugly to beautiful)	---	
Overall Evaluation (pleasing to disagreeable)	.094	-.204(Mood)-.183(Education)-.182(Sex)

^{S} probable suppressor variable

Table 12

Regression Equations in Study 3: The Restaurant

Attribute	R^2	Equation
Illumination (dim to bright)	.243	.382(Time of Day)+.356(Education) +.310(Group Size)-.231(I/E Control)
Quality of Materials (cheap to rich)	.127	-.298(Education)+.249(Extravert)
Temperature (warm to cool)	.197	.305(Neurotic)+.291(Diurnal)+.214(Sun) -.205(Mood)
Ventilation (stuffy to drafty)	---	
Cleanliness (sterile to dirty)	.236	-.215(Group Size)+.196(Diurnal) +.162(Focus)+.354(Time)+.145(Mood) -.226(Familiarity)^S+.281(Age) -.186(Neurotic)-.151(Town Size)
Sound Quality (noisy to quiet)	.208	.309(Time)-.186(Education)+.461(Sun) -.175(Sex)+.355(Weather Est.)^S +.180(Group Size)^S
Spaciousness (cramped to spread out)	.081	.255(Time)+.204(Extravert)
Decor (bland to "loud")	.152	.398(Education)
Modernness (modern to old-fashioned)	.069	-.277(Education)
Formality (hostile to friendly)	.112	.183(Sex)+.255(Familiarity)+.184(Mood)^S -.176(Age)
Air Quality (bad odors to fine smell)	.213	-.342(Education)+.227(Gen. Exper.) +.191(Focus)+.163(R/L Looker)
Usefulness (clear design to confusing)	---	
Aesthetics (ugly to beautiful)	.235	-.387(Education)-.215(Age)+.197(Mood) +.165(Extravert)

. . . cont'd

Table 12
cont'd

Attribute	R^2	Equation
Overall Evaluation (pleasing to disagreeable)	.334	.476(Age)+.243(Education)+.182(Focus) -.231(Extravert)-.199(Neurotic)^s

^{s} probable suppressor value

Table 13

Regression Equations in Study 3: The Library

Attribute	R^2	Equation
Illumination (dim to bright)	---	
Quality of Materials (cheap to rich)	.078	.214(Familiarity)+.399(Sun)^S +.308(Weather Est.)^S
Temperature (warm to cool)	.229	-.346(Sun)-.262(Familiarity) +.228(R/L Looker)+.213(Neurotic)
Ventilation (stuffy to drafty)	.145	-.335(Familiarity)+.186(Mood) -.198(Sun)-.176(R/L Looker)
Cleanliness (sterile to dirty)	.078	.293(Temperature)
Sound Quality (noisy to quiet)	.256	.219(Stability)+.284(Familiarity) +.281(Group Size)-.210(Focus) +.393(Sun)^S+.323(Weather Est.)^S
Spaciousness (cramped to spread out)	---	
Decor (bland to "loud")	---	
Modernness (modern to old-fashioned)	.080	.261(Focus)+.189(R/L Looker) +.185(Stability)
Formality (hostile to friendly)	.252	-.306(Age)+.252(Familiarity) -.179(Focus)+.167(Town Size) +.168(Extravert)
Air Quality (bad odors to fine smell)	.148	.250(Time)+.182(Mood)-.201(Age) +.175(Extravert)
Usefulness (clear design to confusing)	.062	-.211(I/E Control)+.195(Gen. Exper.)
Aesthetics (ugly to beautiful)	.197	-.425(Age)+.240(Mood)-.194(Ground)^S

. . . cont'd

Table 13
cont'd

Attribute	R^2	Equation
Overall Evaluation (pleasing to disagreeable)	.186	.356(Age)-.203(Familiarity) -.257(Neurotic)^s-.205(Extravert) +.170(Focus)

^{s} probable suppressor variable

Table 14

Regression Equations in Study 3: The Student Society Pub

Attribute	R^2	Equation
Illumination (dim to bright)	--	
Quality of Materials (cheap to rich)	.050	-.241(Weather Est.)
Temperature (warm to cool)	.272	-.696(Temperature)+.260(Rain)
Ventilation (stuffy to drafty)	.265	-.646(Temperature)+.252(Rain) -.264(Familiarity)[s]+.208(Education)[s] -.173(I/E Control)
Cleanliness (sterile to dirty)	---	
Sound Quality (noisy to quiet)	---	
Spaciousness (cramped to spread out)	---	
Decor (bland to "loud")	---	
Modernness (modern to old-fashioned)	.173	-.413(Education)+.212(R/L Looker)
Formality (hostile to friendly)	.089	.309(Sun)
Air Quality (bad odors to fine smell)	---	
Usefulness (clear design to confusing)	.146	.279(Familiarity)-.247(Temperature)
Aesthetics (ugly to beautiful)	---	
Overall Evaluation (pleasing to disagreeable)	---	

[s] probable suppressor variable

Table 15

Regression Equations in Study 3: The Van

Attribute	R^2	Equation
Illumination (dim to bright)	---	
Quality of Materials (cheap to rich)	.192	.270(R/L Looker)+.228(Sex)+.181(Time of Day)-.236(Neurotic)-.187(Extravert)[S] +.227(Group Size)
Temperature (warm to cool)	.489	-.373(Ground)+.314(Time)+.267(Weather Est.)-.138(Mood)-.142(R/L Looker)[S] -.146(Age)
Ventilation (stuffy to drafty)	.119	.269(Time)-.223(Ground)
Cleanliness (sterile to dirty)	.069	-.241(Education)+.205(I/E Control)
Sound Quality (noisy to quiet)	.231	-.417(Age)-.450(Ground)+.226(Gen. Exper.)+.200(Group Size)[S]
Spaciousness (cramped to spread out)	.205	-.286(Group Size)+.244(Focus) +.231(Sex)-.208(Neurotic)
Decor (bland to "loud")	.045	-.231(Age)
Modernness (modern to old-fashioned)	.072	.183(Gen. Exper.)
Formality (hostile to friendly)	.119	.240(Mood)+.171(Temperature)-.221(Age) +.187(Neurotic)
Air Quality (bad odors to fine smell)	---	
Usefulness (clear design to confusing)	.123	-.362(Education)
Aesthetics (ugly to beautiful)	---	

. . . cont'd

Table 15
cont'd

Attribute	R^2	Equation
Overall Evaluation (pleasing to disagreeable)	.264	.584(Age)-.169(Neurotic)^s +.390(Ground)^s-.331(Temperature)^s -.148(Diurnal)^s+.193(Extravert) -.174(R/L Looker)-.145(Mood)

^{s} probable suppressor variable

among the numbers can be discussed; the reader is urged to look into the table to appreciate the wealth of possibility it represents in terms of potential hypotheses for future investigation.

In the narrower earlier studies, about 60% of the attributes had one or more significant predictors; in this study 62% of all building attribute ratings (BARs) were predictable by this minimal criterion. BARs with one or more significant predictors had a mean predictability (variance accounted for) of about 17%, similar to the pilot studies.

Perhaps the simplest way to describe the overall content of these tables is to say they appear complex. In the experimentalist's best of all possible worlds, a number of simpler results may be imagined. First, there might be a strong trend for a given attribute to be predicted by a given set of predictors, no matter what the building. Second, a tendency might obtain for certain predictors to relate very often to a given building, no matter what the attribute. Third, some attributes might always be predictable or always unpredictable. Fourth, there might be an obvious dimension separating the more predictable buildings from the less predictable ones. None of these things are true to any great extent. While 31% of the attributes have no significant predictive personal or situational variables, in one case about 50% of the variance was accounted for. This complex situation can be viewed in several ways, which will receive more attention in the discussion section.

For the moment, three simple summaries will be advanced. Examination of the canonical redundancies would provide a more sophisticated account, of course. First, all six places were, across attributes, about equally predictable in terms of mean variance accounted for, but

some places' attributes (McDonald's restaurant, the van, the library and the hotel) were about twice as frequently predictable as others (the recreation center and the student pub).

Second, some attributes were both more frequently and more completely predictable, across buildings, than others. These were Temperature, Overall Evaluation, Aesthetics, Sound Quality and Ventilation. It is of particular interest that these attributes share factors- Temperature and Ventilation are the Climate factor, while Overall Evaluation and Aesthetics are part of the Appeal factor. Sound Quality loads moderately on Appeal as well. It is possible the factors Appeal and Climate are more predictable by personal and situational variables than are other factors.

Third, the most frequently significant predictors in this study are education, age, time of day, mood and familiarity with the building rated. While none of the individual weather variables are among the most frequent, their collective total frequency is 50% higher than that for education, the most frequent single variable.

The second rank of predictors in frequency are lateralization, sex, neuroticism, rating group size, extraversion, focus and temperature. Those of the third rank are the other weather items, internal-external locus of control, general building experience, diurnal, residential stability and size of rater's hometown.

Class membership of the best and worst predictors reveals that the most frequently significant variables tend to be more personal and transitory than external and stable.

Satisfaction with Temperature in the van could be explained 49% by a linear combination of six significant predictors, a new maximum for these studies. More than 25% of 10 other BARs were explained; three of these were ratings of Overall Evaluation, the last judgment made by a rater and probably the one closest to the summing-up of the building.

In passing, it should be noted that once again the predictor set was quite independent. Of 420 non-diagonal pairs in the correlation matrix, only 16 are significant outside the weather group (which adds 10). Nine of these can be seen to be the result of unintentional sampling- for example senior citizen tours happened more often during good weather and Ss with low general building experience went on good weather tours. But Age and General Experience were not themselves related.

Macro-sources of variation in the overall evaluation judgments

Earlier it was suggested that any given rating may be a function of four classes, combinations of the personal-external and stable-transitory dimensions. The stimulus forms part of the External Stable class, while the personal and situational variables form the three other classes.

The whole question of variation in the ratings may be phrased: where does the variation originate? This slight diversion from the theme already discussed seeks to determine whether the buildings, the personal and situational variables or the attributional judgments, as three broad meta-classes, are primarily responsible for the variation in, for example, the summary judgment Overall Evaluation. This can be an important question for designers as well as psychologists. Designers are taught that the structure itself is responsible for its own artistic and utilitarian value and communication to users.

An appropriate method for estimating the proportion of variance in the Overall Evaluation ratings relatable to each of the buildings, judgments and personal-situational meta-classes is the general linear hypothesis. The data from the main study were analyzed with a BMD package program.

This analysis finds the building meta-class with a total sum of squares of 12.05 (5 d.f., F = 4.35), judgments with 114.57 (13 d.f., F = 15.91) and personal-situational variables with 18.84 (20 d.f., F = 1.70). All three terms are significant, although personal-situational only at the .05 level. Clearly the meta-class most closely associated with the variance in the Overall Evaluation rating is the other judgments made.

This finding may not be surprising when we notice that the other judgments were closer to Overall Evaluation conceptually and on the rating sheet than the other meta-classes.

A more useful summary of the results is provided by an analysis of variance focusing on the original theme, whether variance is more closely associated with the External Stable class (here represented by the buildings) or by the other three classes (represented by the personal and situational variables). This analysis proceeds judgment by judgment, thereby ignoring the judgments as a meta-class.

The results, which may be seen in Table 16, show several interesting trends. For every building judgment except Space, there is a building effect: the six buildings are seen significantly differently by the judges in every judgment. This was later confirmed by another BMD analysis, stepwise discriminant analysis, in which each judgment except Space could significantly be used to discriminate buildings. This discrimination was sufficient to

Table 16

Analysis of variance for each judgment in main study

	Buildings (5 d.f.)		Personal-Situational Variables[1] (19 d.f.)	
	F	p	F	p
Illumination	9.18	.01	1.57	(.05)[2]
Quality of Materials	8.33	.01	1.14	
Temperature	39.34	.01	1.62	.05
Ventilation	25.69	.01	1.14	
Cleanliness	14.80	.01	1.50	
Sound Quality	14.35	.01	2.12	.01
Space	1.98		1.43	
Decor	35.71	.01	.81	
Modernness	14.56	.01	4.26	.01
Formality	14.00	.01	1.27	
Air Quality	4.61	.01	.56	
Usefulness	27.59	.01	1.21	
Aesthetics	31.88	.01	1.57	(.05)
Overall Evaluation	32.91	.01	2.28	.01

[1] Familiarity with each building not included.

[2] Parentheses indicate very nearly significant at the stated level.

allow buildings to be correctly classified solely through the use of the judgments made about them from 43 to 72 percent of the time, depending on the building. The mean was 59 percent correctly classified.

Returning to the analysis of variance, significant effects were also found for certain ratings due to personal and situational variables. Sound Quality, Temperature, Modernness and Overall Evaluation were so affected, while ratings of Illumination and Aesthetics were nearly significantly a function of personal and situational variables. These ratings then are those most affected by extra-architectural factors.

There is an indication of which personal-situational variables affect which judgments, across the sample of buildings. Table 17 displays these relationships. The ratings mentioned in the last paragraph are of most interest, because in these the personal-situational variables sum to a significant total; in the others variables may be significant, but their sum is not significant.

