Computers and People Series

edited by B.R. Gaines

On Becoming A Personal Scientist

interactive computer elicitation of personal models of the world

Mildred L. G. Shaw

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The series is concerned with all aspects of man–computer relationships, including interaction, interfacing, modelling and artificial intelligence. Books are interdisciplinary, communicating results derived in one area of study to workers in another. Applied, experimental, theoretical and tutorial studies are included.

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1. On Becoming A Personal Scientist: interactive computer elicitation of personal models of the world, *Mildred L. G. Shaw* 1979

On Becoming A Personal Scientist

interactive computer elicitation of personal models of the world

MILDRED L. G. SHAW

Middlesex Polytechnic, Trent Park,
Barnet, Herts., England

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Foreword

This book presents a highly perceptive account of new technologies for the exploration of the mind in its structuring of a world. The use of an interactive computer to implement and extend Kelly's "repertory grid" technique both makes it more accessible and practically useful, and also throws new light on the "personal" nature of personal computing.

I have seen the programs described in this book in use by a number of people for the first time and have been fascinated by the intense personal reaction of those taking part. The scientist exploring the way in which he comprehends fundamental concepts in his field; the manager exploring the way in which he views the activities of his staff; the individual in a non-professional role just browsing through his personal world of friends, tasks, or problems—all of them become involved, excited, and engrossed in what they are doing—all of them feel strongly that they are finding out new things.

What people seem to find most exciting and unusual is that they are finding out new things about themselves, and coming to understand that the way that *they* think matters—it actually effects the way they perceive things, make decisions, take action. Perhaps our culture brain-washes us into believing that *we* do not matter, or should not matter—that "reality" dominates our ways of thought and that it is our task to perceive it correctly—deviations are to be removed, or tolerated as defects if they cannot. Certainly, our approach to "science" strongly encourages that viewpoint—we, our thought processes, are contaminants to the "ideal observer".

It is symptomatic of the new viewpoint of knowledge and reality that one will take after interacting with these programs that Mildred Shaw has used Kelly's term *personal scientist* in the title. It is almost a contradiction in terms—"impersonal scientist" would be far more appropriate to our conventional stereotype. Yet philosophically our viewpoint of the scientist finds little support, despite very many attempts by some of the best minds over at least two millenia to give it adequate foundations. It is because the process of knowledge acquisition is so intensely personal that we, in attempting to establish "universal laws", have had to stress so much that it is not.

It would be wrong of me in this preface to over-stress the philosophical aspects of Kelly's work and Shaw's developments of it. This is an immensely practical book that teaches through example and case history—it is not what "might" be done—it is not just a set of "clever" programs—it shows what has been done and how others may do it—how the technologies are useful and how the resultant tools may be used. Some of the programs and techniques are simple enough for any hobbiest to implement on a very small home computer—both the author and I hope this will happen because these programs do represent an aspect of truly "personal computing" that could be of great significance to the individual use of low-cost machines. None of the programs requires massive computing facilities.

Where do these programs differ from conventional computer analysis of the Kelly repertory grid? I believe the most significant aspect is the use of close interaction to have the computer probe the constructs and elements and the relationships within them as the user enters his answers. It does not suggest the answers but it forces the user to think about what he is saying and what it means. It aids his comprehension of his own process of construing reality. I would go further than this and suggest that these programs have a force of their own which is independent of Kelly's theory and its presuppositions. Someone unaware of either could go on to develop this work in interesting and original ways—once a theory becomes operational it is its actualisation not its foundations that dominate. We may not understand Newtonian dynamics but, on using one hammer, we can see how to make bigger, stronger ones, and smaller, more precise ones!

Apart from the hobbiest, many others will find this book relevant and useful. The manager and management scientist will find examples immediately and obviously applicable to their own work, particularly the programs for the comparison of the constructs of different groups, e.g. management and workers. The methodologist will find the programs useful in eliciting the fundamental constructs of a particular discipline. The systems analyst will find that he can use the techniques described here to bring out the structures that people, pre-computer, are using in doing their work—if he is wise he will take account of this in writing computer programs for them to use.

