# CONSTRUCT-ELEMENT INTERACTION IN THE REPERTORY GRID

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## ABSTRACT

This study examines the process of construct-element interaction in the repertory grid. It involves a more detailed analysis of grid functioning than is usual. It is proposed that within one subsystem, and within its range of convenience, a construct may not be used in a uniform way of all the elements in a grid. Instead, its application may change with each element considered as a separate context. This may cause difficulty in determining the organization of constructs in the grid.

The study aims to:

(i) Examine the notion of construct-element interaction in relation to aspects of personal construct theory.

(ii) Investigate the process of construct-element interaction in the grid.

(iii) See if interaction produces functionally dissimilar implications.

(iw) Determine when such implications are most likely to be produced.

This is an exploratory study. Results and arguments presented indicate that:

(i) Interaction is not an isolated methodological phenomenon but is closely related to aspects of personal construct theory.

(ii) Interaction produces at least verbally different implications and often functionally dissimilar ones.

(iii) Various factors, especially the hierachical position of a construct, contribute to the production of functionally different implications.

Acknowledgement

The author gratefully acknowledges support of the Social Science Research Council, whose grant financed this work.

She is in debt to the late Dr Joan Wynn Reeves whose help was, sadly, terminated by her death.

The author would like to express thanks for assistance and discussion generously provided by Mr John Valentine of Bedford College.

I should also like to thank Mrs Jenny Lawrence for typing the manuscript.

Results were provided by the M.R.C. Service for analysing Repertory Grids, under Dr P. Slater, and thanks are extended to him.

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PART I SECTION 1

## INTRODUCTION

### Personal Construct Theory and the Repertory Grid

In Personal Construct theory it is assumed that man interprets his world through constructs. 'A construct is a bipolar concept, a way of categorizing similarities and differences which we perceive in our environment. Thus black-white, acid-alkali, friendly-hostile, light-heavy, like I am - like I would like to be and so forth are constructs' ( 6 ).

For Kelly, constructs are essentially predictive instruments. They are organized into systems. 'Because of the network of relationships between X, Y and Z constructs, we expect of an element construed as an X, Y and Z types of behaviour' (6).

In order to study the constructs a person uses and the ways in which they are organized, Kelly devised the technique of Repertory Grid testing. The technique originated as the Role Construct Rep Test. In this, a subject is asked to name twenty or thirty people he knows who fit different role titles, e.g. 'mother', 'my best friend'. These are called elements. Constructs are elicited by selecting three of these elements and asking the subject in what way two of the people are alike and thereby different from the third; by the triadic method. It is from the constructs elicited that the experimenter hopes to gain insight into the way a person construes his own interpersonal environment.

The validity of analyzing results in the Rep Test relies on the assumption that the examiner will correctly interpret the meanings of the verbal labels used by subjects. Grid methods, in comparison, offer some means whereby similarities and differences in constructions underlying similar verbal labels can be ascertained. They allow for some investigation of construct relationships and the hierachical status of constructs.

A grid, 'expresses a man's own finite system of cross references between the personal observations he has made and the personal constructs he has erected'. (77) In the Repertory Grid, Kelly is interested, not in the separate categories as such, but in the: 'differentiation and integration processes that underlie these categories'. (75)

A Rating form of Repertory Grid

| | Elements | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Constructs |
| | 5 | 3 | 6 | 2 | 2 | 3 | 1 | 4 | 5 | 1 | 1. Kind-unkind |
| | 3 | 1 | 2 | 1 | 4 | 1 | 2 | 3 | 2 | 1 | 2. Soft-hard |
| | 4 | 1 | 3 | 3 | 6 | 4 | 5 | 4 | 3 | 3 | 3. Sociable-unsociable |

In a grid, role titles (or numbers referring to them) are written along the top of a matrix, and elicited or supplied constructs down the side. Subjects are asked to apply each construct to each element shown. Various scoring systems have been used, e.g. binary, rating and ranking. Kelly assumes that a psychological relationship between two constructs will be reflected in a statistical association between them. He explains this view of functional similarity: 'If we assume that the rows of pluses and minuses [in a binary grid] constitute the complete operational

definition of the two constructs involved, we may now conclude that the two constructs are functionally identical, even though you have used different words to describe them. There is an important theorem here to the effect that two constructs which produce an infinite series of identical operations are themselves identical'. (75)

Bannister comments that: 'Kelly seemed to allot the simple form of the Rep Test pride of place in his armamentarium of clinical tools, and apparently viewed the grid extension of this technique as a piece of methodological flamboyance which would intrigue the research worker rather than aid the hard-pressed clinician. In Britain... the grid method has received almost exclusive attention both inside and outside the clinical field'. (8)

It has been suggested that the behaviour of individuals in each grid needs to be examined closely, and it is with one aspect of grid use that this study is concerned. Bannister and Mair write: 'It seems clear that the grid will never be a very handy or easy tool of psychological investigation. Yet the problems it presents can initially be investigated by the relatively simple technique of listening to the subject. Given a situation in which the subject is allowed to make a running commentary on the nature of the grid operations he is carrying out, and to deliver a further commentary on the conclusions the psychologist has reached, a better understanding of the relationship between grid results and construing might be achieved'. (3)

Construct-Element Interaction

The above technique has been used in this study to investigate

aspects of the use of constructs of elements in a grid. Specifically it is hypothesized that each construct may not be used in a uniform way of all the elements, that construct-element interaction may take place.

Osgood has recognized the problem of interaction in relation to the Semantic Differential: 'It is clear that there is a high degree of concept-scale interaction, the meaning of scales and their relations to other scales vary considerably with the concept being judged'. (123) This is serious for the Semantic Differential, for as Presly (123) says, on concept-scale interaction depends the whole question of the validity of factor sorting procedures. Such interaction renders illegitimate any pooling of scale correlations across concepts and any subsequent calculations that might be performed on pooled data.

Bannister and Mair partially attribute Osgood's trouble with interaction to a neglect of the principle of the range of convenience of application of a scale. However, Osgood did not completely ignore this. In 1957 he wrote that among the criteria for selection of scales were their relevance for the concept being judged, and their semantic stability for concepts and subjects in a single study, 'whereas high-low can be expected to be stable across a set of sonar signals, it would not across a set of concepts which included both auditory and social concepts'. (115) However, in general, this principle is not adhered to, so that Bannister and Mair conclude: 'The existence of elements, within and without the ranges of convenience of the scales used, is a guarantee of varying intercorrelations dependent upon the particular concept-scale interaction'. (8)

This is not to say that interaction only occurs when concepts/ elements are not all within the range of convenience of application of the scales. Presly (123) used concepts from one concept class and still found interaction; i.e. that the average structure derived from the matrix of all the concepts was not representative of the structures obtained when each concept was taken separately, therefore throwing into doubt the worth of global structural measures. Presly concludes: 'The present study has shown the variation... in inter scale relations between concepts in one concept class, and it is a reasonable assumption that across concept classes this variation must be even greater. The factor scores used... must... have little, if any, validity'. (123)

Bannister and Mair have rephrased their comment about the range of convenience of application of constructs in terms of context: 'the relationships of a construct must be seen and assessed within a specific context, and... it is essential to maintain the distinction between the symbol of a construct (verbal labels etc.) and the construct as used in a given context'. (8) They quote Hinkle: 'For example, what a person considers to be "honest" in the context of criminals may be vastly different from "honest" in the context of intimate friends'. However, both 'criminals' and 'intimate friends' could be present within one domain in the repertory grid, for example they could both figure in a role title list of 'members of my club'. Then the construct 'honest-dishonest' could be applied with varying implications, in a non uniform way of the elements in the grid.

A subject may apply the emergent pole of a construct to several elements in a grid, but see that pole as applicable to each element in

a different way. Take the construct 'talkative-quiet'. If asked to explain how the emergent pole applied to the element, the subject may say that element A is 'boastful', element B 'makes an effort to be sociable', element C 'talks a lot about his interests'. He may produce several verbally different implications.

But, purely verbal differences between implications would have no significance for measures derived from the grid. Several labels may represent for the subject merely one construct. It is only when implications (of the use of one construct of one or several elements) are functionally dissimilar that this has consequences for grid methodology. Functional similarity and dissimilarity are determined, for Kelly, by degrees of match and mismatch between rows in the repertory grid.

Functionally distinct implications may be differently related to other constructs in the subject's personal construct system. Consider the relationship between the constructs 'talkative-quiet' and 'aggressive-soft'. Some ways of being talkative, e.g. 'boastful' may be positively related to some ways of being aggressive, others, e.g. 'nervous' may be positively related to some ways of being soft, and negatively related to all ways of being aggressive. Thus the two constructs, 'talkative-quiet' and 'aggressive-soft' may only match at 'chance' level in the grid. Users of the grid usually dismiss such relationships as being unimportant, or at least do not investigate them fully. It is the author's contention that a 'chance' level of matching between two constructs could be an indication of an important relationship for the subject which needs resolving rather than something unimportant which requires no further investigation.

## The aims of this study

In the present investigation, the author aimed to produce a situation whereby a subject could 'make a running commentary on the nature of the grid operation he is carrying out' (8); specifically here, the use of each construct of the elements in a grid.

As well as investigating:

(I) Whether construct-element interaction takes place on a verbal level.

(II) Whether it may be productive of functionally different implications.

the study also

(III) examines the circumstances in which construct-element interaction productive of functionally different implications is most likely to occur.

## The Following Section

Only a little of the background to this study has been set out here. This investigation continues in the following two sections and seeks to show that construct-element interaction is not just an isolated methodological issue but has important repercussions for aspects of Personal Construct Theory.

PART I SECTION 2

BACKGROUND TO THIS STUDY

## Construct-Element Interaction and the nature of constructs

This section focuses on the nature of personal constructs and their use of elements in the repertory grid. Some features of constructs and of elements which may make construct-element interaction and the production of functionally dissimilar implications more likely, are discussed.

## The Non-Linguistic nature of constructs

A construct is essentially a discrimination which the person can make. It may be verbalized or not, it bears 'no essential relation to grammatical structure, syntax, words, language or even communication, nor does it imply consciousness' (80). Kelly distinguishes between the verbal label a construct may have and the way the construct functions, between the label used to symbolize it and the actual construct. 'Since a given construct symbol may represent a variety of specific bases (constructs) it is important that a construct and its symbol not be equated'. (8)

In the repertory grid, a subject is given, or produces a verbalized distinction. He is asked to use this of elements in the grid, elements in one 'domain', all of which fall within the 'range of convenience' (i) of the construct. Since 'a given construct symbol may represent a

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i. Range of convenience. A construct's range of convenience comprises all those things to which the user would find its application useful.

variety of specific bases' (8) one does not know whether, in fact, the subject is using only one construct of the elements; using the symbol with only one pair of criteria.

One could say that the functional distinction will change only with the context (excluding the 'context' of the weather, the room etc.) and that as the elements within one grid all come from one domain, there should be only one 'game' operating (168). However, the notion of 'domain' is relative, not absolute. A man may 'mean' something different i.e. make a different distinction with different implications in the context of 'intimate friends' as in Hinkle's example (8), but what if both contexts were present in one domain, e.g. 'patients in hospital'? Which distinction would he use, just one? He may use at least as many distinctions as there are elements.

Constructs Used as Scales

Kelly's discussion of the use of constructs as scales contributes to this argument. His dichotomy corollary states that: 'A person's construction system is composed of a finite number of dichotomous constructs' (8). Kelly makes it clear, however, that the notion of dichotomous constructs does not preclude the use of scales.

Various types of scales are delineated (74). For example, Kelly considers a hierachical scale of integrity vs. disintegrity built out of the four basic constructs of honesty vs. dishonesty, candor vs. deviousness, courage vs. defeatism and objectivity vs. subjectivity.

He supposes that these constructs are arranged in a hierachical

order. If we let the binary digit 1 represent the first of each pair, and the binary digit 0 represent the second, a dishonest, devious, defeatist, subjective person would be represented by the scale value of 0000 and would be at the disintegral end of the scale. But, let us see what would happen if the construct 'integral-disintegral' was used by a subject in the repertory grid. Each application could involve any one of the four bases above, or any combination of them, yet the subject would be called upon to respond on a binary, ranking or rating form. One would have no information as to how the construct actually applied to each element.

In the above example, the construct, 'integrity-disintegrity' was superordinate to the four other constructs mentioned. A superordinate construct is one 'which includes another as one of the elements in its context', a subordinate construct is 'one which is included as an element in the context of another'. (8)

Besides this relationship of inclusion, superordinate constructs are held to be 'important', 'general', and 'abstract', (8) and subordinate constructs to be 'specific' and relatively 'concrete'. However, there is some doubt as to what these features actually imply in operational terms. Like a number of other 'important theoretical constructs', superordinacy and subordinacy, 'have proved difficult to translate into agreed and intercorrelating grid measures'. (8)

Characteristics of Superordinacy

Bannister and Salmon (7) have investigated various defining characteristics of superordinacy.

In their first study, they were concerned to show that, what they took to be two defining characteristics of superordinacy (a wide range of convenience, and a large number of inter-relationships with other constructs) were operationally related.

The range of convenience measure was derived from a rank ordering of twelve supplied constructs, from the one a subject applied to the greatest number of elements, to the one he applied to the fewest. For the second measure, eight elements selected from an original thirty on the basis of maximal inclusion in the subject's use of the twelve constructs, were rank ordered on the same twelve constructs by the subject. The resulting sets of twelve rankings of eight elements were intercorrelated, and from the matrix of intercorrelation, the constructs were rank ordered according to the amount of variance for which each accounted.

The results were analysed in terms of the intercorrelations for each of the nine subjects between the rankings of the twelve constructs on the two measures.

The authors found a marked variation in the degree of correlation between the two measures, ranging from 0.36 to -0.71, with a median at -0.11. There was, therefore, no clear indication as to whether the range of convenience measure, or the combined number and strength of inter-relationships measure could both, or indeed singly, be taken as defining features of superordinacy.

These results led these authors to carry out a second experiment

in which these two measures of superordinacy were repeated, along with eight other measures.

In a rating task, each subject categorized twenty elements on fourteen elicited constructs using a six point scale together with a 'doesn't apply' category. From this task, three measures were obtained:

(i) The number of extreme ratings made.

(ii) The range of convenience measure.

(iii) Lopsidedness in using constructs measure.

In a ranking task, eight elements selected from those used in the previous task on the basis of maximal inclusion in the range of convenience of the fourteen constructs, were rank ordered by subjects on each construct, from the positive to the negative pole. Four measures of inter-relationship were derived from these results:

(iv) The degree of relationship with the most important construct.

(v) The relative variance accounted for.

(vi) Size of loading on the first factor.

(vii) Size of loadings on all components.

The resistance to change task was carried out according to Hinkle's (60) method. For each construct, the number of times on which the subject changed on the compared construct was totalled, and the fourteen constructs ordered from most to least resistant to change.

The laddering measure (60) was determined by counting the number of different constructs elicited by this technique for each construct.

The final task consisted of presenting each subject with a list

of his fourteen constructs, and asking him to rank these for their importance to him.

The results were made up of the intercorrelations for each of the ten subjects, between the rank orderings of the fourteen constructs according to the ten criteria of superordinacy, also the mean intercorrelations between the rank orderings for the total group of subjects.

Bannister and Salmon found great variability of size and direction of intercorrelations amongst the ten subjects. This variability served to flatten out a large number of correlations when averaged. The only consistent tendencies towards positive relationships seem to be between:
(i) Those measures concerned with quantifying the total amount of relationship of a construct with other constructs.
(ii) Those measures which concern the subject's ordering of priorities.
(iii) Those measures relating to the subject's broad or limited usage of the construct, as this relates to the measures in (i) and (ii).