In most cases, had the analysis of variance been performed with a selected set of personal-situational variables instead of the whole set, the value of extra-architectural factors in Table 16 would have been more important, sometimes overshadowing the building effects. Little doubt remains that the meaning and evaluation of buildings is importantly influenced by individual differences and the context of the observation. The perception of architecture, if not all perception, would need to include these factors beyond the stimulus itself in any complete theory.

Table 17

Significant personal and situational variables in each judgment

Judgment	Variable(s)[1] (significance level)
Illumination	Education (.001), Internal-External Control (.03), Mood (.07), Time of Day (.10)
Quality of Materials	Age (.07), Mood (.08)
Temperature	Diurnal (.004), Group Size (.02), Weather Estimate (.02) Time of Day (.10)
Ventilation	Diurnal (.04), Education (.06)
Cleanliness	Group Size (.01), Diurnal (.03), Size of Hometown (.04), Ground Wetness (.08), Internal-External Control (.08)
Sound Quality	Group Size (.001), Weather Estimate (.02), Education (.06), Sun (.07)
Space	Ground Wetness (.01), Weather Estimate (.03), Time of Day (.09)
Decor	Weather Estimate (.04)
Modernness	Age (.001), General Experience (.002), Diurnal (.002), Sun (.002), Education (.01), Size of Hometown (.01), Neuroticism (.02), Weather Estimate (.04)
Formality	Mood (.04), Age (.06)
Air Quality	None
Usefulness	Ground (.02), Internal-External Control (.03), Education (.08)
Aesthetics	Education (.001)
Overall Evaluation	Age (.001), Neuroticism (.02), Group Size (.07)

[1] Familiarity with the building not included in these analyses.

DISCUSSION

The importance, in general, of extra-architectural factors in the evaluation and description of buildings has been amply demonstrated. In the latter part of the results section, the data seem to indicate exactly where the judgments are affected by these factors. However, a word of caution is necessary: the general case is not safely applicable to any specific building, real or planned. This is clearly shown by the inconsistencies in the predictions of judgments in each building. Before concrete advice to the designer may be given, further work toward sorting out these inconsistencies is necessary. The first discussion comments are directed toward some possible ways of doing this.

Simplifying the predictor-attribute relationships

In all three studies a relatively well-defined range of multiple correlations (R, while variance is R^2) emerged, despite shifts in procedure and targets. Some attributes seem to be more dependent on personal and situational factors than others; the range went from zero to .70. But the majority of multiple correlations are in the approximate range from .33 to .55, or R^2s of .10 to .30. At the expense of incurring lower reliability, non-significant predictors could have been used to increase these figures- the mean multiple correlation would have been about .53 instead of about .45.

The useful thing to know in a specific design situation would be, which attributes or types of attributes are most related to non-stimulus variables? As mentioned earlier, some attribute factors (Appeal and Climate) are better predicted in general than others. Typically the individual attributes in these factors are predicted by the same variables. Before

moving to a proposition for future work which might well simplify the apparent complexity of the data, it may be well to look at some which presented themselves but did not seem to successfully reduce the complexity of the data.

One of these was that the more controversial or striking buildings were more predictable. However, there is no particular relation between mean predictability and overall evaluation rankings in the building sample.

A second hypothesis was that the more elementary attributes are more or less predictable than the more multidimensional attributes. This is not supported by the data- some strongly predictable attributes are Overall Evaluation and Aesthetics plus certain of the specific ratings, like Temperature and Sound Quality.

A third possible explanation of this diversity claims that each attribute is differentially relevant in each building, and this is why it is differentially predictable. This is slightly different from saying a different set of predictors obtains in each rating situation. Thus we would hypothesize that sound quality would be more relevant (predictable) in the library than in the hotel, or that ventilation is more relevant (predictable) in the pub than in the senior citizen's recreation center. Both these statements are borne out in the data. Quality of materials is always relevant, and is predictable to some degree in all the buildings. Decor is not so important, one might say, and it is not predictable in any building except the restaurant- and the restaurant is part of a chain with an extremely well-known style of decoration.

If the relevance hypothesis is interpreted to mean that buildings with problems or excellences in a given attribute are more predictable in that attribute, the evidence does not seem to support relevance. For Decor, the most extreme mean rating was the only one predictable, but for most of the others, predictability is not related to extremism in mean ratings. But if relevance is defined not so much in terms of extremism, but in terms of appropriateness of the attribute or the "visible" salience of the attribute, the hypothesis may have more strength. Decor is very visible in the restaurant as well as extreme. Perhaps spaciousness is more salient in the crowded van and the large senior citizens center, and though these places were not rated much differently than other places they were more predictable. Perhaps formality is always more salient, at least to this rater sample, than decor- it is much more often predictable. These saliences are accompanied by better prediction than for most BARs. This hypothesis may, of course, be supported with the aid of hindsight in the average situation. Air quality is predictable in the senior citizens center but not in the pub, which seemingly counters the salience notion. If there is a relevance or salience dimension to predictability, it is not simple or always true.

Another of many potential salience hypotheses comes from the following example. In the van, but not in other places, sex is a significant predictor of judged quality of materials. The men tend to rate it "too rich" and the women tend to rate it "too cheap". This could be explained if one assumes a sex difference in the relative importance of interior design of transportation vehicles- the men would rather see the van less frilly and the women would rather see it better appointed. The

salience hypothesis would maintain there was a significant predictor here because decoration is an important sex-linked dimension in vehicles. Many such relationships apparently exist and remain to be confirmed.

A fourth possible solution was that interactions of predictors may simplify the tables. Multiple regression, as it is normally carried out, is a linear zero-order method of approximation. Reality, we sense, is not a simple linear combination of events. This is true in two ways. First, no mathematical equation duplicates the phenomena under study, although this distinction is sometimes forgotten in the analytic process. Mathematical equations are at best models of real phenomena. Model and reality have separate existence. One task of the scientist is to find models that resemble reality. Second, the model usually is much cruder than curvaceous nature; multiple regression tries to sketch with straight lines something that is not all straight. Therefore, higher order interactions have natural appeal. Perhaps they can more accurately model reality. Many psychologists (e.g. Bowers, 1973) have been joining in support of this possibility. Others are not so much opposed to the conception of interaction as they are doubtful of its feasibility. Wiggins (1973), for example, maintains that the effort involved in the search for valuable interactions in a given situation will usually outweigh their contribution. There are many ways for a non-straight line to curve, he says, and it is much easier and almost as accurate to approximate with a straight line as it is to search for a more perfect fit for the curve.

To test this controversy in a small way, a few product terms were computed. It is instructive to follow this gambit through its perturbations. Education, age and size of the rating group were combined

in all possible pairs, as well as in the three-way combination. They were chosen because they are among the better predictors and because they are the closest to ratio scales available in this study. (It has been claimed that it is only appropriate to include product terms if their original component variables are absent in an equation if the variables are on a ratio scale).

The four new predictors were 1) added to the original set of predictors, and 2) added to the original set minus the components of the new predictors. In the first case, problems arose when high correlations between original predictors and interactions began producing spurious-high predictions. Therefore, a scan of the correlation matrix was made to eliminate very high correlations. The best solution seemed to be to eliminate the three-way interaction and the original variable age. This left three interactions and all original variables except age. This set was used, in the first case, to predict each of the attributes.

The results showed a variety of twists. Seven of the 14 attributes were simply not affected at all; the interactions added nothing to their multiple correlations. One attribute used interactions at the expense of original predictors but remained predicted at the same level. Three attributes utilized the interactions to improve their multiple correlations; the gains in variance accounted-for ranged between .1% and 2.1%. The remaining two attributes used interactions but actually lost ground; one lost just .1%, but the other lost 12.2%.

In the second set of analyses, in which all interactions and originals except the components of the interactions were used, a slightly different situation prevailed. Four predictions spiralled off into

spurious-high figures since highly correlated variables were not excised. No effect was seen for two attributes. Three used interactions and predicted variance decreased, from .8% to 7.4%. One attribute was bettered through the use of interactions (3.3%). Two others used interactions but were unchanged. Two used interactions, but worsened; the likely cause was the non-utilization of a good original predictor in this second set of analyses.

The conclusion that may be drawn here seems to agree with both Wiggins and Bowers: interactions may improve the fit, but they may also worsen it or leave it unchanged. The decision whether it is worth exploring large numbers of potentially valuable interactions is up to the patience and resources of the investigator.

A fifth solution to the problem of apparent complexity was contemplated, and it should be attempted at some point. Briefly, this solution claims that a much smaller predictor set will account for the variation in ratings nearly as well as the full 21 member set. In the case of a given attribute, a small set might work as well, and be uniform across buildings, as a larger set which seems to explain the attribute variance with different predictors in each building.

This fifth solution has within it a number of variations, some more ideal than others. In the very best of worlds, one small set of predictors would account for the variance of <u>any</u> attribute in <u>any</u> building as well as the large set. In the next best of worlds there would be one small set for each building (across all its attributes) or for each attribute (across all buildings). The most pleasant of these for a designer wishing to take consideration of people's reactions into the plans for a

new building would be the latter. The former case, for idiosyncracy of buildings with similar internal predictability of attributes, is not so desirable or intuitively attractive.

The proper way to test this solution is to select a small set of predictors, perform the regressions, and compare the results to those obtained by the full set. If across attributes, buildings or both the drop in variance accounted for is not large, then the advantages of having a uniform small predictor set will prevail. The rub, practically speaking, is of course in selecting the correct or best "golden" set of predictors. But, on the other hand, this or something like it must be done eventually if this line of research is to bear any practical fruit. Incidentally, apparently chaotic choices of predictors may also in part be due to sampling error in the stepwise selection routine.

Relative value of theoretical predictor classes

Some thought toward which class or classes of personal-external, transitory-stable might be most likely to supply a "golden" set of predictors is called for.

In the pilot studies the Personal Transitory class was relatively underrepresented and showed up poorly in the results. In the Main Study, where more of the Personal Transitory variables were included, as well as the best of the other two classes, it suddenly became the most important class.

Age has been important in all three studies, but it was almost alone in representing the Personal Transitory class before the Main Study. The experience measure used before was confounded with education; experience was defined as the number of semesters the subject had been at Simon Fraser University. Little variation in education was characteristic of the pilot samples, since the raters were all university students.

Perhaps for that reason, Experience was not then an important predictor. But in the Main Study, with experience measured two ways and education measured separately, Education and one form of Experience (Building Familiarity) became important. There may be a powerful warning in this example concerning the multidimensionality of predictors: the union of two measures may rob them both of potency, rather than cumulating potency as we sometimes expect from indexes.

The general finding that age-linked variables are important suggests that development, experience and education will serve as the broad bases for a closer look into just what in the process of aging is important to building ratings. Beck (1967) has stated that meaning is a satisfaction of needs. As adapted for the present purposes, this hypothesis would claim that different age groups expect a building to serve different needs, and that some of the ratings are tied to these need-perceptions. Another hypothesis might say that, to a point, education teaches us to be critical. This is certainly borne out in the data.

Another Personal Transitory predictor, Mood, increased in apparent value. It is reassuring to know that Mood does affect ratings in a way we would expect: buildings are called friendly, beautiful and pleasing when the rater claims to be in a good mood.

The External Transitory set of predictors, led by weather variables, was not as strong individually as before. Perhaps this was because the buildings this time were all interiors, whereas the open-air Mall was included previously. Whether or not this is so, it looks as if weather is important at least when the rating is done outdoors. However, the fact

that the several component weather variables did well collectively suggests that a single good index of weather may well be the single most powerful predictor. Other External Transitory variables measuring the size of the rating group and the time of day when the rating was done often were significant, too.

The Personal Stable class took the biggest drop in this study. It is hard to say why, unless its fall was the result of simply being squeezed out by the progressive inclusion of better variables from other classes.

The division of variables into Personal and External and into Stable and Transitory is convenient but dangerous. Information is easily lost in dichotomizing. The decision to do it was made with reserve. The chief drawback is that classification of a variable is not universal, but depends on the experimental purpose of the investigator. Age is a stable variable if one is considering perception of a building at any one time or over a quite short time. But if one is studying a building longitudinally, age becomes more of a transitory variable. This is not a problem as long as it is spelled out in each study, of course. But is Neuroticism, or Extraversion, or preference for evening activity stable, or are they unstable? Because personality theorists, at least those who tend to favor the concept of traits, tend to treat them as stable they have been so defined here. But again, stability itself is a relative and shifting thing.

These divisions might be replaced by a system in which another sort of distance is used. Instead of personal-external, the variables might be graded according to their proximity to the rating situation.

It would be hypothesized that proximal variables are more likely to affect ratings. For example, weather may be more proximal to an outdoor rating than an indoor rating. But one might find extenuating circumstances affect this; for example weather only affects outdoor ratings when the subjects have little familiarity with the target or little time in which to complete the ratings.

Exclusive of these extenuating conditions, it is often true in the Main Study that more "distant" variables are less useful. Size of hometown, residential stability and general building experience fit this description. It is also often true that "proximal" variables are important: witness rating group size, time of day and mood. Not all good variables fit this situation, though- can education (a good one) be considered any closer to a rater than Internal-External Control (a poor one)? Still, the proximity dimension seems to account for part of the variation in predictive power among the variables. Perhaps it accounts for much of the variance, and personality variables are simply "distant" ones from the task at hand, whereas educational skills are "proximal" to rating skills. Again the acuity of hindsight must be acknowledged; we cannot let ourselves start simply calling variables that turn out poorly "distant", and vice versa.