And then of course there are the applications in clinical psychology. I have often thought that it was most unfortunate that Kelly oriented his work in this direction. Its far wider and more fundamental importance was for so long missed. This becomes very obvious when people who have met programs such as those in this book in a management decision context express their amazement that they can "also be used in psychiatry"! We are very loth to admit that a tool to aid the mentally disturbed is relevant to our (highly professional and most rational) activities. Yet what is normality?—what is deviation?—what is rational? It may be disturbing to have these questions raised in areas that we think we "know about"—yet that is one profound, and very important, aspect of being a user of these programs.

I feel it is significant that the author of this work is basically an educationalist. These programs are very much learning tools, inducing self-learning slowly but surely, and making it fun. If we interpret education in its widest sense to be the process of "facilitating the acquisition of knowledge", then these are some of the most educational programs in existence. It is also significant that the work was carried out in the Centre for the Study of Human Learning at Brunel University under the supervision of Dr Laurie Thomas. His wide-ranging practical interest in the applications of the work have strongly influenced the case studies given.

Finally, let me give one of my favourite quotes from Kelly that I believe Mildred Shaw has not used. He saw the process of construing as being fundamental to epistemology—all events are different and it is only we who create similarities between them for purposes to which we give such terms as "learning", "decision", "action", etc. (Kelly saw a major part of his work to be the removal of such terms as explanatory primitives by giving them operational definitions.) In his prime work he says: "To construe is to hear the whisper of the recurrent themes in the events that reverberate around us" (Kelly, 1955, p. 76). That may well be no logical answer to Hume's apparently conclusive arguments that our experiences of today are no guide to those of tomorrow. As a psychological answer, however, it has a feeling of truth—certainly, how we construe events indicates how we will hear the whispers of tomorrow—understanding how others construe them may let us hear their whispers of tomorrow. In both cases we are learning something of importance and use to us, and that is the significance of this book.

November, 1979

Brian Gaines
Centre for Man–Computer Studies

Preface

When he has read and fully digested this book the reader should be able to: form a model of any topic in his own terms; discover hidden aspects of himself and his personality; find new ways of tackling and solving immediate problems; apply these techniques to improving his job satisfaction.

This set of psychological tools exists in the form of computer interactions to help man or woman in becoming a personal scientist. Personal construct psychology was developed by George Kelly to explain how similar events could produce different behaviour in different people. He used the repertory grid to elicit the unique dimensions along which each individual classifies his world. In 1955 he published his major work in which he describes his theory and attempts to understand man as a personal scientist who forms theories about his world, testing these against his personal experience, reviewing and revising his theories, anticipating on the basis of them, and acting on the basis of his anticipation.

The system of constructs is monitored by the computer in such a way as to provide immediate feedback to the participant on cross-references within the system as it is elicited from him at the terminal. Using the basic philosophy of personal construct theory the computer offers the facility of interactive and participative methods of analysis of this data, which extracts and displays the essence of the subjectively and personally meaningful relationships in a single grid, a pair of grids, or a group of grids. In this way each person is offered a view of himself and his relationships in a non-directive and supportive environment as he is developing his personal models of the world.

These techniques have been applied in a wide variety of situations. Among those described in the book are studies on aspects of self represented by role perspectives, the personal and family relationships of two adolescents, staff appraisal in industry, and quality control in a knitwear factory. In each case these highly innovative tools are used to shed new light on potentially difficult problem areas. The reader is invited to try the methods for himself and to contact the author for further information about the implementation or use of the programs, and the availability of a grid analysis and advisory service.