The range of convenience measure seemed to act as a link between two other sets of measures which were themselves internally linked. One can say, therefore, that constructs relatively superordinate in certain contexts, as in (i) and (ii) above, may also have a wide range of convenience.

If constructs have a wide range of convenience, they can be used in several contexts. They might, therefore, be used in different ways, with different criteria of application. It all depends upon the relationship between the contexts, and the ways of applying the constructs which are available to the subject. On the other hand, the range of

convenience measure was related to those concerned with the total amount of relationship with other constructs. This suggests that superordinate constructs may be applicable in various contexts, but that their use in each would be similar.

It will be interesting to examine the issue of construct-element interaction in relation to the subordinate-superordinate distinction.

The Use of Constructs in a grid

Mair's paper on whole figure constructs (99) is relevant to the issue of the use of constructs of elements within a grid. The practice has grown up of presenting a subject with constructs such as 'like me in character', or 'like my father', and assuming that the relationship between this construct and others within the grid, will index the subject's self perception or his perception of significant others in his life. This assumption, Bannister and Mair point out 'is debateable, since the subject can hardly handle such whole-figure constructs in any total sense, but must break them down to the idea of like my father in respect of dimension X or like I am in character as far as dimension Y is concerned'. (8) This 'breaking down' may not only be applicable in relation to whole figure constructs. Perhaps one could talk of it in terms of all relatively superordinate constructs. For example, one could say that the construct 'integrity-disintegrity' could be broken down into the four bases Kelly uses in his example. (74)

Mair studied sorts based independently on the constructs 'most like I am' and 'least like I am' and afterwards asked his subjects to explain the basis for every choice they had made. No subject consistently

used only one dimension as a basis for sorting people as like or unlike himself. When the various dimensions underlying 'like me' and 'unlike me' were used as constructs for further grid sorts by each individual, expected intercorrelations failed to appear. It seems therefore, that whole figure constructs may not be applied in an identical way to all the elements in the grid. In his conclusion, Mair states that, 'many problems do seem to arise with the use of whole figure constructs (though these problems only differ in degree from those arising with the use of more specific constructs)'. (99) It is with this latter notion that the study here is concerned.

'Man - the scientist' and the nature of constructs

According to Kelly, all psychological theories involve some philosophical conception of the nature of man. In personal construct theory, Kelly makes such an assumption explicit when he says that we might consider every man and his behaviour as if he were a scientist, 'ever seeking to predict and control'. (74) Man in his scientist-like aspects evolves a construction system which he uses to place and control events. Such a system Kelly thinks, is like a theory. But, a 'theory need not be highly scientific in order to be useful. All of us order our lives by constructs that are somewhat elastic. Under these constructs, our anticipations of daily events while not scientifically precise, nevertheless surround our lives with an aura of meaning'. (74) However we can ask whether Kelly's grid is a fitting vehicle for constructs that are somewhat elastic.

Bannister and Mair (8) describe a study in which they contrasted constructs which deal with people and interpersonal relationships, and

constructs which deal with physical objects. Separate grids were constructed to measure stability within the two construct subsystems. Ten subjects were asked to rank order ten photographs of people on the constructs, sincere, kind, friendly, mean, selfish and energetic. They repeated this task immediately on a different set of ten photographs and six weeks later they used the same constructs on the original set of photographs. Each grid was analysed to provide a matrix of construct relationships and the consistency of this matrix was calculated across time; correlations were averaged for the group. It was found that the mean reliability of the matrix pattern across elements was 0.72, across time it was 0.86 and across elements and time it was 0.73.

The same group of subjects was given a similar series of tests, in which the elements they were asked to sort were two sets of fifteen names of common physical objects (anchor, toy balloon, cricket bat, building brick etc.) They rank ordered these in terms of the constructs large-small, smooth-rough, heavy-light, fragile-tough, curved-straight, long-short. The mean stability of matrix pattern for this task was: across elements 0.92, across time (six weeks) 0.93 and across elements and time 0.93.

In terms of this study, Bannister and Mair argue tentatively that people (as assessed in terms of the stability of their conceptual structure in the two subsystems) are more confident as physicists than they are as psychologists - they have more stable systems through which to view objects than through which to view people.

The contrast Bannister draws here is between 'physical' constructs

and 'psychological' constructs. Bannister and Mair suggest that a grid with people as elements could be completed, by a subject in terms of constructs like 'light-heavy', 'large-small', and that high reliabilities might appear in this type of experiment. But, people as elements may be open to more possible interpretations than physical objects and thus contribute to the possibility of construct-element interaction.

In addition, this distinction between 'physical' and 'psychological' constructs is only part of the issue. Both when used by non professional 'scientists' may be applied as 'commonsense' rather than 'theoretical' constructs. Dewey writes: 'The subject matter of science is stated in symbol constellations that are radically unlike those familiar to commonsense, in what, in effect, is a different language'. (36a) In the 'commonsense' world, the system is practical and institutional rather than intellectual; 'commonsense knowledge of everyday life is sufficient for coming to terms with fellow men, cultural objects, social institutions - in brief, "social reality". The meanings formed on this basis necessarily contain much that is irrelevant'. (36)

Context plays a large part in the meanings of words in a 'commonsense' system. In science, the role of context is somewhat less. 'In scientific inquiry, then, meanings are related to one another on the ground of their character as meanings, freed from direct reference to the concerns of a limited group... Consequently a new language, a new system of symbols related together on a new basis comes into existence, and in this new language semantic coherence, as such, is the controlling consideration'. (36) Within one theory, constructs are applied in a

uniform way. 'One of the hallmarks of science seems to be the care with which the superordinate-subordinate status of constructs is defined and the attention paid to this problem'. (9) How useful would be a determination of the subordinate and superordinate implications of a construct with no integrity?

Science, developing out of a commonsense view of the world, 'should not attempt to reflect the variety of terms in which we customarily express our experience'. (9) This is not to say that 'commonsense' language is inadequate, merely that it may be less than adequate for some purposes. Thayer writes: 'It may well happen that an occasion be such that a more precise, controlled and refined language is necessary, but this fact does not of itself invalidate the function of commonsense language'. (146)

Terms may have a variety of uses. This feature may cause difficulty even with developed 'scientific' constructs. Discussing Bridgeman's Operationism and its thesis that a concept is synonymous with a corresponding set of operations, Mondler and Kessen write: 'Developments in the theory of relativity showed that the concept of length has at least two defining operations within the theory - the conditions under which the two lengths operate, indicated that a unitary concept no longer sufficed'. (104) Tizla gives examples of such semantic confusion, occurring when concepts actually used in different senses in various contexts are still designated by the same term. He quotes Menger, speaking of this difficulty arising in contemporary mathematics, 'mathematico-scientific methodology is in need - in fact, in urgent need - of a separator or a prism resolving conceptual mixtures into a spectrum of their meanings'. (148)

Man may be engaged in predicting and controlling his world, as the scientist, but he may not be engaged in a similar game with language. In the repertory grid, man's constructs are portrayed by the psychologist who is anxious to understand his 'social reality' in a form whereby they can be examined. Deductive relationships, of anticipation or implication are assumed to hold between constructs functionally similar in the grid.

In the grid, within one subsystem, constructs are generally assumed to be used of elements in a uniform way, though, as this thesis hopes to show, in some instances, this assumption may be questionable. Science involves a tightening of construct links. One can see 'everyday' thinking at the 'loose' end of this continuum, but then one must remember the factors involved in this when one comes to interpret the repertory grid. The grid requires standards of uniformity and consistency which may not be applicable to loose construing. Usual ways of analysing grids depend on aspects of 'tight' construing.

Summary of the foregoing

To summarize the points raised so far:

(I) Kelly distinguishes between a construct label and the way the construct functions. A verbalized construct may represent a variety of bases. Several verbalized constructs may represent just one basic distinction. Kelly's discussion of the use of constructs as scales illuminates this further.

(II) Within one grid, all the elements come from one domain. However,

the notion of domain is relative. The domain 'people in general' may include a number of other possible domains.

(III) Constructs are held to be organized in hierachical systems. Relatively superordinate constructs appear to have a wide range of convenience, thus they may be applied with a number of implications, according to context.

(IV) Mair's paper on 'whole figure constructs' (99) suggests that these may not be applied in an identical way to all the figures in a grid. This may be true of many personal constructs.

(V) Kelly suggests that we view every man 'as if' he were a scientist. Whilst this analogy might have useful descriptive value, it may fall down at the level of the analysis of repertory grids. The constructs man uses in the grid are unlike those of the professional scientist, yet they are examined in a form which requires standards of consistency for its interpretation which may not be applicable.

PART I SECTION 3

FURTHER BACKGROUND TO THIS STUDY

Construct-Element Interaction and relationships between constructs in the grid

If constructs interact with elements and this interaction involves the use of functionally different distinctions, this might cause difficulty in interpreting relationships between constructs in the repertory grid.

In the grid, Kelly assumes that a psychological relationship between two constructs will be reflected in a statistical association between them. Bannister gives some support to this idea in a sub-experiment (4). Ten 'normal' subjects were given the ten terms they had already used in the main part of the experiment. They were asked to list under each term the other nine, according to the following instructions: 'Put first the one nearest in meaning to the heading term, then the second nearest in meaning, working down to putting finally the one most opposed in meaning'.

To examine the relationship between meaning and statistical association, Bannister also ranked the terms according to the order indicated by the mean matching scores of twenty 'normal' subjects who had taken part in the main experiment. Resulting correlations, between both lists of terms, were such that he concluded that: 'The implication is clearly that a construct relationship (as operationally defined in terms of matching scores) is akin to "meaning"'.

Mair in his 1966 paper (97) also attempted a test of the relationship between statistical and conceptual associations. He was concerned with whether grid scores from inter-relations between any set of personal constructs accurately reflect the system of the individual concerned, or merely indicate some unsatisfactory aspect of grid method itself.

He assumes, in this paper that people function psychologically both within their own personal construct system and also within a public system of constructs. This public system of constructs, involving dictionary definitions of constructs, would be more open to inspection that the private. Thus, Mair used parts of the public system to allow for the assessment of the validity of taking grid scores as measures of meaningful conceptual relationships, and of change and stability.

In the study, he hypothesized that, if two adjectives with similar public meanings were used as constructs in a grid for a group of people, high positive relationships between them should emerge, provided that subjects knew their meaning. If subjects did not know the meaning of these words, they might place a personal definition upon them. If they did this, grid relationships may be near chance level. If subjects subsequently discovered the correct meanings, in a repetition of the grid there should be an overall increase in relationship. Also, on retesting, relationships between constructs whose meanings were known originally, should remain stable.

Most predictions were confirmed. Mair concluded that: 'the results indicate that under controlled circumstances, grid scores tend

to reflect predicted relations, changes and stability'.

Limitations of the Grid

Therefore, there is some evidence that a significant positive or negative relationship between rows in the grid is an indication of a conceptual association between the constructs. But sometimes the rows match at chance level. Bannister and Mair discuss this case with two constructs: 'If roughly half of those described as intelligent were also described as enterprising, then the dimensions thus represented may be unrelated for the subject'. (8) They may be unrelated. There is no conclusion one can draw. One cannot distinguish between the cases in which:

(i) there is a conceptual relationship between the constructs, but of a complex nature, and

(ii) there is no relationship, merely a chance one; the relation is not important in the subject's personal construct system.

If there was a complex relationship, this might mean that for the subject, some ways of being intelligent were associated with some ways of being enterprising, and some were not. Thus, 'intelligent' and 'enterprising' might be applied with differing criteria to the elements in the grid. In the present form of grid, one cannot tell whether or not this is the case. Bannister and Mair write: 'it is already apparent that the original binary grid and its more recent variations cannot adequately subsume all the ingenious and sometimes contorted forms of construing which men have undertaken. Not least among its limitations is its fixity in expressing only one type of linkage between constructs (the reciprocal linkage represented by a unitary index of association) and its failure to incorporate some important aspects of

construct theory'. (8)

Several forms of implication between constructs are possible. Hinkle (8) gives examples of four patterms which could link two constructs: parallel, orthogonal, reciprocal, and ambiguous. The 'ambiguous' form and what Hinkle says about it is of most interest at present. He discusses an 'ambiguous relationship' between 'desirable-undesirable', and 'realism-idealism', where realism and idealism implied desirable and undesirable aspects for a person. Such situations, he writes, seem to result from: (i) an incomplete abstraction of the differences between the contexts in which the construct was used; (ii) the use of one construct label for two independent dimensions e.g. realism-idealism in the sense of testing ideas-not testing ideas and realism-idealism in the sense of not having goals-having goals. 'When clarified the subject could relate each of these usages of realism-idealism to 'desirable-undesirable' in the unambiguous parallel form. In this sense, psychological movement, conflict resolution and insight depend on the locating of such points of ambiguous implication and the resolving of them into parallel or orthogonal forms.' (8)

In the grid, a 'chance' level of matching between two constructs could be an indication of an important relationship for the subject which needs resolving rather than something unimportant which requires no further investigation.

Measures based on the total structure of the grid

In the repertory grid there is generally a concentration on the total structure produced by scores, rather than any interest in individual

constructs or elements or of any interaction between the two. Slater writes that often researchers 'do not examine the relationships between the elements or of the elements with the constructs. Consequently they waste most of the information in their data, large parts of it entirely'. (142)

Cognitive complexity is one example of a concept which has been tied to a measure of the total structure of the grid. In early work (13) it was defined in terms of the degree of differentiation within an individual's system for construing behaviour. More recently it has been argued (28) that the degree of differentiation of a cognitive system is but one aspect of the complexity of its structure. 'The complexity of a person's cognitive structure', writes Warr et al. (161) 'is a function of the number of dimensions he employs, the way he employs them and the way he combines them to form unified judgements'. The authors describe these three structural aspects of 'differentiation', 'articulation' and 'integration'. Bieri (13, 14, 15) and other workers have investigated the number of dimensions employed. Crockett (28) has drawn attention to the integration idea, which has been particularly stressed by Harvey (54), Harvey, Hunt and Schroder (53) and Schroder, Driver and Streufert (132). Of these aspects the present study is mostly concerned with the employment of dimensions by subjects. Articulation, the fineness of discrimination along individual dimensions is only one aspect of this.

Schroder, Driver and Streufert (132) define discrimination as 'the capacity of the conceptual structure to distinguish among stimuli'. They identify four aspects of discrimination:

(i) the number of stimuli that can be ordered by a given dimension.

(ii) the fineness of gradation of intra-category distances (from a dichotomous scale to an infinite number of values, like Warr's 'articulation').

(iii) the certainty of placement of stimuli; the degree to which the individual delays final decisions concerning the stimulus.

(iv) the flexibility of rules for including certain stimuli in a dimension. 'The less fixed the rules of admission, the more stimuli will be included and the more finely such stimuli can be discriminated. Consequently, new information about any aspect of a stimulus would be associated with greater probability of change in the placement of that stimulus on dimensions'. (132)

This study is concerned with the number of rules a subject has available for the application of each construct label to various elements in a grid, all of which fall within the range of convenience of application of the construct, and come from the same domain. The way in which each construct is applied to individual elements determines the total organization of the grid. However, overall structure is all that is usually investigated. Behaviour on the level of the application of each construct to individual elements is rarely examined.

## The Implication grid and the repertory grid

Kelly's method allows for the indirect assessment of the degree of probability of association between two or more constructs. In contrast to this, Hinkle's Implication grid (60) requires the subject to directly indicate certain links which the subject thinks exist between constructs, usually allowing only for all or none decisions, not degrees of probability. Hinkle's method also focuses on a specific context e.g. a subject's past constructions of himself, his view of a particular

figure, or his own preferred self construction, whereas the repertory grid directs attention to generalized relationships between constructs. It is the emphasis on a specific context within which to determine relationships between constructs which makes the Implication grid especially interesting.