The theory of class membership of predictors has far to go. Yet it is important, since if classes which are more important than others can be discovered, the search for new predictors becomes a guided one instead of a grab-bag one. The discovery of valuable personal and situational variables is an essential part of the general search for the sources of

variance in perception. Too often in the past this search has been limited to consideration of personal (physiological, motivational, learning and personality) and stimulus characteristics, with situational factors abandoned as "error".

In sum, this study has quite clearly shown that at least for these samples, a hierarchy of predictor validity exists within the originally suggested framework. External Stable variables, by which was meant the basic "brackets" of perception, had no variables to represent it, but among the other classes, the ranking was fairly clear and might even be cited as reason to further support the original framework, despite the misgivings reported above. This ranking is: Personal Transitory, External Transitory, Personal Stable.

In this study increasing age is associated with more favorable overall evaluation, where it is a significant predictor. More education seems to be related to being more critical: buildings were down-rated on overall evaluation, quality of materials (cheap), sound quality (noisy), modernness (too much) and aesthetics (ugly). The earlier in the day the ratings are done, the more likely the building will be called too cool, bright, and drafty but good-smelling. Later, of course, the room will be too warm, dim, stuffy and oderiferous.

This kind of finding has obvious implications for the designer of buildings. This is the topic of the last section.

Implications for building design

The rating scales used in these studies have evolved with prime consideration for user comprehensibility and translatability into basic design elements which could be seen to be satisfactory or in need of change.

They began as indicators of building "meaning" (Hershberger, 1968). But often neither choice on a scale seemed to mean anything that could be utilized by a designer to really perfect the building or his future art. Thus, effort has been made to move toward scales with design-meaningful endpoints, labeled categories and evaluative style, and away from semantic-meaningful, end-labeled, descriptive style. Whether this shift is truly for the better remains to be seen. Certain conclusions may tentatively be drawn from the Main Study, since there the furthest flowering of the scales and largest samples were used.

First, it is necessary to distinguish the architecturally important situational variables from the others. It has been shown that anywhere from zero to 50% of attribute variance is due to the context. But some of this variance seems to be a result of the experimental method; it is presumed such items would not affect perception of the building during actual usage. One example is size of the rating group: it sometimes affects the rating a person makes, but wouldn't apparently, if the rating was done by a lone building user. On the other hand it might, since this represents a rating group of one. No judgments were rendered by single raters in this study. On the other hand, size of rating group may generalize to "number of people in the immediate vicinity" in which case the predictor would remain architecturally important. Another sort of predictor, say familiarity with the building, is not bound to the experimental situation; it is important to the designer in any case because the user carries it around with him/herself. In sum, almost all the predictors are free of the experimental context, that is, valid for everyday design purposes, but the possibility should be borne in mind.

In order to make design recommendations we must subtract "unimportant" influences. Beyond this, however, looms a larger problem. This study has shown that a predictor may be strong in one, two or three buildings (for a given attribute), but not for the fourth, fifth or sixth. There has not been any indication of a way in which we can distinguish the first three from the last three. This is acceptable for correcting faults, if possible, in existing buildings, but when a future building is being designed, the only guide would be a study of a simulation of the building, if there is one, as to the importance of a given predictor for a given attribute. One slightly optimistic feature of the results is the tendency for a predictor to always correlate the same. Thus, only a 50-50 chance attends the possibility the variable is of importance, but at least if it is important, the designer can be almost certain which direction.

While the research so far is rather primitive, one direction it might take has been provided by Koopman (1974). Given, through exhaustive research, a complete set of attributes and a good set of predictors, both contextual and target-based, buildings might then be arranged in a mathematical space consisting of such dimensions as function, setting and magnitude. For example, a grocery store in a ghetto of large size, or a bank of small size in suburbia. These dimensions are merely suggestions; they would amount to whatever dimensions are useful for arranging buildings in the resultant space. For example, it may be presumptuous to say grocery store; the truly functional description would be food dispensary, which leaves the conception more open to original, perhaps better designs.

By sampling buildings at representative positions in the space, one might establish sets of weights for the predictor equations at various points. Then assuming some sort of transformation holds, the designer could pick any point in space along the dimensions and obtain an idea of user reaction to it. Or (s)he could pick a spot in space where the building is located and know to some extent in what context (i.e. situations and types of people) it would be appreciated. Or, a designer could find the set of weights fulfilling his expectation of reaction to the proposed building by the anticipated users and use them to work "backwards" to the design.

This conception sounds distant, and it is. But it does represent one important direction the present type of research might go.

Another design implication is related to relevance of attributes. One might assume that the designer is always aiming for satisfaction in every attribute. This is probably not the case. Conrad Hilton sought to drive his hotel patrons from the lobby (they didn't buy anything there). Certain buildings may, with less malice, be designed without satisfaction in mind; a warehouse may not need to rate high on Aesthetics, but a museum might. Such choices are up to the designer and his clients.

The designer even now has the beginning of an indication of user reactions to buildings. The present findings tell him for example, that about half the buildings have quality of materials ratings which depend on educational level. If he is designing one of those buildings, he should somehow deal with the fact that more educated people will tend to be aware of cheapness of building materials. In fact, if this relation holds in half of all buildings, a designer should probably take it into account in all buildings to be safe, if that is possible.

A long time ago, Maslow and Mintz (1956) began the chain of research leading to the present effort. Their conclusion was simple: in "beautiful" rooms, ratings of facial photographs were rated "more energetic" and higher on "well-being" than in ugly rooms. Things looked downhill from there. Then Kasmar et al. (1968) found it wasn't always so: mental patients did not report different moods in ugly and beautiful rooms. Things were not so simple after all. Studies between then and the present have generally served only to deepen the conclusion that context-attribute relations are extremely complicated.

This means few concrete design recommendations outside tentative ones like the education example above can yet be made. Ongoing research should help rectify the state of the art. But in the end, even if a strong science is developed, it would only be advisory; solutions to the problems of potentially mismatched users and buildings are up to the ingenuity of the architect. Educated people tend to rate buildings as too brightly lit. The planner might wish to dim the lights if he is anticipating an educated population. He might rather think bright lights really are best and so try to educate users to that end. He might try some new arrangement of lights that minimizes their apparent brightness.

Much of the impetus behind this investigation has been the idea of developing a method by which designers can obtain user assessments of their buildings. Hopefully the method will be refined, extended and, above all, used.

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APPENDICES

Pilot Study 1: Rating Forms, Questionnaire, Attribute Profiles, Correlation Matrices

SIMON FRASER ARCHITECTURAL EVALUATION PROJECT

Researchers in Environmental Psychology are interested in how people experience the buildings and design of Simon Fraser University.

On the next page, you will find some pairs of words which are useful for describing places. Each pair of words represents a dimension along which you can express your opinion. All the pairs of words on one page refer to one place, which is listed at the top of that page. If you wish to participate, please note the following:

1. Consider the place carefully first.
2. For each pair of words, mark an X along the dimension, in a space that best fits your impression.
3. Please mark every dimension.
4. Give your own opinion, rather than one based on outside standards or other people's opinions.
5. Without being careless, proceed fairly quickly without heavy deliberation.

Begin by supplying the following information please:

How many semesters have you been around SFU? This is my — circle one: first / second / third / fourth / more than four

I am now a student_____ staff worker_____

graduate student or faculty_____ visitor_____

Year of birth_____ and Male_____ Female_____

	very much	quite	some-what	equal	some-what	quite	very much	
pleasing								annoying
delicate								rugged
noisy								quiet
old								new
useful								useless
boring								interesting
complex								simple
private								public
relaxing								exciting
dirty								clean
ordered								chaotic
cold								hot
light								dark
inexpensive								expensive
dangerous								safe
subdued								colourful

Personal Opinion Survey

DIRECTIONS: This survey is designed to explore ways in which certain important events in our society affect people. Each item consists of a pair of alternatives labeled a or b. Please select the one statement of each pair which you more strongly believe to be the case as far as you are concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true.

Since this is a measure of personal belief, obviously there are no right or wrong answers. To indicate your choice, simply place a check mark in the square preceding the item you choose.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case. Do not spend too much time on any one item, but be certain to find an answer for every choice.

1) a____ Children get into trouble because their parents punish them too much.
____b The trouble with most children nowadays is that their parents are too easy with them.

2) a____ Many of the unhappy things in people's lives are partly due to bad luck.
____b People's misfortunes result from the mistakes they make.

3) a____ One of the major reasons we have wars is because people don't take enough interest in politics.
____b There will always be wars, no matter how hard people try to prevent them.

4) a____ In the long run people get the respect they deserve in this world.
____b Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5) a____ The idea that teachers are unfair to students is nonsense.
____b Most students don't realize the extent to which their marks are influenced by accidental happenings.

6) a____ Without the right breaks one cannot be an effective leader.
____b Capable people who fail to become leaders have not taken advantage of their opportunities.

7) a____ No matter how hard you try some people just don't like you.
____b People who can't get others to like them don't understand how to get along with others.

8) a____ Heredity plays the major role in determining one's personality.
____b It is one's experiences in life which determines what they are like.

9) a____ I have often found that what is going to happen will happen.
____b Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10) a____ In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
____b Many times exam questions tend to be so unrelated to course work that studying is really useless.

11) a____ Becoming a success is a matter of hard work, luck has little or nothing to do with it.
____b Getting a good job depends mainly on the being in the right place and time.

12) a____ The average citizen can have an influence in government decisions.
____b This world is run by the few people in power, and there is not much the little guy can do about it.

13) a____ When I make plans, I am almost certain that I can make them work.
____b It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

a_____ There are certain people who are just no good.
b_____ There is some good in everybody.

15) a_____ In my case getting what I want has little or nothing to do with luck.
b_____ Many times we might just as well decide what to do by flipping a coin.

16) a_____ Who gets to be boss often depends on who was lucky enough to be in the right place first.
b_____ Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17) a_____ As far as world affairs are concerned, most of us are victims of forces we can neither understand nor control.
b_____ By taking an active part in political and social affairs the people can control world events.

18) a_____ Most people don't realize the extent to which their lives are controlled by accidental happenings.
b_____ There really is no such thing as luck.

19) a_____ One should always be willing to admit mistakes.
b_____ It is usually better to cover up one's mistakes.

20) a_____ It is hard to know whether a person really likes you.
b_____ How many friends you have depends on how nice a person you are.

21) a_____ In the long run the bad things that happen to us are balanced by the good ones.
b_____ Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22) a_____ With enough effort we can wipe out political corruption.
b_____ It is difficult for people to have much control over the things politicians do in office.

23) a_____ Sometimes I can't understand how teachers arrive at the marks they give.
b_____ There is a direct connection between the marks I get and how hard I study.

24) a_____ A good leader expects people to decide for themselves what they should do.
b_____ A good leader makes it clear to everybody what their jobs are.

25) a_____ Many times I feel I have little influence over the things that happen to me.
b_____ It is impossible for me to believe that chance or luck plays an important role in my life.

26) a_____ People are lonely because they don't try to be friendly.
b_____ There's not much use in trying too hard to please people, if they like you, they like you.

27) a_____ There is too much emphasis on athletics in high school.
b_____ Team sports are an excellent way to build character.

28) a_____ What happens to me is my own doing.
b_____ Sometimes I feel that I don't have enough control over the direction my life is taking.

29) a_____ Most of the time I can't understand why politicians behave the way they do.
b_____ In the long run the people are responsible for bad government on a national as well as on a local level.

30) a_____ When I am not forced by circumstance one way or the other, I prefer to rise early because I work better in the mornings.
b_____ I'd rather sleep in when it's up to me, because I operate better late in the evening.

31) a_____ Generally, I don't bother much with the surroundings, I'm more interested in myself and other people.
b_____ For me, the setting is important and I pay quite a bit of attention to the surroundings.

Table 1

Attribute profiles of the Mall
and the Office, descriptive scales (pilot 1)

	Building			
	Mall		Office	
Attribute	mean	standard deviation	mean	standard deviation
Pleasing-Annoying	3.13[1]	1.55[1]	3.98	1.37
Delicate-Rugged	4.72	1.33	4.06	1.08
Noisy-Quiet	5.05	1.40	3.98	1.51
Old-New	5.45	1.55	5.52	1.15
Useful-Useless	3.05	1.58	2.12	1.27
Boring-Interesting	5.18	1.64	3.20	1.58
Complex-Simple	3.93	1.76	4.33	1.72
Private-Public	5.32	1.78	5.95	1.09
Calming-Exciting	3.37	1.49	3.92	1.13
Dirty-Clean	5.40	1.52	5.53	1.51
Ordered-Chaotic	1.67	1.16	2.75	1.48
Cold-Hot	2.28	1.34	4.08	1.46
Light-Dark	3.48	1.76	1.97	1.05
Inexpensive-Expensive	4.38	1.80	4.23	1.37
Dangerous-Safe	5.10	1.67	5.43	1.64
Subdued-Colorful	2.30	1.38	3.75	1.88

[1] Scores are means and standard deviations (n = 60), where the 7-point scale is 1 for the left-half extreme of the attribute and 7 for the right-half extreme.

