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Abstract

This paper focuses on two aspects of the results of applying a Personal Construct Theory approach to environmental evaluation. It concludes with discussion about possible applications of the approach and how it may be combined with other theories to expand our understanding of how people interpret and use environment.

The two aspects concern the complexity with which people construe environment and the relationships which form between abstract or evaluative constructs and specific physical features of the particular environment.

Introduction

At the EDRA III Conference at UCLA I presented a paper which dealt with the adaptation of Personal Construct Theory for use in environmental evaluation(1). The purpose was to describe this approach conceptually and to explain its processes in both theoretical and operational terms. An indication of the kind of information which could be obtained by examining how people construed an environment was also included.

In this paper my intention is to present two interesting aspects of the fully analyzed results. In particular attention is paid to 'plotting environmental elements in the informants construct space' and to the 'lattices of linear and implicated links' which are formed between constructs. The location of 'elements in the construct space' enables us to gain some idea of the complexity or simplicity with which an environmental event is construed. The 'lattices of linked constructs' show how relationships are formed between evaluative criteria (e.g. informality or happiness) and physical characteristics (e.g. rough brickwork).

The paper concludes with suggestions as to how construct theory and other approaches to environmental analysis, may be combined in even more fruitful inquiry.

Before dealing with the results, however a brief review of the salient points of personal construct theory and how it was used in my study will obviate the need of the reader to refer to the proceedings of EDRA 3.

Personal Construct Theory

'The Psychology of Personal Constructs' (Kelly) (2) describes the development of a theory and associated techniques for dealing with personality problems. Kelly's approach enables the psycho-therapist to observe the way his patient 'makes sense' of the complex patterns of people and events that influence his behavior. It seemed that this approach could be adapted to examine the way people made sense of the complexities of environment and that the results of this kind of examination would constitute a reasonable basis for theorizing about environmental evaluation. Kelly reasoned that man was capable of being his own 'scientist'. Each and every experience as it was 'absorbed' by the person, was interpreted in the light of previous experiences, expectancies and anticipations until it 'made sense'. (Bannister) (3). Kelly called this process 'construing' and the things or ideas which were construed, he called 'constructs'. He maintained that people construed events in the world using their previous experience as a basis. When they approached an event which was wholly new then it was construed using previous experiences as a 'guide' to understanding it. When this happens the new event is said to fall within the 'range of convenience' of the person's process of construing. Sometimes, however, previous experience proves inadequate in helping the person make sense of an event. He may find that his systems of belief and understanding are seriously confounded by the new experience. In these cases the event falls outside 'the range of convenience' and anxiety or even hostility may result. (2)

Stringer identifies 'man the architect' as being Kelly's 'man the scientist' in an environmental context. (Stringer) (4). In making sense of the continuing stream of events and experiences provided by the environments which surround them, human beings transform accommodation into 'homes' by designing, modifying, decorating and arranging their houses until they match their construing of 'home'. Sometimes the building falls outside the inhabitant's range of convenience for construing 'home' and then if he is forced to consider living in it he may become unhappy or anxious. If the building falls within his range of convenience he may still disapprove of it but its inadequacies should be evident in his system of construing it and he should be able to either adapt to them or be able to overcome them.

It seemed that if I were able to examine how people construed an environment then I would be able to see how its various characteristics were themselves construed. I should, therefore, be able to see which of the physical characteristics were significant to the person and how his assessment of them contributed to his overall environmental evaluation.

Using personal construct theory as a basis I conducted an initial study. Interviews with informants resulted in the compilation of a list of adjectives which they personally used to describe their homes. Semantic differential and factor analysis techniques were used to see if differences between scores given firstly for an environmental idea such as 'cottage' and secondly for a color picture of a 'cottage', could be explained in terms of the physical characteristics of the cottage. This proved impossible because the use of one set of rating scales by all the informants meant that their individual construct systems could not be

identified. There was also no way in which the physical characteristics identified by the researcher could be linked into the evaluations that were established. I was only able to say which of the pictures most closely matched the informant's idea and not why. (Honikman) (5). A deeper experimental process which could identify the details of a construct system was clearly necessary.