November, 1979 Mildred L. G. Shaw

To Laurie

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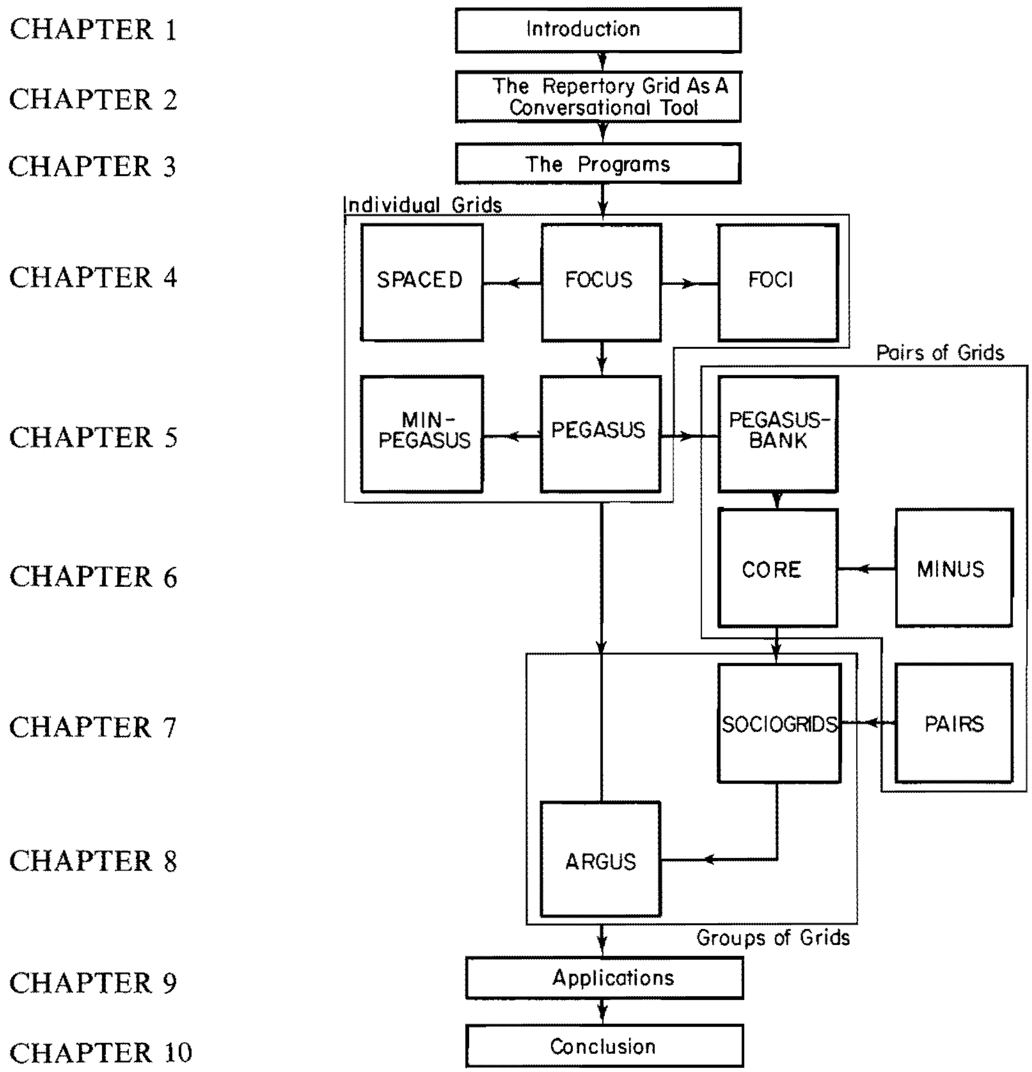

Fig. 0.1. Plan of the book.

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Chapter One

Introduction

I. Learning Difficulties

A basic problem in education is that everyone involved has his own ideas of the objectives which should be specified, and the measurements which should be made to test the achievement of these objectives. Some may think that perhaps an intuitive evaluation of progress is more appropriate than behavioural measurement to the learning which is taking place. If the general aims of education are to increase the autonomy of the individual, to encourage self-organisation and self-development, and to raise levels of awareness of self and others in the world in order to live more fully and operate more effectively, then there will be many opinions of how this is to be achieved.

Many bright young people, both children and adults, experience unnecessary learning difficulties, often due to an inadequate personal meaning system which fails to provide a general frame of reference in which a concept may be developed. Mathematics seems to be one area which is particularly susceptible to such difficulties. The work of Chapman (1974) together with comments from student teachers in initial training such as "I've never been any good at Maths" and "I go all hot and cold when Maths is mentioned" seem to suggest that the inability to cope is due to a mixture of intellectual and emotional problems with the subject. A frequent request to "show me how to do fractions" indicates how basic some of the difficulties are. Despite the amount of time spent on the manipulative skills of "doing fractions" the student is often left unsatisfied, feeling that it must be more complicated or it would have been easier the first time.