Table 2

Simple Correlations Among Predictors and Criteria, The Mall, Study 1

		1	2	3	4	5
Person ID	1	10000				
Control ID	2	2328	10000			
Age	3	0998	-0408	10000		
Sex	4	1505	1881	-0747	10000	
Extravert	5	-1220	-0476	0076	2889	10000
Neurotic	6	-0051	1395	3344	0420	1056
Diurnal	7	-0972	1285	1875	-0626	1238
Focus	8	1708	-1447	1850	0326	-1140
Weather	9	1018	2449	-0237	0739	0470
Experience	10	1004	1307	-1161	-1318	-2071
Pleasing	11	-0078	0465	-0611	1098	-0055
Delicate	12	-0545	-0818	2006	-1101	2245
Noisy	13	0087	-0767	-2147	3247	-0910
Old	14	0078	-0378	-1190	-0467	-1098
Useful	15	-1459	-0212	-3710	-1954	1704
Boring	16	0074	0526	4167	1063	1836
Complex	17	0481	-0714	-3591	2071	-1267
Private	18	1288	-1530	0895	-1751	0467
Calming	19	-0971	-2051	0592	-1373	-0111
Dirty	20	0478	0630	0905	2004	1538
Ordered	21	-1869	-0964	0928	1386	-0364
Cold	22	2071	1859	0768	0318	-0667
Light	23	-0275	-0741	-0158	0322	-1515
Inexpensive	24	0605	0058	0737	0083	-0091
Dangerous	25	-1158	-0715	1156	0248	0384
Subdued	26	2315	-0740	-0024	-2649	-0894

		6	7	8	9	10
Neurotic	6	10000				
Diurnal	7	-0891	10000			
Focus	8	-1873	-1825	10000		
Weather	9	0664	2061	-0467	10000	
Experience	10	-3029	0524	1024	3697	10000
Pleasing	11	-0992	0129	-0981	4919	1544
Delicate	12	1057	1095	-0346	3105	-0591
Noisy	13	-0017	-3517	-0651	-0355	-1072
Old	14	0285	-0183	-1147	-3370	-2224
Useful	15	-2275	-0138	-1217	-0116	-0409
Boring	16	2686	2035	0157	-1537	-2504
Complex	17	-1416	0038	1198	0242	-0500
Private	18	-1278	1042	-0145	-1277	1672
Calming	19	-0626	1323	1696	0858	0924
Dirty	20	0859	0838	-0133	-2300	-3464
Ordered	21	-0719	-0575	0096	1696	1158

. . . cont'd

Table 2
cont'd

		6	7	8	9	10
Cold	22	0564	-1085	0342	-2322	-1556
Light	23	-0836	-1517	1066	3136	1830
Inexpensive	24	0122	-1238	-1128	-3410	-0634
Dangerous	25	1224	1344	0926	-2226	-3576
Subdued	26	-0313	-0962	1685	-0121	0212

		11	12	13	14	15
Pleasing	11	10000				
Delicate	12	4294	10000			
Noisy	13	2351	-1360	10000		
Old	14	-2664	-2850	0127	10000	
Useful	15	3037	2852	0823	0317	10000
Boring	16	-4090	-0144	-1571	1706	-2426
Complex	17	1861	-0366	3408	-1414	0192
Private	18	-0092	1782	-4281	0869	1308
Calming	19	0651	0271	-2486	2664	0914
Dirty	20	-1497	-1171	-1195	4887	-0223
Ordered	21	2364	-0287	1744	-2303	-0273
Cold	22	-3216	-2723	-1321	-0531	-1643
Light	23	3550	3512	3778	-1042	0756
Inexpensive	24	-4951	-1775	-0873	3378	-2009
Dangerous	25	-2876	-0473	-2023	1304	-1793
Subdued	26	-2559	-2575	-1838	0387	-2019

		16	17	18	19	20
Boring	16	10000				
Complex	17	-3370	10000			
Private	18	-2936	-1260	10000		
Calming	19	1700	-3204	1065	10000	
Dirty	20	4328	-2333	0455	1043	10000
Ordered	21	-2476	1681	0027	-1022	-1979
Cold	22	2189	-1895	-1766	-2179	0670
Light	23	-0076	0914	-4106	-0485	-2287
Inexpensive	24	2646	-3974	1283	0655	2367
Dangerous	25	2918	-0318	-0218	-0013	2602
Subdued	26	1027	-0195	-0392	-0378	-0259

		21	22	23	24	25
Ordered	21	10000				
Cold	22	-0036	10000			
Light	23	2011	-1995	10000		
Inexpensive	24	-2414	1551	-1431	10000	
Dangerous	25	1028	3292	-0790	-0072	10000
Subdued	26	-1054	2733	-2566	0484	2440

Table 3

Simple Correlations Among Predictors and Criteria, Office, Study 1

		1	2	3	4	5
Person ID	1	10000				
Control ID	2	2328	10000			
Age	3	0998	-0408	10000		
Sex	4	1505	1881	-0747	10000	
Extravert	5	-1220	-0476	0076	2889	10000
Neurotic	6	-0051	1395	3344	0420	1055
Diurnal	7	-0972	1285	1875	-0626	1238
Focus	8	1708	-1447	1850	0326	-1140
Weather	9	1018	2449	-0237	0739	0470
Experience	10	1004	1307	-1161	-1318	-2071
Pleasing	11	1234	1410	0131	-0344	-1954
Delicate	12	-0561	-0690	1518	-0813	-3370
Noisy	13	-0240	-1296	-0596	0603	0330
Old	14	-1897	-1572	-0756	1316	2239
Useful	15	-0382	0479	-0401	-1211	-1575
Boring	16	-0919	-1346	-0871	-0350	2107
Complex	17	0352	-1000	-0438	-0134	-0864
Private	18	0779	-0128	0166	0605	-1424
Calming	19	0214	-0097	-0797	-0867	-3262
Dirty	20	-3522	0207	0845	0626	1340
Ordered	21	0327	-0044	0631	0351	-0161
Cold	22	-1569	0003	2091	0669	0841
Light	23	3806	-0273	0874	-1892	-2082
Inexpensive	24	0265	-1572	0072	-2490	1533
Dangerous	25	-2216	-1619	1160	1803	0179
Subdued	26	-1611	-1577	0218	-0461	1108

		6	7	8	9	10
Neurotic	6	10000				
Diurnal	7	-0891	10000			
Focus	8	-1873	-1825	10000		
Weather	9	0664	2061	-0467	10000	
Experience	10	-3029	0524	1024	3697	10000
Pleasing	11	-1299	-1086	2590	-0391	1062
Delicate	12	1760	-2237	0229	-0902	-0171
Noisy	13	-0603	-0543	-0542	1967	0048
Old	14	-0362	2321	-0752	1589	-1131
Useful	15	1039	-2077	-0257	-0050	-0991
Boring	16	-0658	0721	-2513	-0168	-2037
Complex	17	-0548	-0390	2087	1028	0145
Private	18	-2257	0817	0526	0599	0397
Calming	19	-1899	-0964	1439	-2030	-0621
Dirty	20	0767	2750	-0920	0323	-2387
Ordered	21	0153	-1529	2615	-3176	-0846

. . . cont'd

Table 3
cont'd

		6	7	8	9	10
Cold	22	0727	3261	-2029	-0883	-2576
Light	23	-0306	-2205	2610	0687	0444
Inexpensive	24	0697	-0171	-3910	0476	1753
Dangerous	25	1952	0962	0877	0475	- 546
Subdued	26	0902	1473	-2061	-0509	-0610

		11	12	13	14	15
Pleasing	11	10000				
Delicate	12	3162	10000			
Noisy	13	-2815	-1733	10000		
Old	14	-1639	-1626	2742	10000	
Useful	15	2122	1775	1056	-4086	10000
Boring	16	-3292	-1841	0643	2649	-0700
Complex	17	-1319	-1469	2844	0141	-0715
Private	18	3459	1309	-3355	-0461	0042
Calming	19	4399	3877	-3621	-0568	0301
Dirty	20	0204	-1058	-0107	5141	-3985
Ordered	21	3921	2091	-2256	-3855	3983
Cold	22	-2814	-1514	-0747	1827	-1131
Light	23	2429	2232	0102	-4707	4048
Inexpensive	24	-2815	0008	1628	1353	-1213
Dangerous	25	0255	-0730	0703	2358	-1933
Subdued	26	-1570	0000	-1719	4858	-1350

		16	17	18	19	20
Boring	16	10000				
Complex	17	-3131	10000			
Private	18	-1496	-1695	10000		
Calming	19	-1028	-2431	1867	10000	
Dirty	20	2487	-0620	-0548	1042	10000
Ordered	21	-1427	-1639	0544	1671	-2014
Cold	22	3677	-1501	-1755	-0160	2814
Light	23	-2477	0617	1741	-0446	-5781
Inexpensive	24	2557	-3159	-0145	-1166	-0118
Dangerous	25	0245	1382	-0534	0285	4188
Subdued	26	3994	-2118	-1614	1631	3116

		21	22	23	24	25
Ordered	21	10000				
Cold	22	0635	10000			
Light	23	2741	-2914	10000		
Inexpensive	24	-2179	1730	1794	10000	
Dangerous	25	-0723	1380	-2830	-1045	10000
Subdued	26	-1246	4991	-3771	1134	0516

Pilot Study 2: Rating Forms, Questionnaire, Attribute Profiles, Correlation Matrices

SIMON FRASER ARCHITECTURAL EVALUATION PROJECT

Researchers in Environmental Psychology are interested in how people experience the buildings and design of Simon Fraser University.

On the next page are some scales useful for rating the characteristics of places. Simply mark an X along each scale according to your experience of the place.

Please begin with the short questionnaire on this page.

SFU Occupation: student_____ visitor_____ staff worker_____
graduate student_____ faculty_____

SFU Experience: 1st_____ 2nd_____ 3rd_____ 4th_____ more_____ semesters
or, for visitors, 1st_____ more than one_____ visit

Your estimate of the weather today: terrible_____ bad_____ moderate_____
fine_____ beautiful_____

male_____ or female_____ year of birth_____

Mark the drawing that best fits your present mood, please:

	very deficient	deficient	acceptable, slightly lacking	quite satisfactory	acceptable, slightly too much	excessive	very excessive
ventilation							
size							
illumination							
formality							
design complexity							
quietness							
ruggedness							
seating							
expensiveness							
cleanliness							
privacy							
uniqueness							
friendliness							
[illegible]							
[illegible]							

[illegible] new scales:	not at all	slightly	somewhat	moderately	considerably	very much	extremely
[illegible]							
[illegible]							
[illegible]							
[illegible]							
[illegible]							

[illegible] any aspects of this place ignored by this set of scales? If so, please [illegible] them on below.

Table 4

Attribute profiles of the Mall and the Office evaluative scales (pilot 2)

Attribute	Mall		Office	
	Mean	Standard deviation	Mean	Standard deviation
Ventilation	4.57[1]	1.74[1]	3.12	.91
Size	4.07	.61	3.09	.90
Illumination	3.50	.77	3.83	.65
Formality	3.91	1.39	4.50	.99
Design Complexity	3.98	1.12	2.90	.92
Quietness	3.52	1.00	3.07	.89
Ruggedness	3.67	1.34	2.71	1.45
Heating	1.98	1.29	4.22	.56
Expensiveness	3.79	1.57	3.33	1.12
Cleanliness	4.02	.54	4.05	.54
Privacy	2.78	1.05	2.36	.92
Uniqueness	3.74	.84	2.05	.82
Friendliness	2.72	1.05	3.02	.86
Calming	3.19	.99	2.64	.86
Modern	4.24	1.02	3.29	1.03
Exciting	2.93	1.53	1.38	.78
Useful	3.86	1.22	4.41	1.38
Dangerous	1.47	.88	1.26	.78
Pleasing	4.14	1.34	2.31	1.23
Boring	2.33	1.42	3.45	1.96

[1] Scores are means (n = 58), where on the 7-point scale 1 is "very deficient" and 7 is "very excessive" for scales Ventilation to Modern, and 1 is "not at all" and 7 is "extremely" for the last 5 scales.