In the Imp grid each construct is paired twice with every other construct (1 with 2, 2 with 1 etc.). Hinkle's instructions to his subjects ask them: 'on which of these constructs do you probably expect a change to occur as a result of knowing that you have changed from one side to the other on this one construct alone? A knowledge of your location on this one construct could probably be used to determine your location on which of these remaining constructs?'. (8)

In an implication grid, the pattern of ticks and blanks in the column is considered by Hinkle to represent the superordinate implications of the various constructs; while the pattern of checks in the rows indicates some of the subordinate implications of the constructs.

As I mentioned, in the Imp grid, subjects consider the implications of constructs relative to a particular context. 'Thus some constructs might be related together in the context of certain people, as the subject viewed them, but not in that of others. Such variations could be of considerable clinical interest'. (8)

For Kelly, 'the context of a construct comprises those elements among which the user ordinarily discriminates by means of the constructs. It is somewhat more restricted than the range of convenience, since it refers to the circumstances in which the construct emerges for practical

use, and not necesarily to all the circumstances in which a person might eventually use the construct. It is somewhat more extensive than the focus of convenience since the construct may often appear in circumstances where its application is not optimal'. (8) Kelly does not consider context at a lower level where it may represent merely one element or even one element at a certain time, place and condition.

Bannister and Mair discuss context in relation to the repertory grid, but not in terms of the application of constructs to individual elements. For example, they write: 'For a given subject the construct mature-immature may have one set of implications when it is applied to members of his own family, a rather different set of implications when it is applied to people in general, implications which are different again when it is applied to nations, and yet a further set of implications when it is used to subsume works of art. The picture of relations between constructs derived may depend a great deal on the context in which the subject was asked to use them. He may well have shifted from one context to another as he handled different constructs and thus produce a confused and mixed reflection of the relations between them'. (8)

Thus, they interpret the notion of context in terms of different domains: 'members of his family', 'people in general', 'nations'. Within the grid, the elements are usually assumed to be from one domain. Yet it seems that 'a confused and mixed reflection of the relations between [constructs]' may occur. Suppose that a subject has to apply the construct 'mature-immature' to elements in a grid, all of which come from the one domain 'people in general'. We do not know whether for him these elements form a uniform context for the application of the constructs. Bannister and Mair have already conceded that the

construct may be used with a different set of implications when used on 'members of his own family'. In a role title list for the elicitation of elements for the subsystem 'people' these would be included. One can easily envisage a situation where, in terms of the construct 'mature-immature', the subject had representatives of at least two contexts in his element list, 'members of his own family', and 'people in general'. Can we then assume that he will use the construct with one criterion of application only?

The Study of Change

'Construct theory's candidate for a central issue in psychology can be argued to be change. Kelly's definition of man as a form of motion makes it central, and the fundamental postulate and virtually all of the eleven elaborative corollaries of the theory specifically refer to process'. ( 9 )

Kelly was concerned that personal construct theory should be able to construe change. But, does the repertory grid, as the principal instrument connected with the theory reflect this concern?

Personal construct theory is about predictable changes. Accordingly, in the rep test, and in the repertory grid, Kelly was concerned, not to position people with regard to certain fixed dimensions, as in most personality tests, but to determine those which they themselves use, 'to reveal pathways along which they are free to move'. (8) The most obvious freedom of movement is, he saw, from one end to the other along the axis, a slot change: 'Knowledge of a person's polar position on any of his important constructs defines something of his present self conception and his notion of the alternative to this conception'. (8) Hinkle has

examined slot change in terms of a person's willingness to move on one construct as compared with his willingness to move on another.

Though Kelly places such emphasis on accounting for change, there have been criticisms of his treatment of change within the repertory grid. Mair and Crisp agree that, 'the two poles of each construct may define pathways along which the person may see change as possible', but think that the repertory grid is, 'still a cross-sectional and relatively passive measure'. (100) In 1970, Mair writes: 'As we have noted, Kelly stresses that "man is a form of motion", but we find that movement is only awkwardly incorporated in the methods he outlines. Only by testing and retesting with grid measures (as in most traditional methods of measurement in psychology) can some idea of movement be gained'. (101)

What is wrong with the repertory grid as an instrument for investigating changes? The grid provides a framework for the study of the elicitation of elements and constructs, the application of constructs to elements, and the relationship between elements and constructs in the grid. The test-retest procedure provides information about:

(i) Scalar and slot change - the elements are rated in a different way on the construct,

(ii) Shift change - a construct used in a context in the first test is not repeated,

(iii) Change in systematic meaning of a construct, a construct used in test one is repeated in the retest, but its relationships with other constructs have altered,

(iv) Changes in total relationship scores.

Unfortunately, as Slater (142) points out, much of this information is usually ignored.

Completing the grid is itself a process. The grid exhibits an interaction system, change can be studied within as well as between grids. Mair suggests that we start on the level of one construct being used in several contexts, in effect what has been carried out in the present study: 'By so doing it would be possible to explore the range of contexts and elements to which each pole could meaningfully be applied, the implications that any particular use of the construct could involve'. (98)

The grid may be studied as a dynamic, rather than as a static instrument. Investigations of processes involved in the elicitation of constructs and elements and the application of constructs to elements, in terms of the various corollaries and theoretical constructs of the theory should be undertaken.

A Summary of this section

If constructs interact with elements to produce implications which are functionally dissimilar, these implications may be differently related to other constructs in the personal construct system.

Thus:

(I) Constructs which match at 'chance' level in the grid may not have an 'unimportant' relationship but a complex one that may be important for a subject and needs resolving.

(II) Measures based on the total structure of grids are determined by

a subject's behaviour at a much lower level - but this behaviour (i.e. the application of a construct to elements) is rarely investigated.

(III) The repertory grid directs attention to generalized relationships between constructs. Kelly discusses the importance of context, but this is not examined on the level of single elements. By contrast, in the Implication grid, constructions are seen as relative to a particular context.

(IV) The concept of change is fundamental to personal construct theory but the repertory grid has been described as a 'relatively passive measure' (100). It is argued here that if the grid exhibits an interaction system then change may be studied within as well as between grids.

PART II SECTION 1

THE INVESTIGATION

This study is an attempt to look at the process of construct-element interaction in the grid in terms of individual verbalized constructs interacting with various elements. It is at the same time part of a wider issue, the idea that a 'Kelly-type' analysis is carried out at a relatively global level and that it might be interesting to examine relationships in the grid, and to see whether they may be for the subject rather more complex than has hitherto been suggested.

Bannister and Mair comment on this: 'Understanding in what way and to what extent grids can reflect the construct systems or the modal systems of groups must involve examining in great detail the account given by subjects of what they think they are doing in a grid situation and finding ways of comparing this with the test outcome'. (8)

Directly relevant to the present study is the following passage from Mair. He speaks of: 'the possible use and importance of investigating more of the internal structure of any generalised construct that a person uses than is at present advocated. Thus it may sometimes be important, and could certainly be instructive from the point of view of advancing understanding of the use of constructs and developing more suitable methodologies, to investigate the ramifications of one construct being used by a person. By so doing, it would be possible to explore the range of contexts and elements to which each pole could meaningfully be applied, and the implications that any particular use of the construct could involve'. (98) The present study is constructed on just such a

model, involving the use of individual constructs of different elements, and an investigation of the different implications such applications may have. As such it forms, it is hoped, a contribution to an analysis of the functioning of the grid.

The Aims of the Study

These were as follows:

1. To investigate the process of construct-element interaction in the repertory grid

Expectation: If constructs interact with elements, this may be investigated on a verbal level by asking subjects how they would apply a construct label to each element in a grid. If their replies are set out in a table, one can chart the verbal change of the original construct. ('Original' constructs are those from which subordinate implications are elicited.)

2. To examine whether the implications produced by construct-element interaction may be functionally as well as verbally dissimilar

Expectation: If a construct is used of elements in a uniform way, then its subordinate implications should be functionally similar and the grid in which they appear, undimensional. One principal component, therefore, should be sufficient to characterize all the significant variation in the grid.

If a construct is not used in a uniform way, its subordinate implications will not be functionally similar and significant variation will be left uncharacterized by the first component.

3. To see which constructs are most likely to interact with elements to produce functionally dissimilar implications

(a) Superordinate constructs

Two hypotheses are possible here:

(i) Superordinate constructs have been described as 'general', 'abstract', and 'important'. (8) They appear to have a wide range of convenience (7). By definition, they have many implications (8). Through experience with them, a subject may come to use them with several rules.

Relatively subordinate constructs are more 'specific', they have fewer implications to other constructs, they have a narrower range of convenience. The potential, therefore, for the non-uniform use of constructs may differ according to their hierachical position. Of course, the sub/superordinate distinction is not absolute but functional. However, constructs which have been determined to occupy a relatively superordinate position in a subsystem might have available a larger set of rules for application in a domain than constructs in a relatively subordinate position. It follows therefore that (hypothesis 1): Relatively superordinate constructs are more likely than relatively subordinate constructs to interact with elements to produce functionally dissimilar implications.

(ii) One way of determining sub/superordinacy is through the repertory grid (8). Constructs loading heavily on the first factor, or determined by a similar measure are taken as superordinate. These are constructs which match highly with others. They may be used with several implications, but the implications are synonymous.

'Subordinate' constructs, on this method, do not exhibit such high matching scores (8). They may be related in a complex way to other constructs in the grid. It follows therefore that (hypothesis 2): relatively subordinate constructs are more likely than relatively superordinate constructs to interact with elements to produce functionally dissimilar implications.

(b) 'Unqualified' constructs

Original constructs (constructs from which subordinate implications were derived) were designated as 'unqualified' or 'qualified' according to the lack of, or addition of qualification they carried. For example, 'good-bad', 'kind-unkind' would be seen as unqualified, whereas 'walks slowly-walks quickly', 'sometimes laughs-never laughs', 'wouldn't want him as a friend-a good person to be friends with' would be seen as 'qualified'. It was thought that already qualified constructs might have less potential than unqualified constructs for the production of functionally dissimilar implications, since their meaning, and therefore application, was already circumscribed.

Thus, it was hypothesized that: unqualified constructs would be more likely than qualified constructs to interact with elements and produce functionally dissimilar implications.

Linguistic features like 'ambiguity' and 'vagueness' would be difficult to investigate on an objective basis. They depend upon the use of a term by a subject and are, in a sense, what this study is all about. Thus, the qualification of the original construct was chosen as a factor likely to be related to the production of functionally

dissimilar implications, and one more amenable to study.

4. Characteristics of the subordinate implications of an original construct which may be related to the production of functionally dissimilar implications

(i) The number of verbally different subordinate implications produced

It was hypothesized that the greater the number of verbally different implications elicited from an original construct, the greater may be the possibility that some of these would be functionally dissimilar and that the original construct was used in a non-uniform way.

(ii) The use of both poles of a construct

If a subject can apply both poles of a construct to an element, this suggests:

(a) that he can perceive that element from more than one angle.

(b) that he can use the construct in a flexible way.

One would expect both of these to be related to the non-uniform use of a construct. Thus, one can hypothesize that: the more a subject uses both poles of a construct, the more likely he is to use the construct with functionally dissimilar implications, of the elements in a grid.

(iii) The number of representative constructs produced

In this study, subjects are asked (for reasons of time) to place into similar groups the implications of each original construct and to select from each group one construct representative of the others in that pile. They can regroup and/or subgroup, and select more representative constructs if they wish. All these representative

constructs are then used to rate the elements which have interacted with the original construct to produce the implications.

It is expected that the larger the number of representative constructs a subject selects, the more dimensions he perceives operating in the subordinate implications, and therefore the greater the number of functionally different rows in the grid.

Thus one can hypothesize that: the greater the number of representative constructs selected per original construct, the greater the likelihood that this construct has been used with functionally dissimilar implications.

This was an exploratory study, aimed at opening up an area previously neglected. The factors taken into account when the experiment was planned are discussed in the following section.

PART II SECTION 2

## THE RATIONALE OF THE METHOD USED

This study follows Mair's suggestion of the importance of investigating 'the ramifications of one construct being used by a person'. (98) But which construct to choose? A provided construct might be familiar to some subjects, in which case they may have available a network of its implications, but relatively unfamiliar to others. On the other hand, to elicit a construct it is necessary to provide instructions with which all subjects can comply. It was decided therefore, to ask each subject to give, as the initial construct, a characteristic of themselves, plus what they considered to be its opposite. This was in keeping with Warren's (163) suggestion that such a construct would be relatively 'central' in any subject's system, and with the intention of erecting a hierarchy of constructs for each subject from the original construct. Warren writes that: 'traits which are "central" for an individual are those which he uses to characterize himself. When he thinks of what kind of person he is, he uses these dimensions to construe himself'. (163)

Therefore, from each subject was elicited, 'an important characteristic of yourself, plus what you consider to be the opposite'. It was felt that this satisfied the various criteria, in that it was an instruction applicable to all subjects, and being designed to elicit a construct 'central' in a subject's system, would produce one with several superordinate and subordinate implications.

The Elements

In personal construct theory, the elements used in a grid are assumed to be a representative sample: representative of the population of which they are a part. To secure such a sample, Kelly advocates the use of a role title list. Such a list, he thinks, helps guarantee that a sample can be considered representative, a test of this being that most of the elements will recur on retest.

Pederson (119) asked his subjects to supply figures to fit role titles. He found an average of 77% agreement between these figures and the figures supplied by subjects to fit the same list of role titles on retest, a week later. However, Fjeld and Landfield (42) showed that without the use of role titles on retest, subjects produced, on average, 72% of the figures they had given in reply to the original list. Mitsos (110) showed that nine tenths of subjects repeated a significant number of their constructs when using a role title list to select elements, over a three month period, but only two ninths of equivalent subjects gave a significant number of repeats when the elements were a sample of 'nineteen friends', without further specification. Bannister and Mair conclude: 'The current practice of abandoning role title restrictions may, in itself, have lowered reliability findings'. (8) However, Mitsos's findings are not particularly surprising since a list of 'nineteen friends' could not include 'significant' others, such as members of the family etc., and the degree of acquaintance may be somewhat superficial.

In the present study, a role title list was not used since it was felt that some of the role titles may not be significant for the subjects. However, instructions were designed to keep some of the better points of

the list whilst losing the restrictions involved. Subjects were asked to produce elements 'who you know well enough to have formed some idea of what they are like in character'. They were encouraged to produce a wide range of elements by the number asked for (thirty, including 'myself'), the anonymity (they could use initials for these people), and the instructions (to 'choose a wide range of people: family, friends, people at college, at work, at school, people you like and dislike').

The number of elements in the grid

Originally, it was intended to investigate the use of the original verbalized construct, an important characteristic of the self plus its opposite elicited from each subject, with each of his thirty elements. From pilot studies, it became obvious that, because of the number of elements involved, this was a time consuming procedure. The construct appeared to be used in the same way of several of the elements, therefore the number of verbally different criteria of application was much less than the number of elements. It was decided, therefore, to carry out the investigation with a sample of ten, including 'myself' from the original thirty elements. These were the elements which, in the subject's opinion, were most different from each other, most different in terms of the original construct, most representative of the 'bases' underlying the original construct label. Similarity or difference is always relative to something. Two elements might be different with respect to age, but if this is not relevant for the subject with regard to the original construct, then they would not elicit different criteria of application.

A grouping procedure was devised in which the subject selected ten elements, most different from each other, with regard to the original construct.

The application of constructs

To elicit the 'bases' underlying the use of each verbalized construct, the subjects were asked of each element in turn, 'In what way is X --------?'. 'What makes you think that he is --------?'.