However, there is no reason to assume that such problems occur only in Mathematics. To "start from where the learner is" seems a good rule of thumb, but is easier said than done. When the learners leave the primary school they are developing in many and varied directions, and the teacher may find it easier to ignore individual differences and resort to instruction. Blishen sums up the situation:

> There are children's words quoted in this book that glow with the memory of good primary school teaching, when you were fully involved—head, heart, imagination. It is a miserable

> thing that the step taken by so many of our children, when they pass to the secondary school, should be a step from excitement and acceptance into boredom and rejection.
>
> *(Blishen, 1969, p. 11)*

Much of what is done in secondary schools, colleges, polytechnics and universities, however, comes into the category of instruction. Dearden (1967) has said that we must be on our guard not to think of instruction as being brow-beating and hectoring by an offensive teacher. Indeed, instruction is an important and useful part of education which passes on to the next generation a coherent body of knowledge, skills and values which by tradition and convention have become accepted as the most successful methods of operation. In societies where scientific and technological understanding is in the early stages of development, this is essential to maintain progress and make good use of the accumulated experience of the human race. Skinner also supports this view:

> Control is clearly the opposite of freedom, and if freedom is good, control must be bad. What is overlooked is control which does not have aversive consequences at any time.
>
> *(Skinner, 1971, p. 41)*

In industrial training, instruction can be the most efficient way of handing on values and skills. However, for it to become effective learning it must produce a change in the learner which is valued by the learner. If the learner's retrospective values align with the trainer's prospective purposes then the instruction has been successful and the learner is able to incorporate his experience into his meaning system. Illich warns against instruction which fails this condition:

> People who have been schooled down to size let unmeasured experience slip out of their hands. To them, what cannot be measured becomes secondary, threatening. They do not have to be robbed of their creativity. Under instruction, they have unlearned to "do" their thing or "be" themselves, and value only what has been made or could be made.
>
> *(Illich, 1971, p. 40)*

It is necessary in secondary and higher education as well as in the primary school to relate the construction of personally relevant meaning to bodies of established knowledge and traditional educational disciplines. The teacher must steer a careful course between the Scylla of unquestioned dogma and "facts", and the Charybdis of permissiveness which leaves the learner's mind in a state of confusion and avoids the wisdom of past generations. Ryle (1949) uses the phrase "re-allocation of facts", and Jones suggests that "facts" or the perception of them may change with time:

> It is likely that in a few hundred years the "facts" described by Einstein, Russell, and Freud, will undergo revision as the "facts" described by Newton have been revised.
>
> *(Jones, 1968, p. 11)*

In current times the "facts" of technology are changing within a five- or ten-year time scale. Over the last decade electronics has developed from the use of valves, through transistors to chips and microprocessors. Consequently education must prepare the learner for a world where knowledge is changing, where flexibility and adaptability are the hallmarks of success. This implies a real need for self-organisation in learning. For learning to take place there must be some reorganisation of the material or experience in terms of the meaning system of the learner.

II. Conversational Method

Despite what has been said above, a physical science paradigm is not necessarily helpful in the educational field, and traditional psychology fails education in this respect as Biggs (1976) has discussed. Since psychology is dealing with people as subject matter, the "experiments" cannot be controlled using the criteria of physical science. Kelly says:

> Too often it turns out that the experiment the psychologist thinks he is performing is not the one in which his subject is engaged. If the two experimenters are to collaborate each needs some idea of what the other is doing. What is frequently regarded merely as the subject's "behavior" may be for him no less of a venture, and have no less extensive implications, than the "experimenter's" efforts.
>
> (*Kelly, 1966b, p. 136*)

Interaction between entities able to model themselves and others must necessarily take the form of "conversation". Individuals cannot be treated as objects, or be instructed how to take part in an experiment without the recognition of the autonomy of each person, and the invitation to participate jointly in co-operative exploration of the nature of man. To facilitate self-organised learning, the teacher must first negotiate needs and purposes using a conversational method, and articulate the needs of the learner into objectives or purposes. This is closely linked with what the teacher terms "motivation". Kelly says:

> Suppose we began by assuming that the fundamental thing about life is that it goes on: the going on is the thing itself. It isn't that motives make a man come alert and do things; his alertness is an aspect of his very being.
>
> (*Kelly, 1962, p. 85*)

He explains that if the child is motivated, it implies that his needs are in line with the purposes of the teacher.