Table 5

Simple Correlations Among Predictors and Criteria, The Mall, Study 2

		1	2	3	4	5
Age	1	10000				
Sex	2	0991	10000			
Experience	3	1074	2223	10000		
Mood	4	-0053	-1350	-0827	10000	
Weather Est.	5	-0343	-1199	-0478	3008	10000
Sun	6	0558	1454	-0057	-1677	-7430
Temperature	7	1217	-2265	0432	0419	3344
Wind	8	-1841	1477	0303	0726	4363
Precipitat.	9	0616	0944	3173	1809	-2762
Ground	10	0736	2281	0410	-2155	-5792
Extravert	11	0228	-1526	2647	2193	0547
Neurotic	12	4181	1691	-1544	-2900	-1131
Ventilation	13	-0962	-0506	-0083	3897	4212
Size	14	-5496	-2369	-1097	-1629	0982
Illuminat.	15	-5939	-2701	0853	0342	-0295
Formality	16	-1109	-0942	-2042	-1546	-1491
Complexity	17	-3212	-1112	-0906	-1043	-0235
Quiet	18	0284	-0078	-1215	1428	0338
Rugged	19	-0607	-2133	-0466	1633	0328
Heating	20	2261	1379	0333	1444	-0673
Expensive	21	0329	-0125	0611	0643	-1049
Clean	22	-4077	0205	0176	-2962	-2592
Private	23	-0949	-0652	-0427	0728	-1245
Unique	24	-1035	-0628	-1229	1736	1058
Friendly	25	-0699	-3144	0429	2044	0599
Calming	26	-1502	0086	0527	0997	-0282
Modern	27	-1033	-2185	-1269	-1024	-0981
Exciting	28	-1983	1443	-0851	-0470	-0789
Useful	29	-0655	1750	1097	-1823	-0115
Dangerous	30	-0689	1694	1586	-1316	-2940
Pleasing	31	0110	-0185	0762	0186	-1810
Boring	32	1111	1754	1183	-2012	-2553

		6	7	8	9	10
Sun	6	10000				
Temperature	7	-4918	10000			
Wind	8	-5309	-1482	10000		
Precipitat.	9	2559	-1258	-1359	10000	
Ground	10	5466	-2688	-2902	4682	10000
Extravert	11	-2293	1826	1754	-1528	-0907
Neurotic	12	-0313	0271	-0214	0069	2833
Ventilation	13	-4950	3345	2710	-0134	-4033
Size	14	0263	-1282	1183	-1308	-2003
Illuminat.	15	-0698	1029	0648	0734	0470

. . . cont'd

Table 5
cont'd

		6	7	8	9	10
Formality	16	1336	-2050	0248	-2634	0709
Complexity	17	-1075	-0887	0061	-1462	-0212
Quiet	18	-1836	-0854	1923	-1750	-0125
Rugged	19	-1302	0509	0975	0828	0149
Heating	20	-0655	-0769	-0333	-0830	0097
Expensive	21	0377	-1195	0208	1886	0032
Clean	22	-0423	-0118	1721	-1154	-0231
Private	23	0783	-1728	1329	-0891	-0178
Unique	24	-2314	1766	-1147	-0974	-2080
Friendly	25	-2670	2998	-0379	1976	-0167
Calming	26	-1455	0894	2263	1064	0076
Modern	27	-1730	1714	0523	0859	1480
Exciting	28	0833	-0525	-0800	-0587	1760
Useful	29	-0263	0417	0042	2233	2299
Dangerous	30	1138	0448	-1556	-0513	0286
Pleasing	31	0506	-0774	0705	1336	3032
Boring	32	3256	-1601	-1276	1610	2415

		11	12	13	14	15
Extravert	11	10000				
Neurotic	12	-2943	10000			
Ventilation	13	1243	-2437	10000		
Size	14	-2424	-2875	0764	10000	
Illuminat.	15	0579	-3325	1218	4018	10000
Formality	16	-0375	1462	-1005	3507	1203
Complexity	17	0225	0930	0227	4036	2292
Quiet	18	1658	2507	-0992	-1142	1336
Rugged	19	-0219	-0069	-0014	-0354	2079
Heating	20	1617	0747	0579	-2599	-2853
Expensive	21	-0043	1312	1373	0506	0284
Clean	22	0989	-0937	-0104	2047	3098
Private	23	-0673	1098	-0245	0776	1595
Unique	24	0571	-0790	0180	-0992	1726
Friendly	25	0550	0361	1427	-0779	2562
Calming	26	-0579	1404	0473	-1069	1467
Modern	27	2089	2494	0003	0285	1968
Exciting	28	0661	0700	-0242	-0686	1900
Useful	29	0965	0154	-0521	-1024	-0183
Dangerous	30	1147	0546	-0380	0044	-0383
Pleasing	31	2950	1340	-1438	-2210	0000
Boring	32	-0940	0011	0850	-0062	-1024

. . . cont'd

Table 5
cont'd

		16	17	18	19	20
Formality	16	10000				
Complexity	17	4955	10000			
Quiet	18	2537	-0074	10000		
Rugged	19	2335	-0037	2661	10000	
Heating	20	-0295	-0715	1662	1158	10000
Expensive	21	2830	3693	1332	2207	-0018
Clean	22	0706	2561	2057	-1345	0497
Private	23	2223	1429	2078	2775	1367
Unique	24	-0484	-0047	2602	2146	-0041
Friendly	25	-0045	0106	2833	4013	0984
Calming	26	1243	1271	1094	2409	-1186
Modern	27	1962	1991	2143	2332	2118
Exciting	28	2399	2003	1691	1064	-1052
Useful	29	0335	-0394	0861	0249	-0233
Dangerous	30	-0943	0609	0988	-1782	1594
Pleasing	31	1168	0587	2281	1490	0311
Boring	32	-2212	-2889	-2278	-2240	-0251

		21	22	23	24	25
Expensive	21	10000				
Clean	22	0042	10000			
Private	23	1075	2190	10000		
Unique	24	-0144	0476	2276	10000	
Friendly	25	0491	-0525	1788	2320	10000
Calming	26	0362	1547	1071	1415	2998
Modern	27	1275	2730	3070	0725	3038
Exciting	28	0371	1056	1941	2137	0527
Useful	29	-0865	0036	-2384	-0681	2394
Dangerous	30	0574	1651	-0553	0698	-0480
Pleasing	31	0216	0915	1682	0620	2964
Boring	32	-0314	0376	-0895	-3909	-3453

		26	27	28	29	30
Calming	26	10000				
Modern	27	0569	10000			
Exciting	28	3158	1760	10000		
Useful	29	2207	0128	3909	10000	
Dangerous	30	-0223	0286	0240	-0205	10000
Pleasing	31	3686	1513	4740	3572	-0546
Boring	32	-3999	-1021	-3232	-1527	1271

		31	32
Pleasing	31	10000	
Boring	32	-2496	10000

Table 6

Simple Correlations Among Predictors and Criteria, The Office, Study 2

		1	2	3	4	5
Age	1	10000				
Sex	2	0991	10000			
Experience	3	1074	2223	10000		
Mood	4	-0053	-1350	-0827	10000	
Weather Est.	5	-0343	-1199	-0478	3008	10000
Sun	6	0558	1454	-0057	-1677	-7430
Temperature	7	1217	-2265	0432	0419	3344
Wind	8	-1841	1477	0303	0726	4363
Precipitat.	9	0616	0944	3173	1809	-2762
Ground	10	0736	2281	0410	-2155	-5792
Extravert	11	0228	-1526	2647	2193	0547
Neurotic	12	4181	1691	-1544	-2900	-1131
Ventilation	13	-1356	-0810	-3456	0730	1029
Size	14	-1675	0197	-1524	-0396	-0726
Illuminat.	15	-0337	-1131	0154	1506	1542
Formality	16	0849	1343	0933	-1739	2226
Complexity	17	-2113	0510	-2331	-0883	1404
Quiet	18	0378	0074	-1497	2000	-1371
Rugged	19	1271	-1040	0425	1215	1817
Heating	20	0539	0550	0569	-0897	-1183
Expensive	21	0242	-1160	-2848	1577	-0124
Clean	22	0719	-0085	-0690	-1081	-1624
Private	23	1030	2116	0885	2876	-0071
Unique	24	-1388	-2370	-0615	1224	0041
Friendly	25	-1198	-0311	-1112	0746	-0749
Calming	26	-0671	1246	-0944	2121	-0800
Modern	27	-1951	-0739	-1233	-1959	-1377
Exciting	28	-0381	-1233	-2697	0331	-2065
Useful	29	-3167	0284	-1683	1504	-0353
Dangerous	30	0337	-1267	-0192	0158	-2702
Pleasing	31	-2399	-0836	-1062	1873	-2166
Boring	32	-0048	2055	0862	-1523	-1990

		6	7	8	9	10
Sun	6	10000				
Temperature	7	-4918	10000			
Wind	8	-5309	-1482	10000		
Precipitat.	9	2559	-1258	-1359	10000	
Ground	10	5466	-2688	-2902	4682	10000
Extravert	11	-2293	1826	1754	-1528	-0907
Neurotic	12	-0313	0271	-0214	0069	2833
Ventilation	13	-1758	-2233	2763	-1693	-0961
Size	14	1926	-5082	0173	-0327	2541
Illuminat.	15	-1453	0169	0293	1780	-0309

. . . cont'd

Table 6
cont'd

		6	7	8	9	10
Formality	16	-3090	2949	1013	0000	0735
Complexity	17	-0845	-3026	0448	-2684	-1152
Quiet	18	1797	-2076	0252	-0264	0662
Rugged	19	-1028	-0346	0119	0686	-0285
Heating	20	1097	0409	-0710	0664	0986
Expensive	21	-0039	-2028	-0277	0017	-0502
Clean	22	1389	-1338	-0384	1775	4015
Private	23	-0543	-1454	1140	0508	-0095
Unique	24	-0839	-0234	-1475	-0906	-1788
Friendly	25	0568	-0074	-0661	-1383	0276
Calming	26	-0250	-1509	1674	-0542	0101
Modern	27	0054	-1050	-0650	-1510	1101
Exciting	28	-0016	-1117	-0660	-0199	1579
Useful	29	-0081	-2265	1339	-0198	1507
Dangerous	30	1582	-0551	-0687	0326	-0080
Pleasing	31	1022	-0931	-1005	0522	1996
Boring	32	1542	-1659	0872	0668	2044

		11	12	13	14	15
Extravert	11	10000				
Neurotic	12	-2943	10000			
Ventilation	13	-1422	-0197	10000		
Size	14	-0472	-1248	3040	10000	
Illuminat.	15	1064	-0804	1815	1446	10000
Formality	16	0065	1939	-2205	-1657	-0540
Complexity	17	-1089	-0479	3840	3444	0279
Quiet	18	-0842	-0904	2241	1226	-1294
Rugged	19	-0696	0240	1050	0592	1115
Heating	20	0138	-0352	-4598	-1075	-0362
Expensive	21	-2363	1381	2484	1780	1255
Clean	22	-0237	1582	0926	0979	2234
Private	23	0910	-0169	2556	2125	1046
Unique	24	-0862	-2139	1535	1350	1145
Friendly	25	-0538	-0856	4589	0875	0363
Calming	26	-0181	-1944	3617	0625	1041
Modern	27	0723	0329	0357	-1017	1529
Exciting	28	0146	1742	2738	1007	0949
Useful	29	1813	-2051	2349	2505	1574
Dangerous	30	1272	0757	-1899	-1556	1228
Pleasing	31	0826	-1685	2579	0382	1749
Boring	32	1044	1852	-3396	-1105	-1976

. . . cont'd

Table 6
cont'd

		16	17	18	19	20
Formality	16	10000				
Complexity	17	0000	10000			
Quiet	18	-1771	2192	10000		
Rugged	19	2108	0546	0826	10000	
Heating	20	1095	-1558	0731	-0679	10000
Expensive	21	0234	3497	2893	2501	-1174
Clean	22	3079	0454	3529	1297	0761
Private	23	-1798	0440	4745	-0109	-1575
Unique	24	0107	3267	2561	1871	0878
Friendly	25	-1928	1759	3594	-2169	-2591
Calming	26	-0909	0827	4366	1353	0609
Modern	27	1436	1583	0531	0228	1848
Exciting	28	-0891	1257	2596	0523	-0367
Useful	29	0507	2507	3291	-0946	-0085
Dangerous	30	-1010	-2029	0241	-1467	1047
Pleasing	31	-1839	0130	2793	-0551	-1509
Boring	32	0892	-1747	-3054	-1359	1604

		21	22	23	24	25
Expensive	21	10000				
Clean	22	3718	10000			
Private	23	-0480	-0030	10000		
Unique	24	2448	-0843	2035	10000	
Friendly	25	-0416	1467	3828	3169	10000
Calming	26	0690	1141	4018	3918	4483
Modern	27	0362	2512	-0751	2877	1493
Exciting	28	0941	1168	1676	2919	1436
Useful	29	-1437	1802	3433	2104	4156
Dangerous	30	-0181	0092	-1544	-0481	-0067
Pleasing	31	-0486	1832	1889	3425	4978
Boring	32	-0119	0434	-2997	-3911	-3728

		26	27	28	29	30
Calming	26	10000				
Modern	27	2921	10000			
Exciting	28	2533	1819	10000		
Useful	29	3862	4111	2378	10000	
Dangerous	30	-0914	0558	2348	0771	10000
Pleasing	31	3797	2664	4483	5733	3472
Boring	32	-3216	1225	-1669	-0304	1955

		31	32
Pleasing	31	10000	
Boring	32	-1075	10000

Main Study: Rating Forms, Questionnaires, Correlation Matrices

PLACE_____ DIRECTIONS: Before rating, explore the building with all your senses. Then rate it according to its purpose. For example, grocery stores should be rated against your standards for food-buying places, not banks, kennels or other buildings. Use your own experience and standards. Try to rate the building, and not the people in it.