Experimental Process

The development of the experimental process using Kelly's (2) construct eliciting and repertory grid techniques, together with Patrick Slater's (6) Ingrid '67 principal components analysis and Hinkle's (7) construct laddering, resistance to change and implication grid techniques is described in the proceedings of EDRA 3 (Honikman) (8).

The following is a brief outline of the experimental sequence.

Construct Eliciting and Laddering

This is the process whereby each informant's supper and subordinate constructs are identified. Eliciting was carried out using 15 color slides depicting a variety of living rooms, as the elements.

Repertory Grid

Each of ten selected elements were given scores on a 1 - 7 scale in terms of each of the informant's personal set of 10 superordinate bi-polar constructs.

Resistance to Change and Implication Grids

The first of these grids establishes the status of each informant's 20 elicited and laddered constructs in his hierarchical construct system.

The implication grid establishes whether each construct implies any other construct and whether the implication is reciprocated or merely one directional.

Forty informants contributed to the study and the object was to try to establish what it was about one of the living room photograph (element 2) that accounted for its unanimous approval by the informants in my initial study.

Selected Aspects of the Results

"Elements in the Construct Space"

The Ingrid principal components analysis program determines both the spread of variance between the principal components and the 'loadings' by which each element and construct relate to them. Figures 1 and 2 show the elements and constructs plotted in the construct space for informants 6 and 29. The X-X and Y-Y axis represent the two major principal components. (i.e. those including the largest

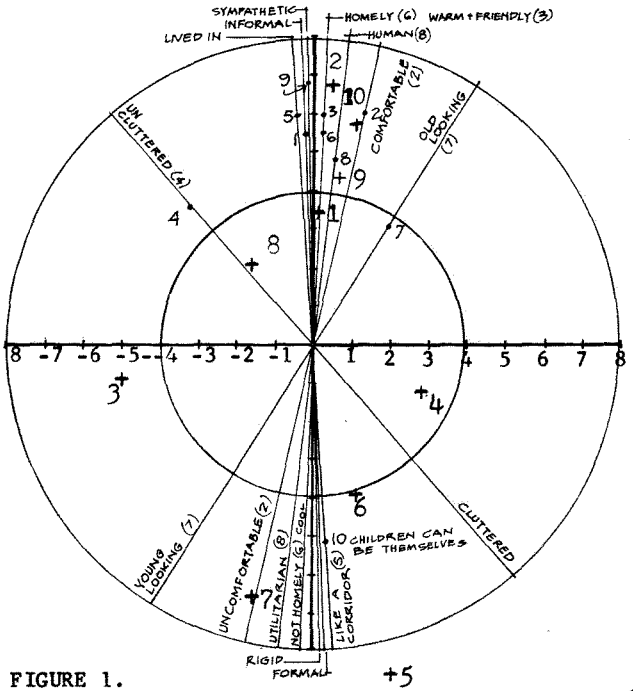


FIGURE 1.
ELEMENTS IN THE CONSTRUCT SPACE INFORMANT 6

AMOUNTS OF VARIANCE INCLUDED IN EACH PRINCIPAL COMPONENT

Informant 6
72.76% in 1st principal component
12.69% in 2nd principal component
8.00% in 3rd principal component *

Informant 29
42.51%in 1st principal component
21.85%in 2nd principal component
16.03%in 3rd principal component *

* note. It has not been possible to include the 3rd principal components in these diagrams. The original construct space diagrams were much larger.