> A teacher might complain that a child was "lazy", but when asked to observe him for several days to see how he went about being "lazy", come up with a description of some very active and purposeful behavior. "Laziness", then, although attributed to the child, had as its principal referent, as far as the psychologist was concerned, the frustration the teacher experienced in trying to get the child to join her in something she thought they ought to be doing.
>
> (*Kelly, 1963, p. 58*)

When a purpose has been clearly stated, the method and content or plan of the learning in relation to the specific purpose must be negotiated, and eventually the learner must match his achievements against some personally valued external opinion. This is the essence of the learning contract (Rogers, 1969). So motivation is the result of personal involvement and the recognition of personally important purposes together with a plan of how they may be achieved. Maslow's (1954) hierarchy of motivation, Bonner's (1967) "pro-active personality" and Rogers's (1969) definition of motivation and creativity, all see man as "becoming his potentialities". Kierkegaard says:

> An existing individual is constantly in process of becoming; the actual existing subjective thinker constantly reproduces this existential situation in his thoughts, and translates all his thinking into terms of process.
>
> (*Kierkegaard, 1941, p. 79*)

This can only be achieved by the personal involvement and self-organisation which may be encouraged by the use of conversational heuristics.

A number of people have put forward models of "conversations". Jahoda and Thomas (1965) have developed a "science of learning conversations" in which the learning experience can be viewed from different perspectives. Figure 1.1 shows the four quadrants: quadrant 1 represents the learner's anticipation of the event, whereas quadrant 2 represents the teacher's objectives. Quadrants 3 and 4 denote a retrospective view of the experience from the points of view of the learner and teacher respectively.

Purpose	Learner	Teacher
Prospective	1	2
Retrospective	3	4

Fig. 1.1 The science of learning conversations.

Each of the quadrants 1 to 4 represents a valid point of view. Much of the learning in quadrant 3 which is retrospectively valued by the learner is unexpected and unplanned, whereas traditional objectives are based on the learning seen in quadrant 2, that which is prospectively defined by the teacher. This first came to be valued through the success of Skinner (1959) with the training of animals which later led to the development of programmed instruction for human learning. Learning in quadrant 1 is exemplified by the Japanese archer described by Herrigel:

> Nothing more is required of the pupil, at first, than that he should conscientiously copy what the teacher shows him. Shunning long-winded instructions and explanations, the latter contents himself with perfunctory commands and does not reckon on any questions from the pupil. Impassively he looks on at the blundering efforts, not even hoping for independence or initiative, and waits patiently for growth and ripeness. Both have time: the teacher does not harass, and the pupil does not overtax himself.
>
> (*Herrigel, 1953, p. 59*)

This is where the learner either has identical purposes to the teacher, or at least partially suspends his own values and judgement in order to take on those of the teacher temporarily. Learning is a two-way process in which a special relationship is established between the learner and teacher. Quadrant 4 denotes the learning which is retrospectively defined by the teacher who is sometimes both surprised and pleased at the changes which have been initiated during the event.

Luft's "Johari Window" (1961) is a model of interpersonal awareness which is now being applied to social skills training in industry (Schein, 1969). The Johari Window again demonstrates the interaction of two variables, as shown in Fig. 1.2.

	Known to self	Not known to self
Known to others	1 OPEN	2 BLIND
Not known to others	3 HIDDEN	4 UNKNOWN

Fig. 1.2. The Johari Window (A).

Hanson (1973) reconstructs this diagram to emphasise the importance of feedback as shown in Fig. 1.3.

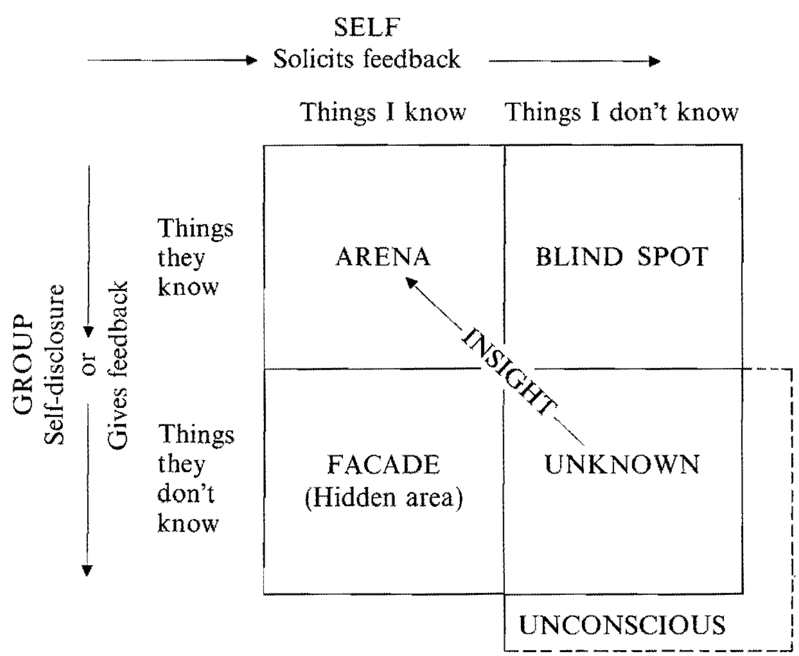


Fig. 1.3. The Johari Window (B).