ILLUMINATION

much too dim	a bit too dim	satisfactory	a bit too bright	much too bright

QUALITY OF MATERIALS

much too cheap	a bit too cheap	satisfactory	a bit too rich	much too rich

TEMPERATURE

much too warm	a bit too warm	satisfactory	a bit too cool	much too cool

VENTILATION

much too stuffy	a bit too stuffy	satisfactory	a bit too drafty	much too drafty

CLEANLINESS

much too sterile	a bit too sterile	satisfactory	a bit too dirty	much too dirty

SOUND

much too noisy	a bit too noisy	satisfactory	a bit too quiet	much too quiet

SPACE

much too cramped	a bit too cramped	satisfactory	a bit too spread out	much too spread out

DECOR

much too bland	a bit too bland	satisfactory	a bit too "loud"	much too "loud"

MODERNNESS

much too modern	a bit too modern	satisfactory	a bit too old-fashioned	much too old-fashioned

FORMALITY

very cold, hostile	somewhat formal	satisfactory	somewhat friendly	very warm, friendly

AIR QUALITY

very bad odors	unpleasant odors	neutral	pleasant smell	very fine smell

USEFULNESS

very clear design	fairly handy	average	a vague design	very confusing

AESTHETICS

very ugly	somewhat ugly	average	somewhat beautiful	very beautiful

OVERALL EVALUATION

very pleasing	somewhat pleasing	neutral	a bit disagreeable	very disagreeable

FAMILIARITY WITH THIS BUILDING

never been inside before	been in 1 or 2 times	been in several times	been in many times	work here

INDIVIDUAL DIFFERENCES SURVEY

The purpose of this study is to find out how different people react to buildings. In order to do this, we need to ask some things to distinguish you from another person who does the evaluations. Should you find one of the following questions offensive, feel free to ignore it. But the questions were not meant to be too personal, and nowhere is your name attached to this study, so hopefully you can respond to all questions.

1) Would you estimate the weather during the rating period?

very beautiful_____ fine_____ fair_____ poor_____ terrible_____

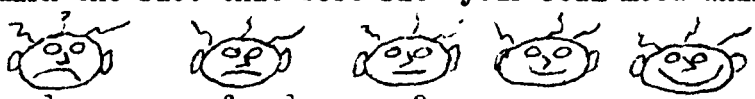
2) Would you indicate how much experience you have in building construction, planning, inspection or evaluation?

almost none_____ a little_____ considerable_____

3) What is the approximate population of the town you consider your home town?

under 10,000_____ up to 100,000_____ up to 400,000_____ larger_____

4) Please mark the face that best fit your real mood while doing the ratings:



5) Are you male_____ or female_____ ?

6) What is the year of your birth_____ ?

7) For how long have you lived at your present address?

under 3 months_____ up to 1 year_____ up to 3 years_____ up to 10 years_____

more than 10 years_____

8) How many years of formal education?_____

The next questions are a survey of how certain important issues in this society affect people. You are asked to choose between "a" and "b" in every question even though sometimes it is very hard. There are no right or wrong answers- pick the one you believe the most.

9) a_____ Children get into trouble because their parents punish them too much.
_____b The trouble with children nowadays is that their parents are too easy on them.

10) a_____ I have often found that what is going to happen will happen.
_____b Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

11) a_____ There are some people who are just no good.
_____b There is some good in everybody.

12) a_____ In my case getting what I want has little or nothing to do with luck.
_____b Many times we might just as well decide what to do by flipping a coin.

13) a_____ Sometimes I couldn't understand how teachers arrived at the marks they gave me.
_____b There was a direct connection between the marks I got and how hard I studied.

14) a_____ One should always be willing to admit one's mistakes.
_____b It is usually better to cover up one's mistakes.

15) a_____ Many times I feel I have little influence over the things that happen to me.
_____b It is impossible for me to believe that luck or chance plays an important role in my life.

16) a____ There is too much emphasis on team sports in school.
____b Team sports are an excellent way to build character.

17) a____ What happens to me is my own doing.
____b Sometimes I feel I don't have enough control over my life's direction.

18) a____ When I am not forced by circumstances one way or the other, I prefer to rise early because I work better in the mornings.
____b I would rather sleep late when it's up to me, because I operate better late in the evening.

19) a____ Generally I don't bother too much about my surroundings, since I am more interested my myself and other people.
____b For me, the setting is very important and I pay quite a bit of attention to the surroundings.

20) In case I forget to thank you personally, I very much appreciate your help on this project. For any further questions you may have, contact me, Robert Gifford, at 291-9835 evenings. When you hand this and the other forms in, I will have one last question, not a hard one. Thanks again.

Table 7

Simple Correlations Among Predictors and Criteria,
The Hotel Lobby, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	-0174	1276	2174	3136	2071
Quality	22	1212	1760	-0882	0956	0347
Temperature	23	2481	0754	0050	0370	0008
Ventilation	24	2530	-1169	0674	-0514	-0772
Cleanliness	25	-2249	1114	0229	1284	1870
Sound	26	-1014	1124	-1008	1559	-0506
Space	27	0818	-0826	0678	1008	0930
Decor	28	-0448	0238	-0702	-0248	0969
Modernness	29	-0015	-1675	0352	-0933	-0871
Formality	30	0564	-1880	0114	-0320	-0058
Air Quality	31	0987	0118	-0439	0456	0392
Usefulness	32	-0361	-0431	-0240	-1463	-1360
Aesthetics	33	0280	2015	0271	1979	1349
Evaluation	34	-2048	-1478	-0710	-1267	-0791
Familiarity	35	1130	-0122	-0598	-0849	-0615

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 7
cont'd

		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	2633	1357	-2112	1343	0931
Quality	22	-0858	-0205	-0333	-0968	-0915
Temperature	23	-1151	-1152	1427	-0104	0252
Ventilation	24	-1183	-0009	-0371	0816	0003
Cleanliness	25	2101	0090	-0138	0383	-2340
Sound	26	-1001	-0691	0798	-1504	0765
Space	27	-0034	0856	-1154	-0763	-1204
Decor	28	1505	1038	-1080	1231	-0779
Modernness	29	-1660	-2798	0606	0525	0590
Formality	30	-0042	-1723	0374	0470	1748
Air Quality	31	-0308	0326	-0256	0178	1055
Usefulness	32	-0925	-0384	0879	1980	0109
Aesthetics	33	-0135	-0411	-0734	0654	-1209
Evaluation	34	0051	-0950	0684	-0711	-0214
Familiarity	35	-1250	-0578	1161	0705	0295

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	-1168	1580	0197	-0984	1879
Quality	22	0227	-2490	0087	1235	-2421
Temperature	23	-0220	-0688	-1379	1819	-2031
Ventilation	24	-1159	-1149	-0695	1271	-2600
Cleanliness	25	-0135	-0040	0751	0106	0749
Sound	26	-1047	0394	2112	-1453	-1020
Space	27	0128	-0178	0092	0266	0081
Decor	28	-0135	-0557	1341	-1598	0912
Modernness	29	-0371	-0530	-0224	1759	-1530
Formality	30	2546	0354	-1587	-0364	-0022
Air Quality	31	-0679	-0093	-0524	0495	-0974

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Table 7
cont'd

		11	12	13	14	15
Usefulness	32	-1358	-1562	0463	0491	1341
Aesthetics	33	1524	-1908	0065	1306	-4410
Evaluation	34	-0414	0967	1683	-0830	3933
Familiarity	35	-0537	-0697	-0996	1613	-1037

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	0000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	0571	0103	-0695	1761	-0190
Quality	22	-0811	-0424	-0790	0189	0098
Temperature	23	-1710	1440	1512	-0152	0008
Ventilation	24	-2085	0414	1743	-0890	-0693
Cleanliness	25	1551	1723	0506	-0008	-0492
Sound	26	0082	-0493	-0190	0931	2506
Space	27	0032	0291	-0302	-0074	-0969
Decor	28	-0245	-1084	-0289	0496	-0465
Modernness	29	0055	0698	1109	-0012	-1277
Formality	30	0096	-0439	0530	-0014	0149
Air Quality	31	0796	-1809	1370	0979	0409
Usefulness	32	0588	2956	-1203	-0026	-0393
Aesthetics	33	-0944	-0504	0612	-0185	0863
Evaluation	34	0474	1946	-0329	0061	-0630
Familiarity	35	0363	0313	1083	1081	0678

		21	22	23	24	25
Illumination	21	10000				
Quality	22	-0759	10000			
Temperature	23	0194	1049	10000		
Ventilation	24	-0232	1382	3461	10000	
Cleanliness	25	0563	-0576	0073	-1979	10000
Sound	26	0322	1129	0195	-0024	-0574
Space	27	0551	1499	-0811	0497	-0407
Decor	28	1619	-0761	-0884	0611	-0436
Modernness	29	-2001	-1616	-1073	0537	-0071
Formality	30	0814	1338	-0209	0875	-0954
Air Quality	31	1194	2082	1202	1829	-2662
Usefulness	32	-1043	-2177	0055	-0462	0284
Aesthetics	33	-1980	5574	0525	2328	-0937
Evaluation	34	1025	-5388	-0712	-2803	2794
Familiarity	35	-0713	0785	0564	0373	-0803

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Table 7
cont'd

		26	27	28	29	30
Sound	26	10000				
Space	27	-2371	10000			
Decor	28	-1892	2265	10000		
Modernness	29	-0706	0460	-2568	10000	
Formality	30	0467	0930	-0210	1450	10000
Air Quality	31	2461	0165	0624	-1116	1657
Usefulness	32	-2879	2014	1082	0868	-1743
Aesthetics	33	2235	0435	-0811	0184	1026
Evaluation	34	-2279	-0315	0776	0668	-2114
Familiarity	35	0167	-0735	-1893	1023	0626

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	-0852	10000			
Aesthetics	33	1673	-2710	10000		
Evaluation	34	-1717	4187	-6605	10000	
Familiarity	35	0471	-1057	0876	-2048	10000

Table 8

Simple Correlations Among Predictors and Criteria, Senior Citizens' Recreation Centre, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	1814	-1953	1386	-0324	-0355
Quality	22	0464	-0061	-1073	-0501	-1513
Temperature	23	0725	-0141	-2080	-0491	-1179
Ventilation	24	1038	-0794	1379	0276	1228
Cleanliness	25	-0753	-0774	1061	0015	1026
Sound	26	-0413	0540	-0518	-0027	-0100
Space	27	-1350	2309	-0597	0065	-0838
Decor	28	-1001	-0768	-1113	-2037	-1544
Modernness	29	0239	-1071	0370	-0693	0310
Formality	30	-0022	-2083	1254	-0280	0149
Air Quality	31	1912	-1822	0292	-0566	-0021
Usefulness	32	0347	0344	-1345	-0130	0396
Aesthetics	33	-0549	-1959	-0391	-1308	-0514
Evaluation	34	0138	0849	-0892	0498	0354
Familiarity	35	3577	-2317	0764	-1426	1243

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 8
cont'd

		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	-1311	0844	-0455	1252	0820
Quality	22	-1982	1504	0660	-0516	-1155
Temperature	23	-1609	0344	2012	0518	-0246
Ventilation	24	-0219	0898	-0260	1047	1490
Cleanliness	25	1226	-0667	0368	0542	-0472
Sound	26	-0203	-1651	0115	-0091	0809
Space	27	-1470	1088	-1634	-0531	1372
Decor	28	-2080	0627	1739	-0205	0495
Modernness	29	-0212	0790	0514	2434	-2051
Formality	30	0606	-3095	0187	-0673	1440
Air Quality	31	-0563	-0256	0812	0400	0406
Usefulness	32	-1319	1446	1793	-0099	-1555
Aesthetics	33	-0203	0472	0462	0371	-0011
Evaluation	34	-0490	0699	0932	0647	-0241
Familiarity	35	0630	0363	0865	1381	0088

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	0346	-1084	-0382	-0294	1098
Quality	22	1984	0344	1697	-0159	-1754
Temperature	23	-0945	-1088	1580	0260	-0268
Ventilation	24	-1024	-0555	-1616	-1347	-0469
Cleanliness	25	-0073	-0611	-1886	0306	0142
Sound	26	0451	0148	1599	0135	0592
Space	27	-0494	-0082	4190	-0748	1777
Decor	28	0930	-1238	-0218	1117	-0852
Modernness	29	0850	0473	-1705	1017	-1252
Formality	30	1152	1145	-1783	0485	0734
Air Quality	31	0500	0502	-1320	-1494	0139

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Table 8
cont'd

		11	12	13	14	15
Usefulness	32	1079	-0008	-1369	1420	-3249
Aesthetics	33	0031	-0265	-0065	1009	0376
Evaluation	34	-2435	-1901	-0149	-0513	-1862
Familiarity	35	0678	1352	-7623	1940	-3030