FIGURE 2
ELEMENTS IN THE CONSTRUCT SPACE INFORMANT 29

KEY FOR READING DIAGRAMS

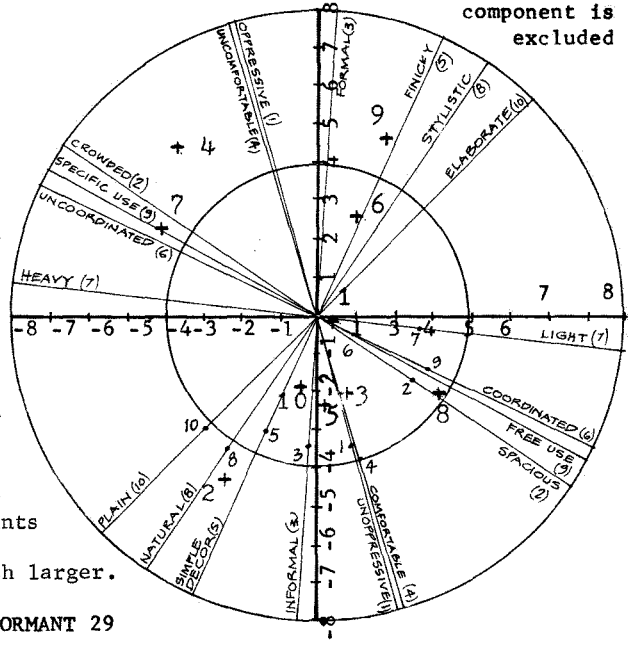
The heavy axis lines represent the principal components and are divided into scales of 8 units. The light lines are the construct lines representing dimensions running between the opposite poles of each construct.

+9 = location in construct space of element 9

2nd PRINCIPAL COMPONENT

= the location of the construct in the construct space

NOTE. The vertical heavy line in both diagrams is the 1st principal component, the horizontal heavy line is the 2nd principal component. For reasons of clarity the 3rd, less important principal component is excluded



amounts of variance). The third principal component is represented by the line at the bottom of the diagram. Each construct and each element are plotted using their principal component loadings as co-ordinates to the XX and YY axes. If as in the case of informant 6 almost all the variance is included in the first principal component and most of the constructs also cluster close to it, we can suggest that he evaluated the elements in terms of one major context. The meanings of the ten constructs do not differ greatly. The informant may be said to have made up his mind on the basis of one parameter reflecting, to a large degree, the meanings of most of the constructs.

Informant 29 on the other hand (figure 2) had three principal components each including a significant amount of variance. His constructs were spread more evenly in the construct space and related to the three components.

Examination of these two diagrams reveals the extent of the complexity with which the informants evaluated the elements. Informant 29's evaluation involving three clear parameters was considerably more complex than that of informant 6.

In scoring the repertory grids informant 6 used much more of the scoring range than 29 did. This suggests that the complexity with which the latter construed resulted in a moderate evaluation. We can say that he is able to tolerate minor ' faults or inadequacies' because low scores on the parameters (or constructs) to which they relate, are balanced by higher scores in other parameters. His view of the elements was therefore balanced. The converse is true of informant 6. So powerful is the influence of his major principal component that there are no other significant parameters which can balance or moderate his evaluations. In other words his entire evaluation is based on only one major but simple factor while the judgements of informant 29 depend on at least three criteria. Generalizing, we can postulate that when the extremes of the scoring range are used, the informant construes simply and probably in terms of one major environmental parameter.

Two opinions lend to support this argument. Canter who has looked at the relationship between cognitive complexity and satisfaction with environment also concluded that people with few simple criteria for discrimination, tended to make more extreme judgements. (Canter) (9).

Bieri theorized:

"That a complex cognitive structure allows for a higher differentiation among persons than a simple cognitive structure" (Bonarius) (10).

Plotting elements on the construct space offers a convenient and revealing way to look at the complexity of environmental construing.

If we examine the location of the elements in the 'construct space' we can see how they were considered in terms of each construct. We can begin to suggest which constructs amount to reasons for high or low evaluation. In the case of informant 6 it is clear that elements 1, 2, 10 and 9 are 'liked' and 7 and 6 are disliked. On the other hand the more complex construing of informant 29 means that none of the elements occupy extreme positions in his construct space indicating that their

evaluation is not established by one super important parameter.

The 'elements in the construct space' diagrams enable us to see both the complexity of each informants construing and the way in which each of the elements he evaluates relates to the hierarchical systems of constructs which comprise the principal components of his evaluation. These systems are illustrated by interrelated diagrams describing the various ways that the informant's constructs are linked to each other.

Linear Link Diagrams and Implication Grids

Linear link diagrams (figure 3) show the different link types by which element 2, principal components and constructs were connected in the first part of a hierarchical system of construing. The second part of the system is shown by the implication network (figure 4).

The construing of element 2 by informant 29 is described to show the kind of information afforded by the experimental process.