The "arena" is characterised by free and open exchange of information. The area of the arena is proportional to the level of trust between the individual and the group. The "blind spot" contains information of which the individual is not aware but which may have been communicated to the group by verbal and non-verbal cues. The third quadrant is the "facade" which contains information hidden from the group by the individual. The "unknown" area "may represent such things as intrapersonal dynamics, early childhood memories, latent potentialities, and unrecognised resources" (Hanson, 1973, p. 116).

III. P-Individuals

Pask has developed a "theory of conversations and individuals" which is a cybernetic approach to psychological model-building. He suggests that participants in a conversation cannot be regarded simply as distinct processors, although in some cases they may be distinct.

> The (sub) theory of individuals is concerned with characterising potentially conscious entities (human, mechanical or both) which have certain invariant and unitary qualities.
>
> *(Pask, 1975, p. 302)*

An "M-Individual" or "mechanically characterised individual" is regarded as a biologically self-replicating system and is consequently a hardware distinction. A "P-Individual" or "psychologically characterised individual" has "many of the properties ascribed by anthropologists to a role" (Pask, 1975, p. 302), and is also a procedure executed in some M-Individual or processor; this is therefore a software distinction. Pask describes the relationships of individuals and conversations:

> Any strict conversation on domain R over occasion $0, 1, \ldots, n, n+1, \ldots, N$ is a P-Individual in its own right; moreover, it can be factored into a pair of entities A and B of which at least one (possibly both) are also P-Individuals ... A and B are called participants. ...
>
> Due to the form of this definition, the P-Individual has a certain primacy. Its integrity as a P-Individual is due to the fact that the procedures which make it up are self-reproducible in the conversational domain R. But they cannot in fact, be reproduced unless they are executed in an M-Individual which is an L [object language] processor. Hence M-Individuation is needed in order to talk about or set up a strict conversation, as well as P-Individuation. It happens that P-Individuals do not correspond, one to one, with distinct M-Individuals unless special precautions are taken and the conversational milieu is specially designed. ...
>
> In fact a strict correspondence or even a strong correlation between P-Individuals and their processors is seldom manifest and, as a rule the P-Individual is distributed under execution.
>
> *(Pask, Scott and Kallikourdis, 1973, pp. 465–466)*

An example of a conversation between P-Individuals contained in one M-Individual is a person learning on his own where one P-Individual has the role of teacher and the other has the role of student; or more generally private thinking and problem-solving activities, "i.e. the conversation is a tutorial contract, the entailment/task structures represent 'subject matter'" (Pask, 1975, p. 303).

One of the main aims of this current work was to provide a technology which created the pre-conditions for self-organised learning in the form of conversations with self and others. Three aspects of conversation are investigated:

Ia. A conversation with oneself where experiences in quadrants 2, 3 and 4 of the Johari Window may be moved into quadrant 1.

Ib. This is generalised to a conversion with several P-Individuals each representing an important aspect of self.

II. A conversation between P-Individuals in two distinct M-Individuals or skins.

III. A conversation in a group of M-Individuals which is one or more P-Individual.

Each of these aspects of conversation is considered in greater detail in later chapters.

IV. Personal Construct Theory

The philosophy and ideology underlying this work has its origins in personal construct theory (Kelly, 1955). For many years psychologists have been interested in how a person classifies his experiences and categorises his environment. The concept of "schema" has ranged widely from Kant (1934) to Bartlett (1932), from Head (1920) to Vernon (1955), Bruner, Goodnow and Austin (1956) and Skemp (1962). The commonality in these approaches suggests that an individual uses a system of organisation together with interrelationships between components in the system, which interacting with the structure produce interdependencies. If the person can become aware of the structure and the organisation within the structure he becomes more able to make adequate predictions and act according to them. Osgood, Suci and Tannenbaum (1957) suggested that each person has a unique system of dimensions which are used to perceive and judge the environment, and that some of these are common to all people. Kelly argues that each person constructs his own version of reality using a hierarchical system or lattice of personal constructs. For him his theory was about personality, how each person constructed his view of reality and lived within it. In the context of a person learning from experience it is about the way in which he can negotiate a viable position in his own reality, review it, revise it and refine it within his own world. Enduring reality is non-conscious, and consciousness is merely a temporary construction within a specific situation.