One can compare this with Hinkle's elicitation procedure for subordinate implications. I quote from Bannister and Mair's discussion of this: 'We might argue that subordinate implications are likely to be elicited by questions such as "how do you know that?" or "what is your evidence for that?". For example, if we ask a man on what basis he sees himself as white collar and he points out that he works in an office (as contrasted with working in a factory), then working in an office is one of the subordinate implications of white collar worker, and is the more subordinate of the two constructs'. (8) There is, it seems, a great similarity between the two procedures, so much so, in fact, that in this study it has been assumed that in eliciting subordinate implications of a construct, Hinkle may be said to be eliciting operational definitions, or criteria of application. Thus, to elicit the subordinate implications of a construct with each element as a focus of elicitation, is to find out how a construct is applied to each element. One can compare this procedure with that used in Mair's (99) experiment with whole figure constructs, where characteristics which underlay the choice of elements as e.g. 'most like self', were determined.

The hierachical position of a construct and its application in the grid

One of the aims of this study was to investigate which constructs are most likely to interact with elements to produce functionally

dissimilar implications?'.

It was hypothesized that the hierachical position of a construct may affect its potential for the production of functionally dissimilar implications.

In this study, the procedure for eliciting criteria of application of a construct appears comparable with that for eliciting subordinate implications. To examine the relation between the hierachical position of a construct and its application in a grid, relatively superordinate implications of the original construct ('a characteristic of yourself plus what you consider to be its opposite') were determined by Hinkle's method.

The elicitation of superordinate implications of the original construct

Hinkle suggests that one possible operational definition of a superordinate implication, is that likely to be produced in answer to the question 'why?' - 'If we ask a man why he prefers to be a white collar worker (as contrasted with a manual worker) and he replies that it is because he wants to be a member of the upper classes (as contrasted with the lower classes), then it can be argued that upper class is one of the superordinate implications of the construct white collar worker and and that thereby upper class is the more superordinate of the two constructs within the system as a whole'. (8)

Bannister and Salmon in their study of superordinacy experienced difficulty when using Hinkle's technique. 'The main problem was that there appeared to be considerable variation in how the subjects interpreted

the question: 'why would you rather be ..... than .....?' In some cases the subject gave a concise answer, expressing a single reason which underlay the original preferences; but other subjects tended to answer each question with a long and very general statement, part of which appeared to be a statement of the preference, or an illustration of this, rather than the underlying reason for the preference'. (7) In the present study, in order to forestall this objection, an example was given. (p 117)

Use of both poles of a construct of each element

As part of the aim of this investigation was to examine in more detail than usual the functioning of the grid, the maximum amount of information was elicited from each subject concerning how he dealt with elements and constructs. Therefore, the procedure followed in this study allowed subjects to apply both poles of a construct to each element. For example, the subject might first be asked, 'how is X kind?', then, later, 'how is X unkind?' This was felt to be necessary. Using a split half technique, Mair (98) showed that elements first placed under one pole of a construct may later be placed under its contrast. Bannister and Salmon write: 'Indeed, several subjects claimed that some elements could be described by both the positive and negative poles of certain constructs. In many cases this was obviously true (e.g. Successful - Hope to succeed, Realist - Petty, Interested in the underdog - Holding a position of authority)'. (7)

One element may represent, not one unitary context, but perhaps several, according to situation, mood etc. considered. It is interesting to examine the various implications a construct might have for a subject,

under such different conditions.

Are different criteria used?

In this study, from an original construct (an important characteristic of the subject) subordinate and superordinate implications were elicited with each of ten elements as focus of elicitation, using a modification of Hinkle's technique. Subordinate implications indicate the way in which the original construct applies to each element. These implications may be verbally dissimilar, but as previously indicated, this would have little significance for the interpretation of the grid. What matters is the functional similarity or difference between the implications.

In this study this was determined by a procedure similar to that followed by Mair in his study of whole figure constructs, i.e. by asking subjects to use the elicited criteria in a grid, and then to determine the degree of matching between them. If the rows matched highly, then in accord with Kelly's notion of functional similarity, one could say that the operational definitions were conceptually similar for the subject - that the original construct was used in a uniform way. If the matchings were at chance level or even negative, this would mean that subjects were using the original construct with differing criteria of application, in a multidimensional way. It only has interesting consequences for grid methodology if the various criteria of application of a construct have different relationships to other constructs in a grid. If the criteria are, on a verbal level, different, but, if used as constructs in a grid, match highly, then they will have similar implications to other constructs. The element as context, then, has no bearing on the systematic context of the construct, and grid methodology has not been shown to be inadequate.

The grouping procedure used

Many characteristics may be elicited from each subject by asking how he would apply the original construct to each of ten elements. When opposite poles have been applied to each, it may mean that, according to the procedure outlined earlier, he would be required to use, say thirty or more constructs in a grid. This would take much time. From pilot studies, it was evident that when, say the thirty rows were examined in the grid, they fell into perhaps five or six dimensions. Therefore, to save time at this stage, and thereby enable the investigation of more grids per subject, a grouping procedure was adopted.

After adding what they considered to be the opposite poles to each construct, subjects were asked to place these cards into similar groups, and to pick out and place on top of each pile, a construct representative of the dimensions contained in that group. The representative constructs were those used in the grid. It was assumed that the other constructs in each group would be used in an identical way to the representative constructs; these rows were added for final analyses of the data. Thus, instead of, say thirty constructs, subjects only had to rate elements in terms of perhaps four or five. The instructions allowed them to regroup or subgroup the constructs and to produce thereby, new representative constructs, which were also used in the grid.

The rating procedure used

Elements were rated by subjects in terms of the representative subordinate implications of the original construct, to see whether, in

grid terms, the original construct was used in a unidimensional way.

Subjects rated the ten elements in terms of each construct on a seven point scale; this was to allow for more detailed matching of rows than is possible in a binary grid. The rating form has various advantages over other types of grid. The subject is allowed much of the freedom of Kelly's original method, being able to nominate any number of elements he chooses for either pole of any construct. He can make fairly detailed distinctions between people, who, in the original form of grid, might receive only a uniform tick or blank. Though he is, therefore, called upon to make fairly fine discriminations, the amount of differentiation called for is not as great as that demanded by the ranking method. The subject may also give two or more elements the same rating, whereas they would be artificially separated in a ranking form with no ties involved.

Each rating scale was printed on a separate sheet of paper. A procedure was devised whereby subjects placed cards with the names of elements to be rated on them, at numbered points on the scale. The physical action involved, it was thought, together with the absence of just completed rows, might decrease mere mechanical repetition of rating and demand more consideration from the subject for the rating of the elements in terms of each of the constructs.

The ratings given to each element on each construct were recorded by the experimenter. The representative subordinate implications were placed in the form of a grid for analysis, each row weighted by the number of constructs in the group of which it was representative. Thus, if five representative subordinate constructs were representative of

twenty implications, the grid of the subordinate implications of the original construct would contain twenty rows, five of them different.

The Second Part of the Study

As already indicated, the second part of this study was concerned with the question, 'which constructs are likely to interact with elements to produce functionally dissimilar implications?'. One way in which this was approached was in terms of the subordinate-superordinate distinction. The range of convenience of both relatively superordinate and subordinate constructs was equalized, in the sense that both were maximized. The procedure followed in the first part of the study was used, whereby each subject and the experimenter collaborated to select ten out of the original thirty elements, most different from each other, along each dimension.

It was felt that the adoption of this procedure would, to some extent, also answer a point raised by Dr Bannister (1970) in a personal communication. He pointed out, that in most investigations of structural differences between more and less superordinate levels in a construct system, the issue is blurred because the actual elements dealt with are kept the same for all levels of the system, whereas, in fact, what is sorted with constructs of a low level are constructs of a lower level yet. With the subsystem dealing with 'people', different people may be construed at different levels in the system. (Different numbers of people may also be construed at different levels, e.g. crowds, teams, couples - this study makes no provision for this.) The procedure used in this study allowed subjects to select ten out of the original thirty elements which they considered suitable for construing with a construct

and which represented the widest range of application of that construct with those elements.

Thus, in the second part of the study, the representative subordinate and superordinate implications of the original construct (a characteristic of the subject and its considered opposite) extracted in the first part of the study, were presented to each subject in a random order. From each of these, subordinate implications were elicited as in the first part of the investigation. Elements were rated in terms of these and each original construct.

If, for one subject, five representative subordinate implications of the original construct (a characteristic of yourself, plus what you consider to be its opposite) and six representative superordinate implications were elicited in the first part of the study, then in the second part, the application of eleven constructs to elements would be investigated.

Thus, a fairly intensive examination of each subject's responses was undertaken.

In the next section the actual procedure that was followed is outlined.

PART II SECTION 3 PROCEDURE

An Outline of the procedure followed

There were two parts to the investigation. In the first part, a construct, 'an important characteristic of the self, plus its considered opposite', was elicited from each subject, together with a list of thirty elements, including 'myself'. Using a modification of Hinkle's technique, and ten elements including 'myself' considered most different from each other in terms of the original construct, subordinate implications of the original construct were elicited with each element as context. Both poles of the construct were explored. These verbally different implications were made into constructs by the addition of opposite poles by the subject, and after a grouping procedure, 'representative' ones (SUB 1, SUB 2 etc.) were used on rating scales. The ten elements selected earlier were rated in terms of them and the results transferred by the examiner to a grid form for an analysis of the relationship between rows.

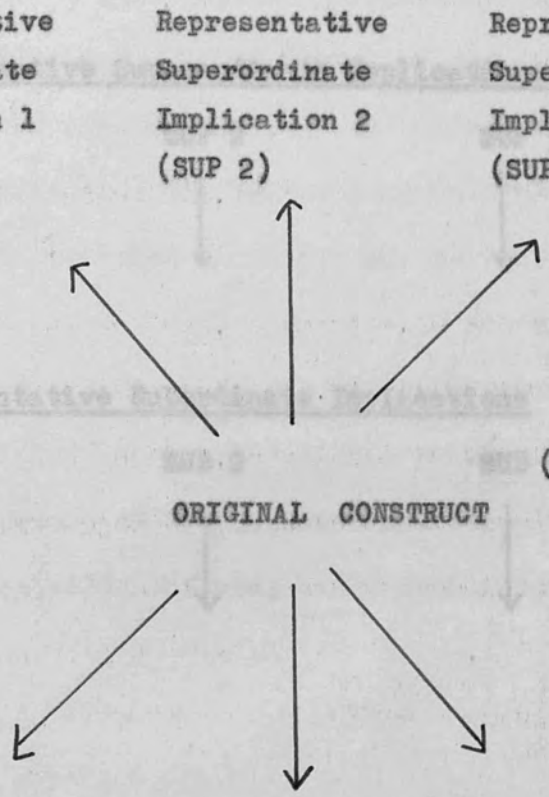
Superordinate implications of the original construct were also elicited, using the laddering technique. These were made into constructs and grouped. Representative ones (SUP 1, SUP 2 etc.) were used in the second part of the study.

In part two, the representative subordinate implications (SUB 1, SUB 2 etc.) and the representative superordinate implications (SUP 1, SUP 2 etc.) of the original construct themselves functioned as original constructs in the attempt to determine whether sub/superordinacy was related to the production of functionally dissimilar implications.

They were presented to the subject in a random order. With each construct, the procedure outlined above was followed: the elements were selected, the subordinate implications of each pole were determined with them, these were given opposite poles, grouped, and the representative ones used in rating scales. Results were put into grid form by the experimenter and the functional similarity of the implications determined.

For each subject, therefore, one has a grid of the subordinate implications of the construct, 'an important characteristic of the self plus its opposite', completed in the first part of the study, together with grids of the subordinate implications derived from representative subordinate and superordinate implications of this construct completed in the second part. These were analysed according to the aims of the study set out in a previous section.

Part I of the study



## Part II of the study

Representative Superordinate Implications

SUP 1 → Subordinate Implications of these were elicited

SUP 2 → Subordinate Implications of these were elicited

SUP 3 → Subordinate Implications of these were elicited

Representative Subordinate Implications

SUB 1 → Subordinate Implications of these were elicited

SUB 2 → Subordinate Implications of these were elicited

SUB 3 → Subordinate Implications of these were elicited

Subjects: Ten female first year students living in halls of residence volunteered to serve as subjects. Their ages ranged from 18 to 23 years.

Procedure

The subjects were given the following preliminary description of the experiment: 'This study is concerned with the way words are used in certain contexts, the contexts being people that you know. I could have used paintings, or cars etc. as contexts, but people differ greatly in their familiarity with these subjects. It was necessary to pick something with which everybody is reasonably well acquainted.

The experiment takes in all about three hours, though it could be longer. It is split into two sessions each of about one and a half

hours' duration. It is essential that both parts be completed'. Complete confidentiality was assured.

Subjects were tested individually in at least two sessions held on consecutive days. The length of the second session depended on the number of representative constructs elicited in part one. If it became evident that the second session would take longer than two hours, the subject was asked to return on the following day for a third interview.
Comments and reactions of the subjects were recorded.

A summary of the instructions is given below. The verbatim instructions will be found, correspondingly numbered, in the appendix.

Part I

1) Each subject was asked to write the names or initials of thirty people including 'myself', whom she knew well, on numbered cards.
2) She was asked to provide one important characteristic of herself, plus what she considered to be its opposite.
3) She was given the thirty element cards and asked to pick out those people to whom she thought this important characteristic of herself applied. She was asked to put them into similar groups according to the way the pole applied to them. With the help of the experimenter, the subject then picked out five of the elements most different from each other in terms of the emergent pole of the construct. All the element cards were put together again and she was asked to select those to whom the opposite pole of her construct applied, and to group them. Five elements, different from those selected before, were chosen, 'myself'

was always one of these.

4) Subordinate implications were elicited from the original construct, the characteristic of the subject plus its considered opposite, with each of the ten elements in turn as focus of elicitation. Starting with the emergent pole, each subject was asked how she would apply this to the ten people in her list, 'I want to know what your evidence is for calling the first person on your list ..... In what way is he .....?'

She was requested to reply in one word or a brief phrase, which was written by the experimenter in the left hand column of a table, similar to that reproduced below. She was encouraged to supply as many ways as possible for each element. A blank was left if a subject said that a pole did not apply to a person.

This procedure was repeated using the opposite pole of the subject's construct.

Subordinate implications of the construct 'Quiet-Talkative'.

| ELEMENT | QUIET | TALKATIVE |
|---|---|---|
| 1 | Distant | Talkative when the centre of attraction |

5) Each characteristic of the table, for example, 'Distant', was written by the experimenter on a card. The subject was asked to add what she considered to be the opposite of each characteristic to each card, and then sort the cards into similar groups. Each subject was

requested to pick out a construct she considered to be representative of each group, and to place it on top of that pile. These 'representative constructs' were noted by the experimenter. Each subject was told that she may regroup, or subgroup the cards and then select new representative constructs from each of the resulting groups. If she did so, these representative constructs were also recorded by the experimenter.

6) Superordinate constructs were elicited from the original construct, the characteristic of the subject, plus its considered opposite, with each of the elements in turn as focus of elicitation.

Subjects were asked which side of the construct each of the ten elements would prefer to be described by, and then what would be implied for each subject by the thought of being this. A 'laddering' procedure was carried out until the subject was unable to provide further implications. Subjects were then asked why the element would not want to be described by the opposite pole of the characteristic and what would be implied for him by the idea of being this, and so on. The information was recorded by the experimenter in the form of a table.