Informant 29 is chosen for this outline because his evaluation is spread more equally between the contexts (principal components or parts of evaluation) than most of the other informants.

The constructs listed as relating to each principal component in the linear link diagrams give a sense of meaning which reflects the context represented by the principal component. The constructs in principal component 1, (figure 3) each seem to identify areas of judgement which are relatively independent from each other. Perhaps the theme which could be argued as connecting them is one of general 'living' or even 'domestic performance'.

The constructs in components 2 and 3 seem to be connected by meanings less general and more specific in character. The constructs in the second principal component suggest a context of 'uninhibited space' and in the third principal component the construct 'co-ordinated' followed by 'informal' and 'free use' generates an impression of 'organized informality'.

Having indicated some idea of the scope of each principal component within the informant's construct system, the linear link diagram and implication network show how the subordinate constructs contribute to it.

The linear links of laddered constructs are easy to follow from the diagram. The suggestion that the first principal component represented a context of 'general living room character' is supported because only one physical characteristic construct contributes to it. Physical characteristic constructs are the most specific of all constructs so that it is reasonable to expect them to relate more frequently to more specific principal components rather than to general ones.

"Spacious" is obviously a major centre of informat 29's implication network (figure 4), followed by 'simple decor', 'flexible', 'comfortable' and 'unco-ordinated'. None of the physical characteristics constructs figure in this network.