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	10000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	-1506	0251	1270	1070	-1635
Quality	22	-1110	-0071	0973	-0281	0625
Temperature	23	-0590	0983	-0918	-0322	1100
Ventilation	24	1316	0470	0949	1227	-1608
Cleanliness	25	0249	-0234	1190	0556	-1131
Sound	26	-1284	0781	-1839	-0575	1489
Space	27	0636	1037	0332	0454	0860
Decor	28	0110	-0015	0266	-0715	-0065
Modernness	29	-0199	0336	1238	0236	-1193
Formality	30	0024	-0145	0082	0250	-0495
Air Quality	31	-2274	0033	1364	-0020	0277
Usefulness	32	-0147	-1385	1827	0045	-0988
Aesthetics	33	-1274	-0118	-0660	-0935	0571
Evaluation	34	-0925	0315	0008	1009	-0750
Familiarity	35	-0715	-2728	0039	-1616	-2786

		21	22	23	24	25
Illumination	21	10000				
Quality	22	-1791	10000			
Temperature	23	1818	-0224	10000		
Ventilation	24	3647	-0796	4056	10000	
Cleanliness	25	-0508	-0908	0367	0694	10000
Sound	26	1419	-1328	-0510	-0121	-3671
Space	27	1270	1379	1055	0036	-1812
Decor	28	-0621	1455	1279	-0628	2644
Modernness	29	-0104	0370	1007	1777	3237
Formality	30	1901	-0286	1064	2111	3878
Air Quality	31	2469	1189	3231	5258	1380
Usefulness	32	-0463	2023	0551	-0129	0061
Aesthetics	33	2027	0576	-0190	1025	1666
Evaluation	34	-2183	0516	-0345	-0588	-2453
Familiarity	35	0527	0117	-0705	1670	0709

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Table 8
cont'd

		26	27	28	29	30
Sound	26	10000				
Space	27	0028	10000			
Decor	28	-2729	-0990	10000		
Modernness	29	-1167	-2277	3402	10000	
Formality	30	-0911	-1392	1127	1375	10000
Air Quality	31	-0159	-0318	-0057	0442	3572
Usefulness	32	0670	-1397	2666	2201	-1338
Aesthetics	33	-1373	-1310	2398	-0211	2379
Evaluation	34	0377	0344	-0594	0357	-3275
Familiarity	35	-0654	-3396	0381	3002	1726

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	-0054	10000			
Aesthetics	33	2837	-2257	10000		
Evaluation	34	-3121	3371	-4772	10000	
Familiarity	35	1407	4315	-0588	0678	10000

Table 9

Simple Correlations Among Predictors and Criteria, The Restaurant, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	2537	1367	0735	1692	1079
Quality	22	0802	0171	0446	0370	0580
Temperature	23	0274	1765	1630	2153	0271
Ventilation	24	1564	-1268	2009	1012	-0030
Cleanliness	25	2294	-2866	-0679	-0473	-1628
Sound	26	2641	0635	1914	1290	0454
Space	27	2358	-0279	-0188	-1112	-1775
Decor	28	-0507	-0461	-1207	-1401	-0590
Modernness	29	-0173	-0355	-0056	-0435	-0198
Formality	30	0339	-0060	0244	0399	0808
Air Quality	31	1560	0327	0509	-0336	0230
Usefulness	32	0216	-0927	-2129	-0887	-0835
Aesthetics	33	0307	0073	1465	0645	0338
Evaluation	34	-0665	-0679	-1786	-0504	-1397
Familiarity	35	3022	0832	-3112	-1222	-2681

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 9
cont'd

		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	1346	1244	-1356	-0466	1029
Quality	22	-0712	0377	-0645	1716	0155
Temperature	23	0256	0083	-1082	-0422	0779
Ventilation	24	0000	-0740	-1099	-1132	0905
Cleanliness	25	-1048	0064	0159	0529	-1393
Sound	26	0371	-1383	-0161	1065	0684
Space	27	-1592	-0905	0535	-0665	0869
Decor	28	0250	-0360	0036	-0776	2426
Modernness	29	-0648	0810	1061	1140	-1718
Formality	30	-0310	0381	0421	0386	0075
Air Quality	31	-0316	1086	1031	2533	1404
Usefulness	32	-1137	0324	1307	-0190	-1933
Aesthetics	33	-0653	-0096	-0452	0447	-1099
Evaluation	34	-0397	-0283	0329	-0804	1234
Familiarity	35	-4670	0644	3324	0263	-0650

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	-0234	-0532	-0027	-1566	2506
Quality	22	-0886	-1312	-1741	0220	-2823
Temperature	23	-1492	0893	1904	-0833	-0706
Ventilation	24	-1648	0856	-0037	-0470	-1313
Cleanliness	25	1757	0095	0635	-0710	-0238
Sound	26	-0909	-1463	-2490	0714	-2585
Space	27	-0339	-1031	-1686	0269	-1820
Decor	28	-1216	0237	1873	-2649	3983
Modernness	29	0043	-0274	-1269	2265	-2768
Formality	30	1830	1980	-1458	0461	-1568
Air Quality	31	0619	-1213	-2061	1306	-3447

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Table 9
cont'd

		11	12	13	14	15
Usefulness	32	1578	0424	1086	0643	-1442
Aesthetics	33	1501	1171	-2643	2079	-3985
Evaluation	34	0064	-1405	4358	-1550	3608
Familiarity	35	-0427	-1424	1910	2315	-2543

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	10000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	-1759	-1146	-0345	-0207	0521
Quality	22	0549	-1623	1239	2301	-0988
Temperature	23	-1051	2547	0552	-1023	2779
Ventilation	24	-1496	0171	0556	-1641	1091
Cleanliness	25	-0229	1789	1775	-0105	-0789
Sound	26	0476	-1522	-0152	0258	0155
Space	27	-0239	-0457	-0225	1793	0320
Decor	28	0379	0475	-0781	-1214	0248
Modernness	29	0554	1298	-0096	0202	-0455
Formality	30	0753	-0476	1128	0393	-0009
Air Quality	31	-0093	-0659	2446	-0129	-0366
Usefulness	32	-1141	0658	-1458	-0206	-0177
Aesthetics	33	-0086	-0743	1459	1307	0217
Evaluation	34	-0982	2019	-2330	-1272	0202
Familiarity	35	-0057	1126	1250	0870	0585

		21	22	23	24	25
Illumination	21	10000				
Quality	22	-1316	10000			
Temperature	23	0732	-1822	10000		
Ventilation	24	1906	0157	3437	10000	
Cleanliness	25	-0732	0143	-0424	0218	10000
Sound	26	1131	3142	-0446	-0563	-1317
Space	27	0941	3328	0819	0513	-0902
Decor	28	1151	-3746	-0019	0077	-0048
Modernness	29	-2952	3479	-0919	-0298	3151
Formality	30	-0542	1476	-1350	-2136	-0129
Air Quality	31	-0597	3376	-1266	-0916	-1934
Usefulness	32	0279	-0323	-1112	0485	1172
Aesthetics	33	-1694	4421	-1350	-0849	0269
Evaluation	34	1608	-5248	1007	0950	1304
Familiarity	35	-0373	1280	0656	-0323	-4800

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Table 9
cont'd

		26	27	28	29	30
Sound	26	10000				
Space	27	3043	10000			
Decor	28	-2270	-2566	10000		
Modernness	29	1412	1113	-4971	10000	
Formality	30	0557	1024	-3009	3373	10000
Air Quality	31	3040	1862	-2200	1668	2708
Usefulness	32	-0493	-0008	-0857	2401	0577
Aesthetics	33	2704	3481	-5693	4132	4074
Evaluation	34	-3212	-3601	5074	-4868	-4766
Familiarity	35	1766	1130	-0943	1443	1868

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	-1959	10000			
Aesthetics	33	5170	-0139	10000		
Evaluation	34	-4930	1301	-7615	10000	
Familiarity	35	1651	1101	0063	-0396	10000

Table 10

Simple Correlations Among Predictors and Criteria, The Library, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	0624	-0708	-0159	-0788	-1464
Quality	22	1682	-0766	1015	-0116	-0841
Temperature	23	-1700	0178	-3040	-1547	-2494
Ventilation	24	-0876	-0774	-1125	-0727	-0709
Cleanliness	25	0672	1986	1242	2926	2802
Sound	26	1270	1691	0979	0610	0395
Space	27	-0525	-0279	0642	-0189	-0204
Decor	28	-0578	-0972	0011	0203	-0040
Modernness	29	0754	-0365	-0487	0000	0000
Formality	30	1636	-1253	0630	-0726	0527
Air Quality	31	2882	-0588	0631	0700	0349
Usefulness	32	-0795	-0123	0232	0903	0658
Aesthetics	33	2409	-0806	0219	-1347	-0768
Evaluation	34	-1477	-0343	0525	0858	-0165
Familiarity	35	3232	-1649	-2486	-2843	-2112

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 10
cont'd

		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	-1995	0287	1175	0119	-0166
Quality	22	-1429	1393	0553	-0864	0988
Temperature	23	-1170	2275	2211	-0797	-1527
Ventilation	24	0000	-1597	0364	0554	-0354
Cleanliness	25	2780	-0521	-2191	1181	-1440
Sound	26	-0142	0933	0195	0366	-0214
Space	27	-1043	-0857	0436	-0020	1503
Decor	28	-0290	-0343	0270	1390	0099
Modernness	29	-0405	1347	1536	0697	-1622
Formality	30	0163	0516	-0174	-0575	2144
Air Quality	31	0550	-0957	0120	-0403	-0374
Usefulness	32	0000	-0580	-0221	1822	-0590
Aesthetics	33	-0810	1512	0780	0478	0389
Evaluation	34	-0583	-0301	-0757	0981	-0354
Familiarity	35	-3609	-0274	3031	-0122	0231

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	0573	0078	0525	0313	-0519
Quality	22	-0421	0793	-1721	0292	-0955
Temperature	23	0717	0383	2116	-0537	0074
Ventilation	24	1782	-1370	0212	-0549	-0294
Cleanliness	25	-1136	1257	-0524	-0184	-1524
Sound	26	-1526	-0195	-1439	3419	-2272
Space	27	0027	-1897	-1034	0848	-0304
Decor	28	0433	0856	0128	0692	-0953
Modernness	29	0000	0399	0386	1248	-1390
Formality	30	-0078	2234	-3519	0929	0225
Air Quality	31	1525	-0331	-2636	-0868	-1047

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Table 10
cont'd

		11	12	13	14	15
Usefulness	32	0067	-1336	0753	0109	-0297
Aesthetics	33	2198	0884	-3525	-0149	-1451
Evaluation	34	-0838	-2275	2839	-0360	0677
Familiarity	35	0522	1810	-2300	2422	-2550

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	10000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	-0675	-0659	0990	-0848	0643
Quality	22	0645	-0852	-0502	1069	-0450
Temperature	23	0577	1541	0281	-0662	2236
Ventilation	24	0347	1546	0477	-0843	-0063
Cleanliness	25	0335	-0143	1210	-1122	2199
Sound	26	0810	-0267	-1980	-0361	0271
Space	27	-0755	-0782	-1367	-0261	-0219
Decor	28	-0278	0207	1303	-0455	0319
Modernness	29	0451	0000	2137	-0348	0181
Formality	30	-0870	-1823	-2186	1280	-1109
Air Quality	31	-0251	-0959	0530	1423	-0150
Usefulness	32	-1992	0564	1216	-0610	1173
Aesthetics	33	0358	-0630	0310	0973	-0591
Evaluation	34	0307	0855	1728	-1102	-0559
Familiarity	35	-0737	-1522	-0594	-0795	-0624

		21	22	23	24	25
Illumination	21	10000				
Quality	22	-0793	10000			
Temperature	23	-1283	0000	10000		
Ventilation	24	1529	-0510	4488	10000	
Cleanliness	25	-0498	-1714	0000	-1312	10000
Sound	26	0061	2317	-0494	-1155	1196
Space	27	1860	0413	-1738	0589	-2327
Decor	28	-0999	2133	0926	1069	-0567
Modernness	29	1787	-0843	-0435	-1278	0700
Formality	30	-1902	2019	-3305	-2415	0193
Air Quality	31	0116	1306	-0873	1124	0000
Usefulness	32	-0702	-0815	0394	-0083	1675
Aesthetics	33	0909	2019	-0825	1367	-0435
Evaluation	34	1698	-1849	0405	0661	0125
Familiarity	35	0477	2084	-1957	-2717	0193

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Table 10
cont'd

		26	27	28	29	30
Sound	26	10000				
Space	27	0945	10000			
Decor	28	0368	0467	10000		
Modernness	29	-0515	0000	-0377	10000	
Formality	30	2355	1379	0722	-0811	10000
Air Quality	31	2584	2483	-0675	-0810	2054
Usefulness	32	-2206	-1595	-0099	-0812	-0764
Aesthetics	33	1857	1960	0712	0284	2798
Evaluation	34	-3436	-2164	-0855	0835	-4751
Familiarity	35	3034	-0366	-0053	-0157	3234

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	-2103	10000			
Aesthetics	33	3798	-2412	10000		
Evaluation	34	-4163	4189	-4553	10000	
Familiarity	35	1564	0205	2080	-2623	10000