Superordinate implications of the original construct, 'quiet-talkative'. (The higher the number, the further up the ladder the implication.)

| ELEMENT | QUIET | TALKATIVE |
|---|---|---|
| 1 | (1) Tells others to keep their distance. | (1) A show off. |
| | (2) Afraid of getting too involved with people. | (2) Boastful. |
| | (3) Afraid of being hurt. | (3) Tries to impress others. |
| | (4) Hurt by parents. | (4) Self-confident. |

7) These verbalized superordinate implications were written by the experimenter on cards. The procedure outlined in (5) for selecting representative implications was followed.

8) Each representative construct label from the subordinate implication elicitation procedure, plus the original construct label was written on a separate rating scale by the experimenter. Each scale referred to one construct, was numbered 1 - 7 and appeared on a slip of paper measuring three inches by nine.

The scales were placed in a random order by the experimenter. The subject was handed the element cards, from which the implications had been elicited and was asked to place each element on the scale at the number at which she thought it belonged. She was instructed that she could place more than one card at a number if she wished.

When all the cards had been distributed, she was asked to remove each card in turn and write its number at the number on the scale at which it was placed.

The Second Part of the Study

9) The procedure whereby subordinate implications of the original construct were elicited, grouped and used to rate elements in part one, was repeated in part two, this time with each of the representative subordinate and superordinate constructs elicited in part one acting in turn as the original construct. These constructs were presented to the subject in turn, in a random order.

For each construct, ten elements were selected from the original thirty, as in (3). Subordinate implications were elicited with each element in turn, as in (4). These implications were written on cards and grouped as in (5). The representative subordinate implications were written on scales and the elements rated in terms of them, as in (8).

PART III SECTION 1

## RESULTS

### Data

The data consisted of, for each of ten subjects, from seven to eleven grids of subordinate implications derived from ratings subjects made with these, plus verbal answers to questions in the instructions. The actual number of grids per subject depended upon the number of 'representative' subordinate and superordinate implications elicited from the original construct in part one. For example, if a subject produced four representative subordinate and five representative superordinate implications, then the number of grids would be four plus five, plus the grid of implications of the original construct in part one, a total of ten.

Each grid consisted of the representative subordinate implications of each original construct, multiplied by the number of constructs each was representative of. Thus, if a subject selected three constructs as representative of groups of four, three and five constructs, then the grid which was analysed would contain twelve rows.

The entries in the grids were ratings on seven point scales, with seven as the highest grade. Each grid had ten columns corresponding to the number of elements used.

Subjects are referred to by letters (e.g. subject A, subject B) corresponding to the alphabetical order of their names.

## Analysis of Grids

The grids were analysed by Slater's 'Ingrid '67' program (M.R.C. service for analysing repertory grids). Amongst other information, this gives a principal component analysis of the data. Additional calculations were carried out in accordance with the various aims of this study, these aims being:

1. To investigate the process of construct-element interaction in the repertory grid

Elicited subordinate implications of original constructs were set out in tables charting the verbal variation in the original construct. Three examples of such tables are given (Tables 1 - 3), others appear in the appendix (p124-133).

All subjects produced some verbally different implications of each original construct. Implications differed as regards their number, degree of qualification, relationship with the original construct and verbal similarity to each other. These, and other factors are considered later in this section.

Table 1.

Subordinate Implications of the construct 'Intelligent-Stupid'.

(Subject B, SUP 3)

| Element | Intelligent | Stupid |
|---|---|---|
| 12 | Understands himself | Extremely childish<br>Closely attached to his mother |
| 5 | Can cope | Has strong views on Christianity |
| 7 | Studies hard | Bumptious<br>Childish |
| 17 | Extremely clever | |
| 8 | Has some good manners | Subnormal |
| 21 | Knows a lot | Expects others to believe what he says |
| 22 | Can do a job | Subnormal |
| 30 | Very superior | Lacking in social know how |
| 20 | A near genius<br>Engrossed in his work | Asocial |
| 24 | Knows what's good and bad<br>Knows the right thing to do | Very erratic |

Table 2.

Subordinate Implications of the construct 'Has no idea of what responsibility is - is very aware of what is expected of him'. (Subject F, SUB 1)

| Element | Has no idea of what responsibility is | Is very aware of what is expected of him |
|---|---|---|
| 18 | Chooses not to acknowledge responsibility | |
| 24 | | An individual<br>Does things on his own |
| 9 | | Unsure of people's ideas about him |
| 23 | Hasn't thought about what responsibility means | |
| 26 | Self centred<br>Pursues own ends | |
| 13 | Doesn't want to know what responsibility is | Ignores what's expected of him |
| 30 | Shelves responsibility at times | Doesn't bother with what's expected of him |
| 27 | Has no idea of the concept of responsibility | Has some idea of what's expected of him |
| 17 | | Very aware of what's expected of him |
| 2 | | Tries to do what's expected of him |

Table 3.

Subordinate Implications of the construct 'Considerate-Inconsiderate'. (Subject I, SUB 3)

| Element | Considerate | Inconsiderate |
|---|---|---|
| 5 | Helpful | A bit heartless |
| 2 | Understanding<br>Penetrating | |
| 29 | Sensitive | |
| 8 | | Selfish |
| 20 | | Egotistic |
| 11 | Sociable | |
| 1 | Takes pity on people | |
| 30 | Thoughtful | Careless |
| 17 | | Without feeling |
| 27 | | Thoughtless |

2. To investigate whether construct-element interaction may be productive of functionally as well as verbally dissimilar implications

Although it is interesting that subjects can produce verbally different implications of constructs with various elements, it only has significance for the interpretation of grid scores if the implications are functionally dissimilar also.

As previously stated, the functional similarity and dissimilarity of implications was determined by subjects rating elements in terms of them and by their appearance as rows in a grid. If a verbalized construct was used in a uniform way of elements, its subordinate implications should be functionally similar, and the grid in which they appear unidimensional. One principal component should be enough to characterize all the variation in the grid.

For each grid, the Bartlett test was used to decide whether the remaining variation, after the first principal component had been extracted, was nonspherical or contained linear interrelationships. The results of this test, for each grid, are given in table 4.

For four subjects: A, B, C and H, all grids contained variation significant at least to a 0.025 level after extraction of the first component. In terms of this study, the grids cannot be considered to have only one dimension operating, each original construct appears to have been applied in a non unidimensional way. For subjects D, E, F, G, I and J, some grids contained nonsignificant variation after extraction of the first component. Even in these cases, at

Table 4.

Grids with significant variation after extraction of the first component.

| Subject | X.05 | X.025 | X.01 | X.005 | n.s. |
|---|---|---|---|---|---|
| A | | 4 | 1 | 3 | |
| B | | | | 8 | |
| C | | | | 8 | |
| D | | 2 | | 4 | 3 |
| E | | 1 | 2 | 3 | 1 |
| F | | | | 2 | 2 for 3 grids n=2 |
| G | 1 | | 2 | 3 | 4 |
| H | | | 1 | 10 | |
| I | | 1 | 1 | 3 | 3 |
| J | 3 | 1 | 1 | | 5 |

least half of each of the subjects' grids had significant variation remaining.

In this study, therefore, four subjects always applied their constructs in a non unidimensional way. Six subjects applied some verbalized constructs in a non uniform way. All subjects used some original constructs with more than one criterion of application.

This indicates that functional dissimilarity between the implications produced by construct-element interaction may not be uncommon and that in certain circumstances it is liable to occur with almost any subject.

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For many of the following tests, the percentage of total variation accounted for by the first principal component in each grid was used as an indication of the degree of uniformity of use of the original construct from which the grid was derived. This result was given in the Ingrid '67 analysis. High percentages of variation accounted for by the first component were taken as indications of a uniform application to each element of the original construct.

A first component accounting for a lower percentage of the variation in a grid would be an indication that the original construct had been applied with more than one criterion.

Table 5 gives the average percentage over all grids (including '1 SUB' - the first construct elicited from each subject) of variation accounted for by the first component for each subject, and its range. Complete results are given in the appendix (p 134-137).

Table 5.

The average % of variation accounted for by each first component over all grids and its range.

| Subject | No. of grids | Average % | Range |
|---|---|---|---|
| A | 8 | 67.41 | 48.88-88.52 |
| B | 8 | 68.20 | 55.86-85.86 |
| C | 8 | 61.97 | 36.31-91.60 |
| D | 9 | 75.17 | 53.60-94.64 |
| E | 7 | 80.73 | 65.82-89.98 |
| F | 7 | 90.10 | 72.68-100 |
| G | 10 | 90.00 | 80.70-100 |
| H | 11 | 69.16 | 54.30-92.40 |
| I | 8 | 87.70 | 71.48-98.29 |
| J | 10 | 88.14 | 78.47-100 |

Average percentages ranged from 61.97 for subject C, to 90.10 for subject F. Four subjects (A, B, C and H) had averages of under 70%.

Table 5 also gives the range of the percentage of variation accounted for by each component. As one can see, for subjects A, B, C, D and H, this is quite large, indicating that the subjects could apply verbalized constructs flexibly, sometimes with more criteria than at other times.

3. To determine which aspects of constructs are related to the production of functionally dissimilar implications:

(a) The hierachical position of the construct

A Wilcoxon test was performed on the mean percentage of variation accounted for by the first component in grids derived from relatively superordinate constructs, versus the mean percentage of variation accounted for by the first component in grids derived from relatively subordinate constructs. The result of this test was significant. ($T = 3$, $N = 10$, $p = .005$)

This indicates that the hierachical position of a construct is relevant to its potential for interaction and the production of functionally dissimilar implications. In line with hypothesis 1 (p.39 ) relatively superordinate constructs were applied with more varying criteria than relatively subordinate ones.

(b) The qualification of the construct

The t test was used to test the hypothesis that already qualified constructs, e.g. 'softly spoken - shouts a lot', might have less potential

for complex application than unqualified constructs e.g. 'soft - hard'.

Resulting probabilities are given in table 6. Two, for subjects A and D were significant at 0.05 level, indicating a relationship for these subjects between qualification and uniformity of application and the use of unqualified constructs and more complex application. The individual t tests were combined, the result was not significant.

The number of qualified and unqualified constructs produced, and the percentage of each type varied between subjects. The figures are given in table 7. In all cases except one (subject E) the number of qualified constructs exceeded the number of unqualified ones produced. For subject G, only 4.6% of constructs were unqualified.

Table 6.

The mean percentage of variation accounted for by the first principal component in grids of implications derived from qualified and unqualified original constructs.

| Subject | Mean % V. qual. | Mean % V. unqual. | t | d. f | p |
|---|---|---|---|---|---|
| A | 84.52 | 57.52 | 5.97 | 6 | < .05 |
| B | 71.63 | 62.50 | 1.10 | 6 | n.s. |
| C | 51.02 | 61.05 | -0.61 | 6 | n.s. |
| D | 81.70 | 67.02 | 2.50 | 7 | < 0.05 |
| E | 77.72 | 82.99 | - .80 | 5 | n.s. |
| F | 90.00 | 90.49 | -0.04 | 5 | n.s. |
| G | 90.36 | 88.57 | 0.34 | 8 | n.s. |
| H | 70.34 | 67.26 | 0.84 | 9 | n.s. |
| I | 83.42 | 94.43 | -1.27 | 6 | n.s. |
| J | 90.16 | 89.20 | 0.18 | 8 | n.s. |

Table 7.

Number and percentage of qualified and unqualified constructs produced by each subject.

| Subject | No. Unqual. | No. Qual. | % Unqual. | % Qual. |
|---|---|---|---|---|
| A | 36 | 86 | 29.5 | 70.5 |
| B | 65 | 153 | 29.8 | 70.2 |
| C | 45 | 134 | 25.1 | 74.9 |
| D | 16 | 100 | 13.8 | 86.2 |
| E | 48 | 34 | 58.5 | 41.5 |
| F | 22 | 85 | 20.6 | 79.4 |
| G | 5 | 102 | 4.6 | 95.4 |
| H | 95 | 146 | 39.4 | 60.6 |
| I | 42 | 58 | 42.0 | 58.0 |
| J | 32 | 52 | 38.1 | 61.9 |

## 4. Characteristics of Subordinate Implications

### (a) The number of verbally different subordinate implications produced

It was hypothesized that the greater the number of verbally different implications elicited from an original construct, the greater the likelihood of functional differences between the implications. To test this, for each subject, grids were rank ordered according to the number of verbally distinct constructs produced per original construct, and the percentage of variation accounted for by the first component. Kendall's tau was used as a measure of correspondence and correction was made for ties. The resulting probabilities are given in table 8. Only one (subject I) was significant at 0.05 level; the combined S values were not significant ($p = 0.1500$).

The above procedure was followed with the total number of subordinate implications produced per original construct (not just verbally different ones). Probabilities are given in table 9. One outcome (for subject I) was significant at 0.05 level. The combined S value was not significant . ($p = 0.4840$).

Table 10 gives for each subject, the mean number of subordinate implications and the mean number of verbally different subordinate implications produced per construct. Within subjects, the relationship between the number of implications/different implications produced and the complexity of use of the original construct was not significant (except for subject I). However, it was thought that across subjects, there might be some correspondence between the mean numbers of implications/ verbally different implications produced and the relationship between these constructs in the grid, such that subjects who gave high mean

Table 8.

Number of verbally different subordinate implications produced per original construct and the percentage of variation accounted for by the first principal component in the grid in which they appear

| Subject | Number of grids | S | p |
|---|---|---|---|
| A | 8 | 5 | 0.3121 |
| B | 8 | 4 | 0.3600 |
| C | 8 | 5 | 0.2981 |
| D | 9 | -6 | 0.2946 |
| E | 7 | 4 | 0.3300 |
| F | 7 | -5 | 0.2643 |
| G | 10 | 0 | 0.1922 |
| H | 11 | 5 | 0.3783 |
| I | 8 | 22 | 0.0041 |
| J | 10 | -4 | 0.3859 |

Table 9.

Number of subordinate implications produced per original construct and the percentage of variation accounted for by the first principal component in the grid in which they appear

| Subject | Number of grids | S | p |
|---|---|---|---|
| A | 8 | 0 | 0.4247 |
| B | 8 | -3 | 0.4013 |
| C | 8 | 7 | 0.2206 |
| D | 9 | -9 | 0.1977 |
| E | 7 | -6 | 0.2236 |
| F | 7 | -7 | 0.1788 |
| G | 10 | -2 | 0.4641 |
| H | 11 | 1 | 0.4880 |
| I | 8 | 18 | 0.0170 |
| J | 10 | 1 | 0.4602 |

Table 10.

The mean number of subordinate implications produced per original construct and the mean number of verbally different subordinate implications

| Subject | Mean Sub. Imps. | Mean diff. Sub. Imps. |
|---|---|---|
| A | 16.6 | 15.2 |
| B | 27.7 | 27.2 |
| C | 24.2 | 22.3 |
| D | 14.0 | 12.8 |
| E | 15.1 | 11.7 |
| F | 16.6 | 15.2 |
| G | 15.3 | 10.7 |
| H | 24.0 | 21.9 |
| I | 15.0 | 12.5 |
| J | 11.0 | 8.4 |

numbers of implications/verbally distinct implications were also those with low mean percentages of variation accounted for by the first component in each grid. Kendall's tau was used to determine any correspondence.

It was found that the mean number of verbally different subordinate implications produced per original construct was related to the mean percentage of variation accounted for by the first component ($N = 10$, $S = 21$, $p = 0.036$). But, there was no significant relationship for the mean number of implications produced. ($N = 10$, $S = 17$, $p = 0.078$)

(b) The Use of Both Poles of a Construct

For each subject, grids were rank ordered according to the number of cases (out of ten) in which elements were construed on both poles of a construct, and also according to the percentage of total variation accounted for by the first component. Kendall's tau was used as a measure of correspondence. Correction was made for ties. Probabilities are given in table 11. Only one, for subject I, was significant at 0.05 level. The result of combining S values was not significant ($p = 0.2420$)

The mean number of elements in each elicitation table which were construed on both poles, varied between subjects, the range being 0.10 (subject J) to 7.87 (subject B). Complete results are given in table 12.