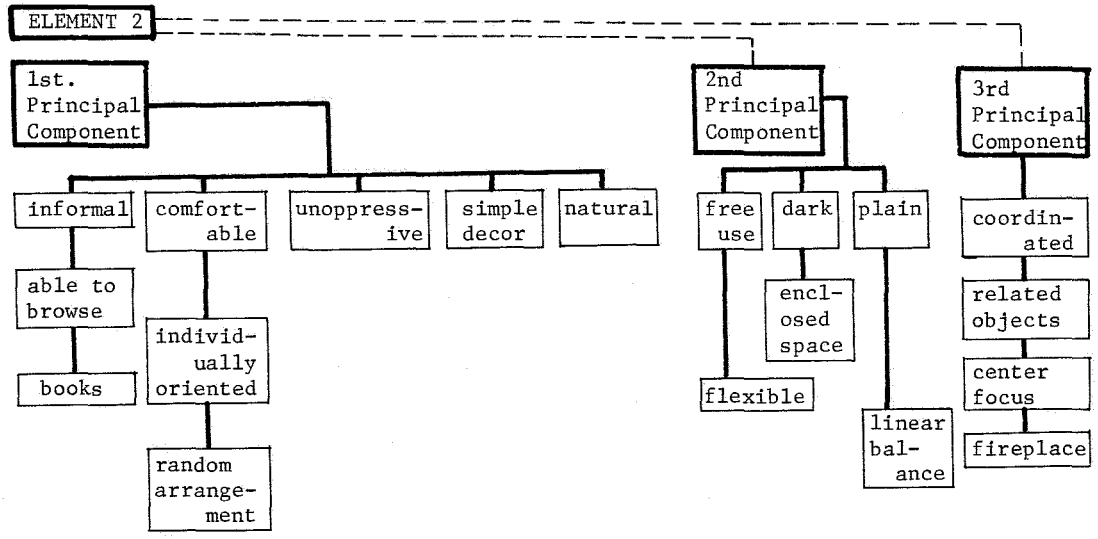


FIGURE 3
LINEAR LINK DIAGRAM FOR INFORMANT 29

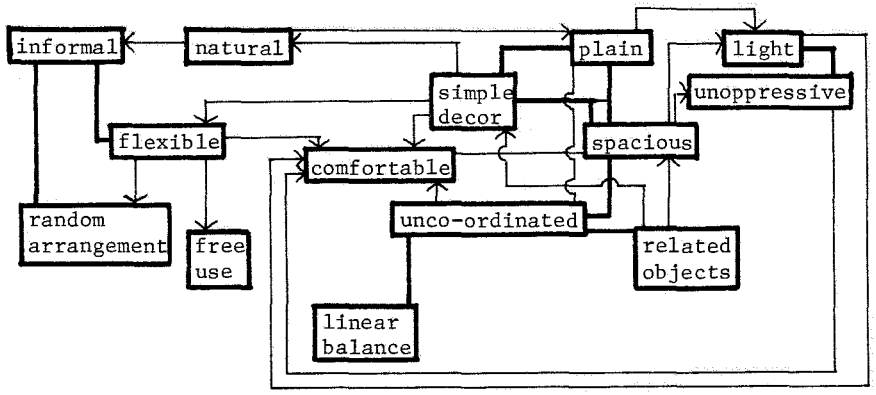


FIGURE 4
IMPLICATION NETWORK FOR INFORMANT 29

The informant does not consider that physical characteristic constructs, unqualified and on their own, imply very much for other, more descriptive or evaluative constructs. In other words, implication links are formed only when a physical characteristic has been linked to more superordinate evaluative constructs. Physical characteristics imply other constructs for the informant only after he has made an initial evaluation or judgement about them. In addition to 'books' and 'fireplace' constructs which are purely physical, informant 29 identified, 'random arrangement', 'simple decor', 'centre of focus', 'related objects' and 'enclosed space', as constructs which are partly evaluative (in that they reflect his personal interpretation) and partly physical. For example the construct 'related objects' consists of the 'objects' which exist as tangible physical items and 'related' which describes an evaluation the informant makes about the object.

The fact that these are not purely physical characteristic constructs does not preclude them from representing, together with books and fireplace, the significant ingredients the informant identified in the element.

Collectively the diagrams identify the principal components of the informant's system of construing and the superordinate constructs which are closely associated with them and which collectively represent their meaning. The physical characteristics which were significant in the way the informant construed the living room photographs are also established and the various links by which each of these physical characteristics are connected to more superordinate, evaluative non-physical constructs may be traced.

In this way a schematic diagram of the informants network of constructs and links may be compiled which graphically demonstrates how he sees and interprets the particular living room environment represented in the photograph. (element 2).

Discussion

Speculation about the application of a Personal Construct Theory approach in a realistic context is not difficult. Clearly further research is needed to deal with operational difficulties. Questions such as what is technically involved in replacing photographic elements with real environments should not be insoluable.

'Time' for instance, is an influential factor in the construing process. People are continually experiencing new events and new constructs are constantly being admitted to their construct systems. These may change the nature of the construct system and initial rejection or disapproval can easily mature after long acquaintance into warm approval. These and other issues are important in the development of personal construct theory as a tool for environmental analysis however this discussion is devoted to looking at the possibilities of combining my adaptation of construct theory technique firstly with another approach by Anna Bridge and secondly with a 'territoriality' approach by Duncan Joiner.

Anna Bridge (unpublished) a member of the Architectural Psychology Research unit at Kingston Polytechnic elicited room constructs without using photographs or exposing her informants to real environments. (11)

She selected 5 main areas of a home, such as 'kitchen', bathroom, living room etc., and the informants were asked to consider an example of each of these that they liked and one that they disliked. In this way 10 abstract elements were defined but each informant could rely on his personal experience of real environments for construct eliciting. The results of repertory grid testing and analysis enable both elements and constructs to be plotted in the construct space. In this way she is able to see whether her informant's consider rooms similarly because they accommodate the same function or because they have similar visual or spatial qualities.

If linear link and implication network diagrams were prepared in conjunction with Bridge's results, we would be able to see which physical characteristics contribuated to functional, formal and any other major environmental contexts significant in the informants systems of construing.

A study could be set up as follows: Informants would be asked to compile a list of room types. They would then be asked to write down two examples of each type, one which they liked and one which they disliked. Each example would be drawn from rooms with which they had had personal experience and would be specifically nominated. Constructs would be elicited by the triad method. A triad could consist of a 'liked' kitchen, a 'liked' bathroom and a 'liked' bedroom or a 'liked' study, a 'disliked' study and a 'liked' living room. The 'sorting' of various triads combining 'liked' and 'disliked' examples of the same room type with other room types would result in sets of constructs covering both the quality of the room and its ability to accommodate the activity. A 'liked' dining room may be preferred to a 'disliked' dining room because better dining could take place in it and it might also be preferred to a 'liked' living room because of spatial quality or informality. It is easy to imagine all kinds of combinations between activity and evaluative constructs. The plotting of elements and constructs in the construct space would reveal relationships between construct groupings and elements. One would be able to propose that an informant approved of a room not only because it was an appropriate place for its designated activity but also because of a number of other environmental qualities. A 'liked' study might be construed similarly to a 'liked' bathroom because of qualities not necessarily associated with bathing or studying. On the other hand a 'liked' kitchen might be preferred to a 'disliked' kitchen simply because it was a better 'cooking machine'.