A. The Personal Scientist

Kelly saw each human being as a personal scientist, classifying, categorising and theorising about his world, anticipating on the basis of his theories and acting on the basis of his anticipation.

> Now what would happen if we were to re-open the question of human motivation and use our long-range view of man to infer just what it is that sets the course of his endeavour?... Might not the individual man, each in his own personal way, assume more of the stature of a scientist, ever seeking to predict and control the course of events with which he is involved? Would he not have his theories, test his hypotheses, and weigh his experimental evidence? And, if so, might not the differences between the personal viewpoints of different men correspond to the differences between the theoretical points of view of different scientists?
>
> *(Kelly, 1955, p. 5)*

Kelly was concerned in his work with the supervision of research students, encouraging them into learning. He was also a psychotherapist. He gives an account of an afternoon spent alternately with students and clients, eventually coming to the conclusion:

> I must say that this sort of thing went on for a long time before it ever occurred to me that I was really doing the same sort of thing all afternoon long.
>
> (*Kelly, 1963, p. 61*)

Traditional disciplines, areas of research and operation become coherent for ease of management, but as one becomes more deeply involved in a theme of work, time and again it is necessary to work through the traditional boundaries. One gradually begins to be aware of the underlying structures which are only too familiar. Perhaps there is some common structure in human processes which is only waiting to be recognised by each one of us. The boundaries between learning and psychotherapy, between learning and training, and between training and psychotherapy seem to move so frequently as to be totally fluid. Rogers (1969) extended his ideas of client-centred therapy into education and learning; Hilgard and Bower (1975) consider Freud's theories as theories of learning. Much of the recent innovation in industrial training has origins in clinical psychology such as encounter groups, role play and transactional analysis. This technology is finding applications in education, psychotherapy and industrial training. Conversations between two people may exhibit the relationship of expert and client, or tutor and student, as well as that of equals co-operating to solve a joint problem, each providing a valuable interaction and an awareness of the process of communication. Conversation between people may help in exploring individual personal problems, or in negotiating among the individual personal meaning systems brought to bear by work groups on common problems. The emphasis is on the individual as a person, as a personal scientist, who remains as such whatever activity he happens to be engaged in. Ardrey says:

> We are not the sole product of the parental relationship, as the Freudians would suggest, nor are we the simplistic, identical ciphers that the behaviourists would find convenient. We are beings created unequal who through learning come to make the best or worst of our endowment.
>
> (*Ardrey, 1970, pp. 86–87*)

One of the informal divisions within psychology is between "hard" and "soft". "Hard" psychology seems to imply exact and rigorous conditions for experiments, and exact and rigorous statistics for the analysis of the data. "Soft" psychology seems to embody the humanistic approach of seeing in human nature that unmeasurable individuality which we all recognise and may or may not choose to ignore. When a physical scientist sets up his experimental conditions he does so in such a way as to stabilise his observations which can then be repeated; that is, measured by other scientists looking from the same point and with the same perspective. The social scientist, however, is unable to keep his subject matter constant in quite the same way. There can no longer be an "external" observer but only participants helping each other. To minimise the effect of the interaction, a psychologist may use himself as subject, acting as his own laboratory, experimenting with himself and introspecting on the consequences. This has led to some interesting and worthwhile results; for example, Freud's theory of dreams (1953), Huxley's experience with drugs (1954) and Ebbinghaus on memory (1885). However, the problem of reflexivity or self-reference in psychology results from the fact that the psychologist is the object of his own study. This problem is discussed by Oliver and Landfield, who say:

> The way to surmount reflexive difficulties is to be aware of them and how they differentiate psychology from the other sciences, and to draw the consequences. Psychologists should seek to avoid fallacies of reflexivity, but not reflexivity.
>
> (*Oliver and Landfield, 1962, p. 124*)