The degree of correspondence between the mean number of elements construed on both poles of a construct and the mean percentage of variation accounted for by the first component in each grid over all subjects was calculated. It was not significant ($p = 0.078$).

Table 11.

The use of both poles of an original construct and the percentage of variation accounted for by the first principal component in the grid of implications derived from it

| Subject | N | S | p |
|---|---|---|---|
| A | 8 | 5 | 0.3050 |
| B | 8 | 3 | 0.3936 |
| C | 8 | 8 | 0.1841 |
| D | 9 | -1 | 0.4483 |
| E | 7 | -5 | 0.2707 |
| F | 7 | -1 | 0.4404 |
| G | 10 | 0 | 0.4641 |
| H | 11 | 1 | 0.4641 |
| I | 8 | 14 | 0.0392 |
| J | 10 | -5 | 0.2451 |

Table 12.

The mean number of elements construed on both poles of a construct, per elicitation table

| Subject | Mean |
|---|---|
| A | 5.50 |
| B | 7.87 |
| C | 6.70 |
| D | 2.33 |
| E | 2.85 |
| F | 3.14 |
| G | 2.70 |
| H | 7.00 |
| I | 2.87 |
| J | 0.10 |

(c) The number of representative implications selected per original construct and the complexity of its application

It was hypothesized that the greater the number of representative implications a subject selected from the subordinate implications elicited from each original construct, the greater the likelihood that the original construct was applied with more than one criterion of application. One would expect some correspondence between the categorizing behaviour of an individual and his behaviour in the grid.

Grids were rank ordered according to the number of representative implications selected per original construct and the amount of variation accounted for by the first principal component. The measure of correspondence used was Kendall's tau, and correction was made for ties. Results are given in table 13. Three results were significant at 0.05 level (for subjects A, G and J). S values were combined, and the resulting probability calculated. This was significant at 0.05 level. ($p = 0.0082$.)

The mean number of representative implications selected per original construct varied between subjects (see table 14), the range being from 2.420 (subject F) to 7.750 (subject C). The relationship between the mean number of representative implications produced per original construct and the mean complexity score for each subject was determined using Kendall's tau. The result was highly significant ($p = 0.00018$).

Subjects who produce more representative constructs have lower average percentages of variation accounted for by the first component

Table 13.

The number of representative implications produced per original construct and the percentage of variation accounted for by the first principal component in the grid of subordinate implications derived from that construct

| Subject | Number of grids | S | p |
|---|---|---|---|
| A | 8 | 13 | 0.0409 |
| B | 8 | 6 | 0.2743 |
| C | 8 | 12 | 0.0838 |
| D | 9 | 6 | 0.2912 |
| E | 7 | 0 | 0.4325 |
| F | 7 | -5 | 0.2611 |
| G | 10 | 17 | 0.0485 |
| H | 11 | -11 | 0.1611 |
| I | 8 | 9 | 0.1357 |
| J | 10 | 29 | 0.0033 |

Table 14.

Mean number of representative constructs selected per original construct

| Subject | Mean |
|---|---|
| A | 3.870 |
| B | 4.750 |
| C | 7.750 |
| D | 4.330 |
| E | 3.850 |
| F | 2.420 |
| G | 3.400 |
| H | 4.630 |
| I | 3.620 |
| J | 3.100 |

in grids than those who produce fewer. However, on an intra subject level, there is not absolute correspondence between the number of representative constructs produced per original construct, and the percentage of variation accounted for by the first principal component in the grid of implications derived from that original construct.

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In this study a fairly intensive study of a small number of subjects was undertaken. In the following pages some details of each subject's responses are given.

In Part III Section 2 points arising from the results which have been reported, are discussed.

INTER - SUBJECT DIFFERENCES.

SUBJECT A ELICITED CONSTRUCTS

Superordinate Implications.

SUP 1: Talks to everyone - doesn't talk to other people

SUP 2: Kind - ruthless

SUP 3: Affected - Sane

Original construct : AFFECTIONATE - RESERVED

Subordinate Implications.

SUB 1: Helpless - independent

SUB 2: Kind - unkind

SUB 3: Very outgoing - takes a long time to get used to people

SUB 4: Oversentimental - afraid of sentimentality

The subject was slow and deliberate in her replies. Implications selected as representative were usually functionally different. All grids contained variation significant at least to a 0.025 level after extraction of the first component.

Grids derived from qualified original constructs were simpler than those from unqualified constructs. Fewer constructs were elicited from qualified constructs and these were represented by fewer constructs.

The subject used the fourth highest number of extreme ratings and produced the fourth highest average number of subordinate implications.

SUBJECT B ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Wouldn't want him as a friend - a good person to be friends with

SUP 2: Something went wrong in his early childhood - nothing went wrong in his early childhood

SUP 3: Intelligent - Stupid

Original Construct: QUIET - TALKATIVE

Subordinate Implications

SUB 1: Is calm - can get annoyed

SUB 2: Attentive - seems not with you

SUB 3: Always talks - never talks

SUB 4: Unfriendly - sociable

Most noticeable about this subject's results were the large differences perceived between elements as contexts, evident in the number of verbally different constructs produced and their functional dissimilarity. The subject had spent some time in a psychiatric hospital prior to this investigation. This may explain, to some extent, the differences between, and the extreme nature of some observations. For example, with the construct 'quiet - talkative', one element was described as 'not speaking at all', and another as being 'pathologically talkative'.

All grids contained significant variation (0.005 level) after extraction of the first component. In three grids, less than 60% of the total variation was accounted for by the first principal component.

The largest average number of different subordinate implications, and the largest average number of representative constructs were produced.

Elements were generally rated on both poles of each construct, few extreme ratings were made.

SUBJECT C ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Popular - disliked

SUP 2: Happy - unhappy

SUP 3: Free - restricted

Original Construct: CONTENTED - DISSATISFIED

Subordinate Implications

SUB 1: Surrounded by what he's interested in - cut off

SUB 2: Contented - feels he could have achieved more

SUB 3: Doesn't feel inferior - feels inferior

SUB 4: Affectionate - cold

The subject produced a large number of implications and the highest average number of representative constructs. All grids contained variation significant at 0.005 level after extraction of the first component. In four cases, under 60% of the total variation was accounted for by the first component.

Few extreme ratings were made, both poles of a construct were generally used of an element.

Constructs were used in a 'loose' way. Certain implications appeared relevant whatever original construct was used. These constructs were functionally dissimilar in the grid and often organized in a fairly

complex way. Access, it seemed, could be provided to them through almost any construct, once it was elevated to importance by being investigated.

SUBJECT D ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Is individual - influenced by others

SUP 2: Insecure - stable

SUP 3: Able to communicate - uncommunicative

Original Construct: CREATIVE - UNIMAGINATIVE

Subordinate Implications

SUB 1: Naturally creative - creative through circumstance

SUB 2: Progresses - doesn't progress

SUB 3: Has a creative attitude - does not

SUB 4: Imaginative - satisfied with simple solutions

SUB 5: Resourceful - impractical

Three grids produced by this subject contained non significant variation after extraction of the first component.

Relatively few verbally different implications were produced. Not many elements were rated on both poles of a construct, few extreme ratings were made.

Implications produced were often qualified versions of each original construct, for example, from 'progresses - doesn't progress' (SUB 2), one gets, 'progresses artistically', 'progresses in his ideas',

'progresses through knowledge', 'progresses financially'. Grids derived from unqualified original constructs produced more functionally dissimilar implications than those derived from qualified original constructs.

SUBJECT E ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Has a well balanced personality - feels unsure of himself

SUP 2: Self centred - unselfish

SUP 3: Likeable - unlikeable

Original Construct: TALKATIVE - QUIET

Subordinate Implications

SUB 1: Sympathetically talkative - selfishly talkative

SUB 2: Careless - thoughtful

SUB 3: Nervously talkative - confidently talkative

In all cases except one, the variation left after extraction of the first component was significant at least at a 0.025 level.

None of the factors examined were significantly related to the complexity of application of constructs.

The subject produced few different subordinate implications. Often, the implications produced qualified the original construct closely, e.g. from 'talkative-quiet' (1 SUB), one gets 'nervously talkative', 'efficiently quiet' etc. However, this was the only subject to produce overall, a larger number of unqualified than qualified constructs.

Little use was made of both poles of a construct, few ratings were in extreme categories.

SUBJECT F ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Wants to be admired - self sufficient

SUP 2: Doesn't have any worries - over serious

SUP 3: Doesn't know what responsibility is - aware of the need to use abilities and opportunities

Original Construct: IRRESPONSIBLE - RESPONSIBLE

Subordinate Implications

SUB 1: Has no idea of what responsibility is - is very aware of what's expected of him

SUB 2: Knows what responsibility is but does not acknowledge it - responsible when required

SUB 3: Stupid - knows what he's doing

This subject found it 'difficult to evaluate the characteristics of people'. She recognized that words do change meaning but felt that the change was often subtle. She said that she found difficulty in detecting differences between elements on a construct.

Two grids contained non significant variation after extraction of the first component; two contained variation significant at 0.005 level, three had only two components.

Of major interest is the qualification of the constructs.

Subordinate implications were subtle variations of each original construct. All constructs were tightly interrelated. The same subordinate implications often appear in grids derived from verbally different original constructs.

Few representative constructs were selected, sometimes only two, emphasizing once more the smallness of the differences between constructs. The median number of different subordinate implications were produced. Few extreme ratings were given.

SUBJECT G ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Unable to mix well - able to mix well

SUP 2: Unstable - stable

SUP 3: Afraid of others - trusts others

SUP 4: Knows what he's doing - lacks confidence

SUP 5: Considers himself more important - considerate of others

Original Construct: ALOOF - FRIENDLY

Subordinate Implications

SUB 1: Tends to ignore people - doesn't tend to ignore people

SUB 2: Likes to keep his position separate - doesn't

SUB 3: Occasionally overfriendly - not overfriendly

SUB 4: Immediately friendly - friendly after long acquaintance.

This subject commented that although she recognized the change in meaning of some words, she would not normally think about the different meanings a term would have.

Four grids contained non significant variation after extraction of the first component.

Few different subordinate implications were produced. Many extreme ratings were made, a further indication of an inability to perceive shades of meaning? Few elements were rated on both poles of a construct. The functional similarity/dissimilarity of constructs in each grid was related to the number of representative constructs selected.

SUBJECT H ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: An extrovert - an introvert

SUP 2: Got character - lacks character

SUP 3: Happy - unhappy

SUP 4: A good person - selfish

SUP 5: Liked - unliked

SUP 6: Gives himself more to others - doesn't give himself

Original Construct: NOISY - QUIET

Subordinate Implications

SUB 1: Bounces around - walks with his head down

SUB 2: Speaks loudly and harshly - speaks softly and slowly

SUB 3: Excitable - unexcitable

SUB 4: Talks a lot amongst people - doesn't say much in a group of people

All grids contained significant variation (0.05 level) after

extraction of the first principal component.

The variance of ratings on each original construct was related to the production of functionally dissimilar implications.

The subject produced a large number of different subordinate implications per original construct. She was verbally fluent. Elements were often construed using both poles of a construct, several implications were produced for each element. She used the third highest number of extreme ratings per original construct.

SUBJECT I ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Has a good feeling - well liked
SUP 2: Worth knowing - not worth knowing
SUP 3: A bit soft - callous

Original Construct: TACTFUL - TACTLESS

Subordinate Implications

SUB 1: Likes everybody - hates everybody
SUB 2: Thoughtful - thoughtless
SUB 3: Considerate - inconsiderate
SUB 4: Puts himself in the other person's position - doesn't put himself in the other person's position.

This subject, a student of English, said that she always tried to be 'precise' and to avoid 'blanket' terms. Of eight grids produced,

three contained non significant variation after the first component had been extracted.

The percentage of variation accounted for by the first component in an analysis of each grid was related to the total number of subordinate implications produced, the number of different implications, and the degree of use of both poles of a construct. Thus, when verbally different constructs were produced, these tended to be functionally dissimilar as well.

Few verbally different implications were elicited, not many elements were construed on both poles of a construct. The highest average number of extreme ratings per original construct were produced. The subject gave, not a quantity of implications which, in practice, came to the same thing, but a few verbally different constructs whose variety was reflected in ratings.

SUBJECT J ELICITED CONSTRUCTS

Superordinate Implications

SUP 1: Not a deep person - has a mind of his own

SUP 2: Dependent - Independent

SUP 3: Well balanced - unstable

SUP 4: Intelligent - dull

SUP 5: Friendly - reserved

Original Construct: TALKATIVE - RESERVED

Subordinate Implications

SUB 1: Likes to be impressive - unobtrusive

SUB 2: Gregarious - lives in a closed circle

SUB 3: Has a great deal of self confidence - has no self confidence

SUB 4: Very interested in people - not interested in people

This subject commented that: (i) it was difficult to find people different from oneself

(ii) she was conscious of placing herself in the middle of each rating scale

(iii) characteristics e.g. 'intelligent' do change meaning 'a certain amount'

(iv) often opposites are not 'true opposites' e.g. 'intelligent-dull'.

Five grids contained non significant variation after extraction of the first component and were thus effectively unidimensional.

The subject produced the lowest average number of subordinate and different subordinate implications per original construct, perhaps in line with her difficulty in perceiving people as dissimilar from herself i.e. as different contexts.

Elements were rarely construed on both poles of a construct, despite comment (iv). 'Myself' was seldom placed in the middle of each rating scale, on occasion it was rated extremely. The percentage of variation accounted for by the first component was significantly related to the number of representative constructs selected (which were few in number), it was unrelated to any other factors.

PART III SECTION 2

DISCUSSION

The results indicate that:

(I) For all subjects, constructs interacted with elements to produce verbally dissimilar implications.

(II) In many cases, constructs interacted with elements to produce functionally dissimilar implications.

Bartlett test results (table 4) show that many grids of subordinate implications contain more than one dimension. This indicates, in terms of the argument outlined earlier (p68) that constructs were often not used in a uniform way of elements, but with more than one criterion of application, thus producing functionally dissimilar implications. In fact, sixty-five out of a total of eighty-six grids contained significant variation after extraction of the first component.

In this study, the elements all came from one domain 'people you know well', and were within the range of convenience of application of each construct. Yet functionally dissimilar implications were still produced. Although, as Bannister and Mair point out (8) in relation to the semantic differential, the existence of elements (concepts) within and outside the range of convenience of constructs (scales) would make interaction productive of functionally dissimilar implications more likely, this study shows that it still occurs when the principle of the range of convenience has been adhered to.

The percentage of variation accounted for by the first principal component, and the Bartlett test of significance were used to determine the complexity of application of each original construct, as there were different numbers of implications in each of the grids. This issue is discussed later in the section.

(III) <u>The hierachical position of the construct was related to the production of functionally dissimilar implications.</u>

Over all subjects, a significantly lower percentage of variation was accounted for by the first principal component in grids of implications derived from relatively superordinate constructs than in grids derived from relatively subordinate constructs. This indicates that relatively superordinate constructs may be more liable to construct-element interaction productive of functionally dissimilar implications than relatively subordinate constructs. It confirms hypothesis one (p.39 ) based on notions of superordinate constructs as being 'general' (8) and having a 'wide range of convenience'. (7)

It was thought possible that highly superordinate constructs, i.e. constructs at the 'top of the ladder' in Hinkle's elicitation procedure ( 60 ) might have more potential for interaction productive of functionally dissimilar implications than those lower down the ladder. Unfortunately this could not be tested in this study as for each subject the superordinate implications of an original construct elicited with each of the elements, were pooled and representative ones selected.