At this stage the linear link diagrams and implication networks would be compiled and would show how the physical characteristic of the rooms fitted into the informants overall construct system. Some informants might link the cooker in a kitchen directly to the activity of 'preparing food' which might be a superordinate construct highly loaded to the 'liked kitchen' element. The implication grid, however, could show that the cooker had many reciprocal implications for evaluative constructs, such as 'homeliness' or 'practicality' and we would begin to be able to see how the performance of a room in accommodating an activity was construed on the basis of specific characteristics. We would also be able to see that although certain physical characteristics of the room impeded the specific activity associated with it, it was nonetheless a 'liked' room. It would be particularly interesting if a multi-activity room like a kitchen was construed with principal components relating to different activities. The first major principal component,

accounting for most of the variance, might be approving while subsequent principal components reflecting more specific sets of kitchen criteria could be disapproving. In this way the experiment would begin to demonstrate how the interactive roles of 'form' and 'function' influenced environmental evaluation.

Clearly the other people using the rooms would also figure in an informant's construing process. The way they operate on and within the room affects the way it is seen to function. In my experiment the use of photographs meant that the informants could not include the living room users in their construct systems, and consequently their attitudes to personal space and aspects of territoriality could not be reflected in their construct systems.

Kelly's sociality corollary states. "To the extent that one person construes the construction process of another, he may play a role in a social process involving the other person." (2)

Bannister explains that in this corollary Kelly is concerned about interpersonal relations. (Bannister and Mair) (12). In the environmental sense it is clear that the interpersonal relations could well affect the way a pupil, for example, construes a headmaster's study. Most of the pupil's construing of the environment, which includes the headmaster as a 'physical characteristic', will be related to making sense about how the headmaster is construing him. In a study of personal space and social ritual in small office spaces, Joiner suggests that the use of the offices and organization of the furniture in them may be related to sustaining social relationships (Joiner) (13). The headmaster might well position his desk in relation to the window, the door and the lights so that a visitor will be conscious of intruding into the territory of a superior, more powerful being. In this case the headmaster would be anticipating how, by the arrangement of his environment, he can reinforce and enhance his status in the mind of the visitor.

Joiner's study uses a participant observation method. Evidence upon which opinions and conclusions are based is compiled from programmed observations. The way in which the person psychologically uses the particular environment is deduced from watching him behave in it. No attempt at understanding his cognitive interaction with the environment is made.

Question of territoriality, interpersonal relations in environment and personal space are important aspects of man-environment theories but researchers such as Joiner tell us little about how the informant understands his territory and the people in it. Consider the combination of a study such as Joiner's using observation techniques, with a personal construct approach for analyzing the process and components of evaluation. The results would tell us much more than that people used their accommodations as aids and props in their relationships with others. We would begin to understand which qualities a person looked for in an environment and how its ingredients contributed to them. We would be able to say that the status he felt he gained from, for example, the positioning of his desk was because the desk itself, in association with the color of the walls, the thickness of the carpet and the kind of people who came to see him were part of a network of constructs closely related to the network with which he construed his rank. We would further be able to tell what it was about the desk in the particular

room which made it a better prop or aid to his purpose, than one of another type.

The results of the combined study would extend our practical understanding of the particular environment because we would be able to predict what would happen if for example, we moved the person to a smaller room and what measures we could take to make this move more acceptable to him.

More generally contention is that useful man-environment theory will develop from combinations of this kind. The examination of the details of a construct system can expose the way the physical environment and its cognition are associated.

Notes

1. Throughout this paper the word 'environment' is used to mean a particular piece of territory which may be natural or constructed, designed or accidental and internal, external or both.

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