Table 11

Simple Correlations Among Predictors and Criteria,
The Student Society Pub, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	0823	-1521	0529	0358	0261
Quality	22	-0322	1005	1879	1501	0983
Temperature	23	0328	-1912	-3943	-5045	-2610
Ventilation	24	0192	-1545	-3251	-4336	-1969
Cleanliness	25	0775	-0326	0376	-1326	-1072
Sound	26	0899	-0580	0651	0798	0241
Space	27	1746	0657	0445	0407	1317
Decor	28	-0255	0120	0497	1134	0033
Modernness	29	-0195	0157	0153	0067	-0334
Formality	30	0192	0854	3089	2181	1506
Air Quality	31	1607	-1682	0037	-0908	-0827
Usefulness	32	0315	-0686	-1490	-2924	-2435
Aesthetics	33	-0366	0387	0896	0747	-0382
Evaluation	34	-0170	0068	-2151	-1645	-0680
Familiarity	35	-1561	0630	-0950	-1617	-1934

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 11
cont'd

		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	0741	-1116	-0998	-0079	-0117
Quality	22	1270	0563	-2411	0611	0827
Temperature	23	-2048	0257	3971	0605	0799
Ventilation	24	-1652	0330	3505	0961	-0217
Cleanliness	25	-0586	1208	0696	-0014	0208
Sound	26	0957	-0434	0047	0377	-0470
Space	27	-0268	0809	-0909	-0047	-0708
Decor	28	-0129	0592	-1161	-0046	0543
Modernness	29	-1668	1459	0588	1320	-2027
Formality	30	0354	0528	-2265	1558	0724
Air Quality	31	-0996	-0906	0608	1611	0583
Usefulness	32	-2232	0636	1621	0026	0463
Aesthetics	33	-0055	0044	-0194	-0409	0370
Evaluation	34	-0760	-1258	1662	-1560	-0248
Familiarity	35	-0530	0220	-0140	-0283	2078

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	1554	1062	0412	-1176	2113
Quality	22	0621	-0507	-0644	0552	-0832
Temperature	23	-0364	-0156	-1579	0948	0353
Ventilation	24	0310	-1267	-1868	0217	0930
Cleanliness	25	0523	0240	-0711	0439	1941
Sound	26	1587	0362	-1208	0121	0306
Space	27	1532	-0744	-1749	1219	-1830
Decor	28	0348	-0916	0971	0090	-0694
Modernness	29	0445	-0782	-0275	1915	-3789
Formality	30	1589	-0481	-1238	0028	-0298
Air Quality	31	-1494	-1022	-0793	1095	-0318

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Table 11
cont'd

		11	12	13	14	15
Usefulness	32	0143	-1344	-0527	-1206	0819
Aesthetics	33	0771	-0173	0460	1986	-0894
Evaluation	34	-1093	-0868	0083	-0078	0222
Familiarity	35	-0926	-1364	2752	-2780	4787

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	10000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	-1241	0093	-0724	-0615	0091
Quality	22	0116	-0147	-1277	1324	-0655
Temperature	23	0197	-0346	-1224	-1468	-1519
Ventilation	24	-1239	0630	-0414	-1191	-1204
Cleanliness	25	1360	1851	-0498	1700	-0330
Sound	26	0468	1253	1784	-0366	-0278
Space	27	-0810	-0518	0421	-0608	-0935
Decor	28	-0864	0770	-0655	0468	-1118
Modernness	29	0243	0821	0742	0812	-1090
Formality	30	-1464	0279	1265	0827	-1252
Air Quality	31	-0494	1114	0006	-0838	-0548
Usefulness	32	-1151	-0995	-0115	-1386	-0093
Aesthetics	33	-0770	0498	-1858	1063	0575
Evaluation	34	0113	-0299	-0559	-1173	0180
Familiarity	35	-0549	0758	-0795	0552	0444

		21	22	23	24	25
Illumination	21	10000				
Quality	22	-1871	10000			
Temperature	23	-0071	-1652	10000		
Ventilation	24	0291	0053	5793	10000	
Cleanliness	25	0187	-0947	2111	1240	10000
Sound	26	1951	0565	-0699	-0459	0943
Space	27	-0297	-0511	1579	1473	1299
Decor	28	-1986	4457	-0930	-0542	1094
Modernness	29	-2107	2080	-0418	-0146	0249
Formality	30	-1130	3489	-2976	-1174	0062
Air Quality	31	1268	1270	1167	0981	0192
Usefulness	32	1012	-2250	1532	0648	-0773
Aesthetics	33	-0187	3945	-0627	0188	0201
Evaluation	34	0253	-3408	1226	0576	-0165
Familiarity	35	1361	-0952	0347	-0990	0890

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Table 11
cont'd

		26	27	28	29	30
Sound	26	10000				
Space	27	1285	10000			
Decor	28	0937	1384	10000		
Modernness	29	1984	2171	2173	10000	
Formality	30	2525	1216	3810	1747	10000
Air Quality	31	2521	1813	2303	1067	2060
Usefulness	32	-0911	0596	-1091	-1672	-0960
Aesthetics	33	1890	0481	4280	2948	3950
Evaluation	34	-2627	-0430	-2734	-2317	-5291
Familiarity	35	-0377	-2079	-0096	-2899	0276

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	-0370	10000			
Aesthetics	33	1704	-3106	10000		
Evaluation	34	-2153	3272	-5941	10000	
Familiarity	35	0108	3190	-0745	0762	10000

Table 12

Simple Correlations Among Predictors and Criteria, The Van, Study 3

		1	2	3	4	5
Time of Day	1	10000				
Group Size	2	-3290	10000			
Sun	3	-0277	1993	10000		
Temperature	4	-0553	5085	6691	10000	
Rain	5	-1237	4587	5626	7460	10000
Ground	6	-1038	4019	4704	6173	8444
R/L Looker	7	-0139	0746	-0489	-0783	-0585
Weather Est.	8	0639	-3729	-7949	-7376	-6848
Gen. Exper.	9	0329	0500	0606	0253	1215
Town Size	10	0017	-0745	1086	-0854	-1195
Mood	11	-0858	-0757	-0366	0346	-0367
Sex	12	1067	-0693	0934	0916	1263
Age	13	-3486	2097	-2679	1037	-2703
Stability	14	0372	-0686	-0076	-0865	-0800
Education	15	-1223	-0748	-0108	-0889	-0774
I/E Control	16	-0752	0930	-0296	0004	0125
Diurnal	17	-1771	0732	-1394	-0251	-1846
Focus	18	0624	0357	1039	1178	0921
Extravert	19	-0951	1485	0146	0569	-0133
Neurotic	20	-0466	0866	-0577	1865	-0992
Illumination	21	-1776	1093	1658	1197	1370
Quality	22	1555	1238	-0180	0350	1348
Temperature	23	4348	-3806	-3704	-4374	-4983
Ventilation	24	2920	-1077	-0942	-1380	-1475
Cleanliness	25	-1401	-0085	0821	0498	0289
Sound	26	1899	-0571	-0440	-1406	-1407
Space	27	2026	-3110	0322	-1511	-0990
Decor	28	-0503	0156	1157	0527	1154
Modernness	29	-1195	-0452	0447	0325	0670
Formality	30	-0596	1054	1257	1916	1354
Air Quality	31	1429	-1678	0252	-0473	-0485
Usefulness	32	0810	0694	0353	0350	1279
Aesthetics	33	-0160	0914	0713	0578	0568
Evaluation	34	-1830	-0125	-1198	-0373	0203
Familiarity	35	----	----	----	----	----

		6	7	8	9	10
Ground	6	10000				
R/L Looker	7	-0950	10000			
Weather Est.	8	-6017	0320	10000		
Gen. Exper.	9	0896	1009	-0430	10000	
Town Size	10	-0803	-1650	-0504	-1393	10000
Mood	11	-0427	-0114	-0396	-0146	-0704
Sex	12	1696	0276	-1455	-2606	-0567

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Table 12
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		6	7	8	9	10
Age	13	-2904	-0247	0649	-1098	-0377
Stability	14	-1469	-1301	1466	-0044	-1624
Education	15	0549	1605	-0914	0119	3038
I/E Control	16	0540	0061	-0080	0611	-0180
Diurnal	17	-1051	0250	1068	0254	0248
Focus	18	-0031	-1151	0241	0736	-1719
Extravert	19	-1034	2043	-0812	0414	-0018
Neurotic	20	0031	-1141	0434	-1274	-1296
Illumination	21	0650	-0297	-1916	-0382	-0095
Quality	22	0842	2798	0118	0483	-0929
Temperature	23	-5043	-0976	5026	-0816	-0533
Ventilation	24	-2506	0354	1331	-0691	0865
Cleanliness	25	0321	0640	-0180	1677	-1235
Sound	26	-2284	1617	1496	2411	0080
Space	27	-1333	0203	0379	-0790	0141
Decor	28	0724	1087	-0564	1622	-0954
Modernness	29	0524	-0301	0600	2833	-1609
Formality	30	1377	-0621	-1367	0339	-0607
Air Quality	31	-0791	-0222	0486	-1079	1662
Usefulness	32	-0085	-1330	0565	0578	-0662
Aesthetics	33	-0402	-0047	0070	-0755	0109
Evaluation	34	0339	-1433	0020	0000	0710
Familiarity	35	----	----	----	----	----

		11	12	13	14	15
Mood	11	10000				
Sex	12	1184	10000			
Age	13	0667	-1648	10000		
Stability	14	-0274	0342	-1151	10000	
Education	15	0970	-0901	1914	-3767	10000
I/E Control	16	0185	0343	-0138	-0899	1543
Diurnal	17	0881	-1505	2823	-0662	1413
Focus	18	0733	-0397	-0351	-1377	-1636
Extravert	19	0302	-0158	0715	-1874	0638
Neurotic	20	1253	1389	3834	0503	-0581
Illumination	21	0232	0142	-0593	0373	0270
Quality	22	-0201	2088	-1868	0953	-0971
Temperature	23	-1672	-0264	-1358	0895	-1606
Ventilation	24	0827	1588	-1754	-0236	-1627
Cleanliness	25	1199	-1380	-0270	-0269	-2092
Sound	26	-0741	-0199	-2688	0220	-2028
Space	27	0616	2126	-1742	0617	0824
Decor	28	0661	0517	-2312	2032	-1884
Modernness	29	1249	-0124	-0871	1584	-1489
Formality	30	2544	1467	-1154	-0399	-0947
Air Quality	31	0712	1171	-2210	-0912	1112

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Table 12
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		11	12	13	14	15
Usefulness	32	-1675	-0935	-2116	1081	-3624
Aesthetics	33	-0781	1429	-1577	1231	-1994
Evaluation	34	-1602	-1246	3389	-1319	1956
Familiarity	35	----	----	----	----	----

		16	17	18	19	20
I/E Control	16	10000				
Diurnal	17	-0168	10000			
Focus	18	0344	0313	10000		
Extravert	19	1014	0814	-0401	10000	
Neurotic	20	-1293	0368	0179	-2356	10000
Illumination	21	0269	-0120	0850	1286	-0868
Quality	22	-0606	-0032	0006	-0629	-1804
Temperature	23	-1408	0082	0253	-0927	0311
Ventilation	24	0215	-0090	1175	0350	-0340
Cleanliness	25	1681	0919	1851	0267	0678
Sound	26	0503	0823	0206	0004	-0909
Space	27	0352	-0502	2210	0445	-1963
Decor	28	0095	0262	0476	0362	-0698
Modernness	29	1430	1507	0826	-0763	0133
Formality	30	1204	0909	1480	-0688	1644
Air Quality	31	0734	-0596	0842	0553	-1892
Usefulness	32	-1663	-1579	0604	-0236	-0918
Aesthetics	33	0732	0737	0450	-0655	-0507
Evaluation	34	0416	-0233	-1413	1627	-0526
Familiarity	35	----	----	----	----	----

		21	22	23	24	25
Illumination	21	10000				
Quality	22	0807	10000			
Temperature	23	-1663	-0316	10000		
Ventilation	24	-2439	-0757	4030	10000	
Cleanliness	25	-2794	-1462	-1255	1980	10000
Sound	26	1357	2878	1330	1228	1383
Space	27	2816	2281	1140	1161	-1490
Decor	28	1702	3314	-1056	-0035	3494
Modernness	29	-1225	0151	-0548	-0029	3860
Formality	30	0355	2183	-1210	0221	1795
Air Quality	31	-0143	2101	1230	0718	0289
Usefulness	32	-1566	-0289	2433	1332	0921
Aesthetics	33	-0229	3813	0119	0758	1121
Evaluation	34	-0976	-3679	-0690	-1485	-0781
Familiarity	35	----	----	----	----	----

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Table 12
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		26	27	28	29	30
Sound	26	10000				
Space	27	1558	10000			
Decor	28	3166	2787	10000		
Modernness	29	2627	0014	3513	10000	
Formality	30	1221	2282	2008	1709	10000
Air Quality	31	2874	1674	3495	2463	-0139
Usefulness	32	1761	-1355	0038	-0369	-0282
Aesthetics	33	3411	1688	4151	2976	3460
Evaluation	34	-4508	-2007	-3080	-1850	-4477
Familiarity	35	----	----	----	----	----

		31	32	33	34	35
Air Quality	31	10000				
Usefulness	32	0089	10000			
Aesthetics	33	2122	0685	10000		
Evaluation	34	-1982	-0583	-5726	10000	
Familiarity	35	----	----	----	----	----