(IV) The qualification of an original construct was related to the production of functionally dissimilar subordinate implications for two subjects only.

For subjects H and D, the use of unqualified original constructs was related to the production of functionally dissimilar implications. This relationship was not significant on a combined subjects basis.

The qualification of construct labels was studied as one aspect of the linguistic nature of verbalized constructs. From data obtained, it is obvious that the term 'qualified' may cover several possibilities, for example:

(a) the addition of a qualifier such as 'very' or 'quite' as in 'quite hard', or 'very handsome'.

(b) the restriction of a description to one aspect of behaviour, as in 'walks slowly', or 'speaks slowly', rather than 'slow'.

(c) a general description, as in 'has a responsible attitude to life' (subject F), or 'something went wrong in his early childhood' (subject B).

It was thought that these various possibilities might have differing potentials for interaction productive of functionally dissimilar implications. One way in which one can distinguish between unqualified constructs and a, b, and c types of qualified constructs would seem to be by counting the total number of words on both poles of each verbalized construct.

This was carried out. Kendall's tau was used to determine the relationship between the number of words in a verbalized construct and the percentage of variation accounted for by the first component in

the grid of implications derived from that construct. Over all subjects, the results were not significant (N = 10, S = -36, p = 0.05.

(V) <u>The use of both poles of each original construct was significantly related to the production of dissimilar subordinate implications for one subject only.</u>

Exploring the application of both poles of a construct in relation to each element made for some experimental difficulties. It meant that with an original construct, for example 'kind-unkind', a subject first used the pole 'kind' of each of the elements, and then, if she wished, applied the pole 'unkind' to them. The implications which emerged e.g. 'charitable', 'soft', 'loving' and 'cruel', 'hard' and 'bitter' were then given opposite poles by the subject so that they could be used to rate elements in a grid.

In contrast to this, in Mair's study of whole figure constructs (99) subjects used only one pole of the elicited characteristics underlying the use of the construct 'most like self - least like self' at a time in a grid, with a split half technique. They selected for each characteristic, ten out of twenty elements which they felt demonstrated it most markedly.

Though the binary form of grid which emerged does make for easier scoring, its globality does confine the subject in a manner at odds with the spirit of this inquiry. This could be avoided to some extent if the subject was allowed to pick any number of elements as demonstrating the characteristic involved. However, as indicated by pilot studies, this could mean that for some characteristics, every cell could be ticked.

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Subjects were free to produce as many implications of original constructs as they liked. This meant that their grids contained different numbers of rows. It was thought unwise in an exploratory study to stipulate the number of implications to be produced (if any), since this could put subjects in the artificial position of:

(a) having to produce several implications of the use of a construct with elements, whereas, for them, the construct was applicable in a uniform way.

(b) limiting the number of implications to some arbitrarily fixed number, and perhaps minimizing the appearance of construct-element interaction and the production of functionally dissimilar implications.

From table 10 one can see the big range in the number of implications produced by subjects.

However, not stipulating the number of implications does cause some difficulties in analyzing the data obtained. For example, the measure of complexity of grids that was used, was based on percentage (of variation accounted for by the first principal component) rather than being additive.

The possibility does arise that differences in percentages of variation accounted for by each principal component could be accounted for by dissimilar numbers of rows in each grid.

To check on this, an analysis of covariance was carried out to determine whether the difference in percentage of variation accounted for by the first principal component in grids derived from relatively superordinate and subordinate constructs, remained after differences in

the number of rows in the grids was taken into account. Over all subjects, the difference was still significant at 0.05 level ($X^2 = 32.17$ $n = 20$).

(VII) <u>The mean number of representative implications produced per original construct was negatively related to the mean percentage of variation accounted for by the first component in grids of such implications.</u>

Thus, the higher the mean number of representative implications produced per original construct, the more multidimensional the grid in which they appeared.

'Representative' constructs were the result of subjects placing verbalized implications of original constructs into groups and selecting from each group one dimension representative of others in that group. Subjects were allowed to subgroup and regroup implications and to select as many 'representative' constructs as they wished.

This procedure was used to save time. If a subject produced, say, thirty implications of an original construct, rating them could be a lengthy process. As subjects' time was limited, it was thought preferable to examine more grids using this procedure rather than less grids, rating each implication. In pilot studies, when subjects used every implication in a grid, only a few different ways of rating elements emerged.

There are several issues to be discussed:

(a) The selection of representative constructs implicitly involves a statement by each subject that these constructs are superordinate to other

implications in each group.

Though these representative subordinate implications may be called 'superordinate' in this other sense, they are still subordinate in terms of Hinkle's method to the original construct. The grouping procedure merely maximizes the superordinacy in this other sense, of the selected subordinate and superordinate implications of the original construct.

(b) In the grids of the subordinate implications of each original construct, it was assumed that implications in the same group as each representative construct would be used of each element in the same way. Thus, for analysis of the grids, each representative construct was replicated by the number of implications it was representative of. Grids to be analysed contained the number of rows equal to the total number of implications elicited per original construct.

If this replication had not been carried out, it would have meant that an implication representative of one other implication would have the same weight in analysis as one representative of twenty others.

(c) Though there were reasons for the adoption of this grouping procedure, it would seem preferable in the future to ask subjects to use all implications produced in a grid. This would avoid the notion that perhaps differences in the number of representative implications in grids could account for other observed differences between variables.

To determine whether or not this was the case, an analysis of covariance was carried out to see whether the difference in percentage of variation accounted for by the first principal component in grids derived

from relatively superordinate and subordinate constructs, remained after differences in the number of representative implications in each grid were accounted for. Over all subjects, the difference was still significant at 0.05 level. ($X^2 = 32.88$, $n = 20$)

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In this section, the results obtained and some experimental details have been discussed. Aspects of this investigation, for example the examination of both poles of a construct, allowing subjects to produce as many or as few subordinate implications as they wished, and the use of representative implications only in grids have been examined. Analysis of covariance results indicate that differences in the number of implications, and the number of representative implications in grids cannot account for significant results obtained.

In future studies, it would seem preferable for subjects to use every implication produced, in a grid. However, bearing in mind the range in the number of implications elicited per original construct and the relationship found between the production of large numbers of verbally distinct implications and their functional dissimilarity, it would seem unwise to arbitrarily limit the number of implications subjects could produce.

PART IV SECTION 1

## SUMMARY

The aims of this research have been to:

(i) Examine the notion of construct-element interaction in relation to aspects of personal construct theory.

(ii) Investigate the process of interaction in the grid.

(iii) Examine whether construct-element interaction productive of functionally different implications does occur.

(iv) Explore factors which might be related to the production of functionally dissimilar implications.

The various arguments and findings are summarized below.

### Construct-Element Interaction and personal construct theory

In personal construct theory, man is looked at 'as if' he were a scientist, he is assumed to be involved in controlling and predicting his world. Most constructs he produces, or is given however (e.g. 'soft-hard'), are unlike those used in science. Such terms have many uses and are highly dependent on context for their meaning. The repertory grid is used by psychologists to grasp the social reality of a subject, to make it publicly expressible. Man's constructs are placed in a form whereby they can be examined as one would examine a linguistic

system in science. One can argue that whilst the professional scientist is at the 'tight' end of the cycle of inquiry, the ordinary man is at the 'loose' end. But, the nature of the grid, and the ways in which it is usually analysed, require aspects of tight construing if they are not to distort.

Everyday terms are highly dependent on context for their meaning. Kelly sees context as those elements amongst which the user ordinarily discriminates by means of a construct. Bannister and Mair indicate that a construct may have different implications in dissimilar domains. 'For example, what a person considers to be 'honest' in the context of criminals may be vastly different from 'honest' in the context of intimate friends! But the notion of a domain is not absolute. One domain, 'people at work' may cover other possible distinctions. If examples of these were contained in one grid, all within the range of convenience of the constructs, and the distinctions were relevant, then each construct may be applied with different criteria to each of them. In the present study context is examined in terms of each element in a grid.

Kelly distinguishes between the verbal label of a construct and the way the construct functions. When a subject is provided with a label, or produces one, we cannot tell anything about it as a construct until we look at the marks made in the grid. But the format of the grid involves the notion that he is using it in a uniform way of the elements. If a construct label is representative of several bases, he might be using all of these, if the elements can be seen as contexts relevant to each application.

Constructs may match at 'chance' level, not because the relationship

is unimportant, but because it is 'complex'. If all constructs in a grid match at 'chance' level and construing is consistent between grids, one has a 'complex' grid, but one cannot distinguish between constructs being unrelated or relating in a complex way. Without further investigation one cannot tell anything about the possible integrative processes operating, or what 'complexity' means.

Although 'construct theory's candidate for a central issue in psychology can be argued to be change', ( 9 ) Mair and Crisp have called the repertory grid 'a passive and cross sectional measure' (100). Usually only total scores are examined, processes involved in completing the grid have not been investigated. What is needed is a study of the internal structure of the grid and of the grid functioning. On the suggestions of Mair, in this study we look at one construct at a time being used of several elements. There is a general tendency, against the work of Kelly, to view the repertory grid as a test, complete in itself instead of as an introduction to confirmation of other research. We need less reliance on global scores and more interest in what goes on in the grid.

The production of functionally different implications

If subjects are asked to use a construct of various elements, they may produce verbally different applications of that construct. Such tables are given in the appendix. However, interaction is only disturbing if it produces not only verbal, but functional dissimilarity.

If a construct is used in a uniform way, then its grid of applications (subordinate implications) should be effectively unidimensional. The Bartlett test used here showed that, in a total of sixty-five out of

eighty-six grids, statistically significant variation was left after the first component had been extracted. Such grids cannot be considered to contain only one dimension. The subordinate implications of the original construct were not all functionally similar.

Factors Related to the production of functionally different implications

In this study, the hierachical position of each original construct was significantly related to the production of functionally dissimilar implications. In grids of implications derived from relatively superordinate constructs, a significantly lower percentage of the total variation was accounted for by the first principal component.

The mean number of verbally different implications produced per original construct was related to the mean percentage of variation accounted for by each principal component in the grid of implications. Where subjects produced high mean numbers of verbally dissimilar implications, these implications were often functionally dissimilar also. Likewise, the production of high mean numbers of representative constructs per original construct was related to lower mean percentages of variation being accounted for by the first principal component in grids of implications.

The qualification of original constructs, and the use of both poles of each construct was related to the production of dissimilar implications only for one or two subjects.

From the above results, within subjects' findings and comments subjects made, one can put together a list of factors which may be

related to the production of functionally dissimilar implications:

(i) The use of relatively superordinate constructs.

(ii) The ability to discriminate between elements, and between elements and the self (e.g. subjects A, B, C, H).

(iii) The ability to discriminate between elements on the relevant construct, indicating verbal fluency, experience with the construct label and with the elements (e.g. subjects A, B, C, H).

(iv) The use of discriminable elements (e.g. subject B).

(v) A loose personal construct system organized around several different superordinate constructs (e.g. subject C).

The following factors may be related to the production of functionally similar implications:

(i) The use of relatively subordinate constructs.

(ii) Difficulty in discriminating between elements and between elements and the self (e.g. subjects J, F, G).

(iii) Difficulty in construing elements on a construct, due to lack of experience with the construct, with the elements, and/or lack of verbal fluency (e.g. subject J).

(iv) The use of similar elements.

(v) An inability to perceive shades of meaning, probably involving:

(a) The production of few verbally different subordinate implications (e.g. subject J).

(b) The production of few representative constructs (e.g. subject F).

(c) Little use of both poles of a construct (e.g. subject J).

(vi) The use of highly qualified constructs (e.g. subject F).

(vii) A decision to apply construct labels in a precise way (e.g. subject I).

## The present study

The present study has examined aspects of the issue of construct-element interaction in the repertory grid and, it is hoped, has contributed in several ways to the knowledge in this field.

This was an exploratory study. As such, it has opened up an area not previously investigated in relation to the repertory grid. It has emphasized the importance of investigating the functioning of the grid and of looking at change within, not between grids.

Construct-element interaction has been related to aspects of personal construct theory and shown to be not just an isolated methodological issue, but one of relevance to the interpretation of behaviour in the grid.

The results of the study have indicated that interaction productive of functionally dissimilar implications may be a common occurrence.

The hierachical position of a construct appears to be one of the factors related to the production of such implications. Other factors which may be involved have been discussed.

The investigation has also emphasized some of the consequences for grid use of interaction productive of dissimilar implications. For instance, that a 'chance' level of matching between two constructs in a grid may be indicative, not of an unimportant, but of an important complex relationship for the subject, also that a reliance on total grid scores obscures what may be happening in the grid.

Future Research

There are a number of ways in which the work described in this thesis could be developed.

Further study of the process of construct-element interaction in the repertory grid could be undertaken, with adaptations to the experimental method as described in the previous section. Factors mentioned on pages 107 and 108 which may be related to the production of dissimilar implications could be investigated. It could be interesting to examine the hierachical position of a construct and its potential for interaction, in more detail. Other issues, for example, the use of elicited and provided constructs and the relationship of this to interaction could be studied.

It would be useful to investigate the use of two or more constructs of elements in a grid, and then look at the relationships between the two constructs in detail.

Work could be undertaken to tie in ideas from the repertory grid and Hinkle's implication grid, for example, to investigate relationships between the 'resistance to change' (60) of a construct, and the application of that construct to elements. Are relatively superordinate constructs 'resistant to change' because each pole can be applied in a flexible way?

Experimental work on differences in response of two groups of subjects, for example thought disordered schizophrenics and 'normals' could be undertaken on the level of one construct being used of several elements and its relationship to another construct, rather than being based on total scores from completed grids.

Relationships between the various operational definitions of theoretical terms in personal construct theory, like superordinate and subordinate, would be interesting to investigate.

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The findings, arguments and experimental details recorded in this thesis should, it is hoped, be of value to workers in this field.

PART V

## APPENDIX

INSTRUCTIONS

1. Please write down the names of 29 people who you know well enough to have formed some idea of what they are like in character. Write one name on each card.

I am not in the least concerned to know who the people are, only in the fact that you can identify them. So use initials if you wish. This anonymity leaves you completely free to choose a wide range of people: family, friends, people at college, at work, at school, people you like and dislike.

You might have:


2. Can you tell me an important characteristic of yourself, plus what you consider to be the opposite? For example, you might think that you are "sociable" and that the opposite of this is "reserved".

3. Now, can you pick out the people you would say were.....

Can you put them into groups according to the way they are.....

In terms of the example here, with the characteristic "sociable - reserved", if Uncle Fred and J.F. are sociable in the same way, both being jolly, and J. is sociable in a different way, being compassionate, then you would put Uncle Fred and J.F. in one group, and J. in another group.

Now, can you pick out the people you would say had the opposite characteristic.

Can you put them into groups according to the way they are.....

To continue with the above example, this would mean putting people on your list into groups on the basis of the way in which they were reserved.

4. I am interested in how you would apply this characteristic and/or its opposite to the ten people on your list.

I want to know what your evidence is for calling the first person on your list.....

In what way is he.....

Please answer in one word or a brief phrase. For example, you could say that your evidence for describing Uncle Fred as sociable is that he is "gregarious" or that he "likes people" not that "it is evident from the way he behaves that he likes people".

Please say if the characteristic does not apply to a person and I will leave a blank by his name.

Now, in what way is the next person on your list.....

Now I want to go through your list in the same way using the opposite of your characteristic.

In what way is the first person on your list.....

5. As you can see, I have written these phrases on cards.

I want you first to write an opposite for each characteristic on each card.

Now can you put into the same group any characteristics and their opposites which you think are very similar?

In terms of the example here, if one had two cards "likes people - doesn't like people", and "gregarious - not gregarious" then one might put these in the same group if one thought that they were saying the same thing, but not if one thought that they were different.

Please pick one card from each group which you think is representative of the cards in that group and place it on the top of that pile.

Do you want to regroup or subgroup these cards? If so, please pick out characteristics representative of each new group.

6. This part is similar to the last, but I am asking you a slightly different question.

This time I want to know, firstly, which side of the characteristic the first person on your list would prefer to be described by?

Why? What would be implied for him by the idea of being.....

Let us look at this in terms of the example used here. I am asking: "which side of the characteristic would Uncle Fred prefer to be described by, "sociable" or "reserved"?

Answer "sociable"

Question "Why? What would be implied for Uncle Fred by the idea of being sociable?"

Answer "that he is liked by others"

Question "What would be implied for Uncle Fred by the idea of being liked by others?"

Answer "that he is needed" etc.

Why would the first person on your list not prefer to be described as.....

What would be implied by this for him?

7. As before I have written these phrases on cards.

I want you first to write an opposite for each characteristic on each card.

Now can you put into the same group any characteristics and their opposites which you think are very similar?

Please pick one card from each group which you think is representative of the cards in that group and place it on the top of that pile.

Do you want to regroup or subgroup these cards? If so, please pick out characteristics representative of each new group.

8. I now want you to rate the people on your list in terms of the representative characteristics and their opposites which you have given me.

Each rating scale refers to one characteristic and its opposite.

Please give each of the cards representing the people on your list a number indicating where you think they belong on the scale.

If the scale was:

Likes people ——————————————— Doesn't like people

1 2 3 4 5 6 7

You might give the card with "Uncle Fred" written on it number 1 if you considered that he liked people to a high degree, the card with J.F. on it number 3 if you thought him less keen on people, and the card with "J" on it number 6 if you thought that she didn't really like people very much.

You may place more than one card at each number if you wish.

9. This procedure has to be undertaken with each of the following characteristics:

Firstly, can you pick out the people you would say were.....

Can you put them into groups according to the way they are.....

Now can you pick out the people you would describe as.....

Can you put these into groups according to the way they are.....

Secondly, I want to see how you use these characteristics and their opposites of the ten people we have just selected.

Please answer as before, in one word or a brief phrase.

Say if you would not apply a characteristic to a person and I will leave a blank by his name.

What is your evidence for calling the first person on your list.....

In what way is he.....

Now I want to go through your list in the same way using the opposite of your characteristic.

In what way is the first person on your list.....

10. As before I have written these phrases on cards.

I want you first to write an opposite for each characteristic on each card.

Now can you put into the same group any characteristics and their opposites which you think are very similar?

Please pick one card from each group which you think is representative of the cards in that group and place it on the top of that pile.

Do you want to regroup or subgroup these cards? If so, please pick out characteristics representative of each new group.

11. Please rate each person on your list in terms of the representative characteristics and their opposites which you have given me.

Each rating scale refers to one characteristic and its opposite.

Please place each one of the cards at numbers on the scale where you think they belong.

You may place more than one card at each number if you wish.

12. In this study I have been examining whether words have different meanings when used in different contexts, where the contexts are people, e.g. Uncle Fred, J.F., and J.

I am interested in your reactions to this experiment. Have you any comments to make?

Did the characteristics seem to you to change meaning when used of different people? Did you find that this was more true of some words than of others?

Have you any other points to raise?

TABLE 1A

SUBJECT A Table of subordinate implications of the construct 'Affectionate - Reserved' (1 SUB)

| Element | AFFECTIONATE | RESERVED |
|---|---|---|
| 4 | Demands affection<br>Helpless | Unsentimental |
| 29 | Genial<br>Friendly | Unsure of other people |
| 10 | Genial<br>Friendly<br>Physically affectionate | Dislikes people for no reason<br>Very superficial |
| 5 | Kind<br>Concerned | Won't reveal himself |
| 30 | Worries | Takes a long time to get used to people |
| 11 | | Afraid of sentimentality |
| 24 | | Won't reveal himself<br>Takes a long time to get used to people |
| 22 | | Not really interested in other people |
| 1 | Superficially affectionate | Doesn't talk to people |
| 16 | Not obviously affectionate | Very down to earth<br>Won't reveal himself |

TABLE 2A

SUBJECT B Table of subordinate implications of the construct 'Quiet - Talkative' (1 SUB)

| Element | QUIET | TALKATIVE |
|---|---|---|
| 4 | Dwells in her own imagination<br>Seems a bit far away<br>Distant<br>Schizophrenic | Will speak when spoken to<br>Seems not with you |
| 13 | Normally quiet<br>Prefers to listen than to speak himself | Sociable<br>Can get annoyed |
| 30 | Lacking in self confidence<br>Afraid of being laughed at | Talkative when the centre of attention<br>Talkative when talks about himself |
| 12 | | Talks about himself constantly<br>Extremely selfish. Not interested in other people's talk |
| 8 | | Pathologically talkative |
| 20 | Won't speak at all<br>Not interested in others | |
| 23 | | Boastful<br>A bully<br>Puts on airs |
| 18 | Quiet when lacks ideas | Makes an effort to be sociable |
| 1 | | Irritable<br>Rude when talks<br>Shouts |
| 28 | | A hypochondriac<br>Lacks imagination |

TABLE 3A

SUBJECT C Table of subordinate implications of the construct 'Contented - Dissatisfied' (1 SUB)

| Element | CONTENTED | DISSATISFIED |
|---|---|---|
| 2 | Not taxed<br>Got his family around him | Feels he could have achieved more |
| 1 | | Knows he's capable of more than he's doing |
| 11 | Has achieved his aim<br>Affectionate | Feels he could have achieved more qualifications |
| 28 | Full of the joys of living | |
| 21 | | Dominated by other people |
| 9 | | Separated from everything he likes |
| 7 | | Dominated by parents<br>Feels inferior in intellectual attainments |
| 8 | Surrounded by what he's interested in | Separated from things close to him |
| 30 | Interested in his work<br>Surrounded by friends | Separated from people close to him |
| 23 | | Feels inferior<br>Feels he hasn't many friends |

TABLE 4A

SUBJECT D Table of subordinate implications of the construct 'Creative - Unimaginative' (1 SUB)

| Element | CREATIVE | UNIMAGINATIVE |
|---|---|---|
| 4 | Resourceful<br>Naturally creative | |
| 24 | His job is creative<br>Has a creative attitude | Doesn't progress |
| 21 | | Unable to accept new ideas |
| 9 | Naturally creative | |
| 15 | Creative through his work | Not willing to try new things in his work<br>Satisfied with simple solutions |
| 30 | Naturally creative<br>Creative through his work | |
| 14 | Spends his life creating things<br>An artist | |
| 1 | An artist<br>Doesn't put value on material things | |
| 27 | Basically creative<br>Resourceful | Doesn't try new new ideas |
| 25 | Creative as a student | Follows present cults |

TABLE 5A

SUBJECT E Table of subordinate implications of the construct 'Talkative - Quiet' (1 SUB)

| Element | TALKATIVE | QUIET |
|---|---|---|
| 9 | Nervously talkative | |
| 6 | Intellectually talkative | Nervously quiet |
| 26 | Confidently talkative | |
| 12 | Sympathetically talkative | Thoughtfully quiet |
| 19 | Sociably talkative | |
| 15 | | Thoughtful |
| 17 | | Shy |
| 29 | Efficiently talkative | Efficiently quiet |
| 23 | Thoughtfully talkative | Nervously quiet |
| 30 | Interestedly talkative<br>Nervously talkative | Occasionally quiet |

TABLE A 6A

SUBJECT F Table of subordinate implications of the construct 'Irresponsible - responsible' (1 SUB)

| Element | IRRESPONSIBLE | RESPONSIBLE |
|---|---|---|
| 1 | Carefree | Conscientious |
| 15 | Doesn't bother about people | Knows what he's doing<br>Reliable |
| 23 | Stupid<br>Childish | |
| 13 | Doesn't realize what responsibility is | Has to be responsible<br>Responsible when required |
| 7 | Doesn't bother with people<br>Knows his own mind | Manages his own life well |
| 30 | Not bothered to face up to responsibilities | Responsible when required |
| 17 | Wasteful | Very aware of what is expected of him |
| 11 | Sarcastic | Must be in control of any situation<br>Supports himself |
| 5 | Doesn't care what he says to people | Not frightened by any contingency |
| 3 | Doesn't take things seriously all the time | Responsible in practical matters<br>Reliable |

TABLE 7A

SUBJECT G. Table of subordinate implications of the construct 'Aloof - friendly' (1 SUB)

| Element | ALOOF | FRIENDLY |
|---|---|---|
| 18 | Tends to ignore people | Talks quietly |
| 10 | | Outward going<br>Interested<br>Helpful |
| 5 | | Appears to be interested in people |
| 2 | Very shy<br>Keeps away from people | Shows interest if conversation is interesting |
| 30 | Dislikes people | Friendly after long acquaintance |
| 12 | Keeps to himself | Quietly friendly<br>Helpfully friendly |
| 6 | Looks down on people<br>Likes to keep his position separate | Helpfully friendly |
| 7 | | Outward going<br>Will always make the first move |
| 14 | Feels he doesn't need people | Occasionally over-friendly |
| 25 | | Outward going<br>Will always make the first move |

TABLE 8A

**SUBJECT H** Table of subordinate implications of the construct 'Noisy - quiet' (1 SUB)

| Element | NOISY | QUIET |
|---|---|---|
| 13 | Sings and whistles a lot<br>Very excitable<br>Plays music loudly | |
| 22 | | Speaks slowly and softly.<br>Looks quiet.<br>Walks with his head down |
| 11 | Gets very excited<br>Talks loudly | |
| 3 | Plays music loudly<br>Talks a lot<br>An exhibitionist | Talks slowly<br>Got quiet eyes |
| 30 | Got a loud voice<br>Talks a lot<br>Makes a lot of noise by action | Talks quietly<br>Walks quietly<br>Unassured |
| 24 | | Talks very quietly<br>Never says much<br>Shy |
| 29 | | Never know he's around<br>Doesn't bang things around |
| 7 | Noisy at a party | Shy<br>Unexcitable<br>Speaks slowly |
| 17 | Talks loudly<br>Excitable<br>Noisy at a party | Sings quietly |
| 18 | Giggles a lot<br>Screams<br>Argues loudly | Shy<br>Doesn't say much in a group of people |

TABLE 9A

SUBJECT I Table of subordinate implications of the construct 'Tactful - tactless' (1 SUB)

| Element | TACTFUL | TACTLESS |
|---|---|---|
| 6 | Thoughtful<br>Sensitive | |
| 28 | | Doesn't realize he's being tactless |
| 5 | | Moderately thoughtless |
| 24 | Likes everybody | A bit thoughtless |
| 30 | Puts himself in the other person's position | Selfish |
| 10 | | Thoughtless |
| 27 | | Extremely selfish |
| 20 | | Inconsiderate |
| 29 | Sensitive | |
| 1 | Considerate | |

TABLE 10A

SUBJECT J Table of subordinate implications of the construct 'Talkative - reserved' (1 SUB)

| Element | TALKATIVE | RESERVED |
|---|---|---|
| 12 | Friendly<br>Interested in anyone | |
| 4 | Likes to be impressive | |
| 20 | Very interested in people | |
| 30 | Likes impressing people<br>Likes talking to strangers | |
| 17 | Noisy | |
| 29 | | Has no self confidence |
| 13 | | Uncertain of people<br>Doesn't talk to people unless he knows them well |
| 1 | Will always talk commonplaces | Has to know people quite well |
| 14 | | Has peculiar interests<br>Incapable of talking to others<br>Lives in a closed circle |
| 22 | | Overpowered<br>Has little self confidence |

Table 11A

Percentage of total variation accounted for by the first principal component, in each grid

| SUBJECT | GRID | % V. accnted for by 1st p.c. |
|---|---|---|
| A | 1 SUB | 64.64 |
| | SUB 1 | 53.45 |
| | SUB 2 | 62.89 |
| | SUB 3 | 86.35 |
| | SUB 4 | 78.71 |
| | SUP 1 | 88.52 |
| | SUP 2 | 55.86 |
| | SUP 3 | 48.88 |
| | | |
| B | 1 SUB | 72.54 |
| | SUB 1 | 67.97 |
| | SUB 2 | 64.44 |
| | SUB 3 | 85.86 |
| | SUB 4 | 56.81 |
| | SUP 1 | 55.86 |
| | SUP 2 | 84.02 |
| | SUP 3 | 58.15 |
| | | |
| C | 1 SUB | 81.40 |
| | SUB 1 | 36.31 |
| | SUB 2 | 53.49 |
| | SUB 3 | 62.38 |
| | SUB 4 | 91.60 |
| | SUP 1 | 51.49 |
| | SUP 2 | 63.02 |
| | SUP 3 | 56.17 |

Table IIA(cont'd)

| SUBJECT | GRID | % V. accnted for by 1st p.c. |
|---|---|---|
| D | 1 SUB | 83.52 |
| | SUB 1 | 76.18 |
| | SUB 2 | 66.66 |
| | SUB 3 | 82.56 |
| | SUB 4 | 78.45 |
| | SUB 5 | 64.30 |
| | SUP 1 | 94.64 |
| | SUP 2 | 53.60 |
| | SUP 3 | 76.68 |
| | | |
| E | 1 SUB | 79.56 |
| | SUB 1 | 65.82 |
| | SUB 2 | 89.98 |
| | SUB 3 | 85.57 |
| | SUP 1 | 81.78 |
| | SUP 2 | 87.94 |
| | SUP 3 | 74.51 |
| | | |
| F | 1 SUB | 90.49 |
| | SUB 1 | 97.63 |
| | SUB 2 | 96.38 |
| | SUB 3 | 81.33 |
| | SUP 1 | 100.00 |
| | SUP 2 | 72.68 |
| | SUP 3 | 92.20 |

Table IIA (cont'd)

| SUBJECT | GRID | % V. accnted for by 1st p.c. |
|---|---|---|
| G | 1 SUB | 90.53 |
| | SUB 1 | 91.45 |
| | SUB 2 | 98.95 |
| | SUB 3 | 81.95 |
| | SUB 4 | 90.62 |
| | SUP 1 | 80.70 |
| | SUP 2 | 86.62 |
| | SUP 3 | 88.26 |
| | SUP 4 | 100.00 |
| | SUP 5 | 90.97 |
| | | |
| H | 1 SUB | 70.25 |
| | SUB 1 | 84.60 |
| | SUB 2 | 54.30 |
| | SUB 3 | 64.15 |
| | SUB 4 | 76.63 |
| | SUP 1 | 78.09 |
| | SUP 2 | 56.49 |
| | SUP 3 | 62.11 |
| | SUP 4 | 92.40 |
| | SUP 5 | 61.69 |
| | SUP 6 | 60.06 |

Table IIA (cont'd)

| SUBJECT | GRID | % V. accnted for by 1st p.c. |
|---|---|---|
| I | 1 SUB | 96.47 |
| | SUB 1 | 71.11 |
| | SUB 2 | 92.62 |
| | SUB 3 | 94.22 |
| | SUB 4 | 97.89 |
| | SUP 1 | 78.34 |
| | SUP 2 | 71.48 |
| | SUP 3 | 98.29 |
| J | 1 SUB | 84.34 |
| | SUB 1 | 92.94 |
| | SUB 2 | 100.00 |
| | SUB 3 | 78.47 |
| | SUB 4 | 100.00 |
| | SUP 1 | 79.43 |
| | SUP 2 | 92.14 |
| | SUP 3 | 95.29 |
| | SUP 4 | 85.98 |
| | SUP 5 | 88.25 |

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