B. The Repertory Grid

Alternatively each person may act as his own scientist. Each personal scientist uses himself as participative subject matter, and construes and interprets the results in a personally meaningful way. To do this effectively a conversational method must be used. Psychology offers a variety of these from the interview to introspection, but within personal construct theory the technique of the repertory grid exhibits a "scientific" tool with which to structure a conversation. The repertory grid has since come to be known as "a hard tool for soft psychologists", and indeed, to date, is one of the best attempts to examine and bring into awareness the conceptual system built and held by an individual. Kelly used this method to augment his theory of personality, suggesting that each person has a unique system of personal constructs through which he experiences life, and categorises and makes use of his experiences. He explains how similar events can produce quite different behaviour in different people, the system of constructs acting like a pair of spectacles, focusing and colouring his external and internal worlds. The following statement gives a personal view of the grid.

> By a "construction matrix" I mean a postulated grid in which events and abstractions are so interlaced that whatever appears to occur independently of one's intention is given meaning in depth by being plotted against whatever co-ordinate reference axes he has intentionally erected. And in this psychological hyperspace the humanly contrived axes of reference, in turn, acquire whatever objective significance they have through extension—or through "operationalising", if one prefers a term that has more current usage. This is to say that human constructions derive their objectivity wholly from the way they cast events into varying arrays—or simply from the lines of perspective they provide. Actually it is in terms of such arrays that consensual judgement becomes psychologically possible. Consensus itself, while often cited as the criterion of objectivity, does not properly define the psychological grounds on which objectivity rests. Only sociological grounds are implied.
>
> But now, since we are talking about human experience, including our own particular experience as scientists, it may be more precise, instead of saying that the matrix is a schema in which events and abstractions are interlaced, to say it is a man's observations and his constructs that are woven into the fabric of experience—the one ascribing meaning to the other and the other lending palpability to the one. And in this more phenomenological sense the grid might better be characterized as a "repertory grid", since it expresses one's own finite system of cross-references between the personal observations he has made and the personal constructs he has erected. I suppose it is apparent that all of us must have quite limited repertories, for the events we encounter are experienced only in such depth as our constructions will plumb, and our constructs have only that scope which is provided by the ranges of events to which we undertake to apply them.
>
> (*Kelly, 1965b, pp. 290–291*)

1. *Constructs*

A construct is a bipolar dimension which to some degree is an attribute or property of each element. Bannister clarifies the idea by contrast with a "concept":

> A construct is a way in which some things are seen as being alike and yet different from others. ... The idea of relevant contrast and limited range of applicability or convenience is not involved in the notion of a concept, but is essential to the definition of a construct. ... Sometimes concepts are also regarded as ways in which certain things are naturally alike and really different from all other things. This use suggests that a concept is being considered as a feature of the nature of things, an inherent categorisation of reality. The idea of a construct does not carry with it any such assumption, but rather is seen as an interpretation imposed upon events, not carried in the events themselves. The reality of a construct is in its use by a person as a device for making sense of the world and so anticipating it more fully. It must be stressed that all invented dichotomies, however widely agreed (large–small), specifically annotated (bass–treble), or scientifically approved (acid–alkali) are constructs—useful inventions, not facts of nature.
>
> *(Bannister and Mair, 1968, pp. 25–26)*

2. *Elements*

In the repertory grid as used in this book the universe of discourse is represented by a particular although not necessarily specific problem or need. From the area mapped out by the universe of discourse a set of "observations" or "elements" is chosen which are personally important to the person concerned, the elicitee. The elements originally suggested by Kelly in his work as a psychotherapist were role titles such as: Self, Mother, Father, Best Friend, Threatening Person, Rejected Teacher, Boss. The client was required to supply names of his personal acquaintances to fit these and other roles as closely as possible. These roles are still commonly used in psychotherapy, but are equally applicable to a person in industry or education.

However, the elements need not be role titles, but may be a set of people—such as work colleagues or subordinates, things—such as books used for learning or detergents in market research, or events or experiences—such as parts of a course of psychotherapy, which span the area of the problem. For example, if the problem was one of choosing a future career the elements might be different jobs; if the problem was to become a "better" person the elements might be different aspects of self; if the problem was to evaluate the success of a training course the elements might be significant events which took place during the course. When choosing elements care must be taken to ensure that each one is well known and personally meaningful to the elicitee. Each construct must be central to the person in the context of the particular problem. Thoughts and feelings, objective and subjective descriptions, attitudes and prejudices all constitute valid constructs. The verbal descriptions of the construct and the labelling of the poles need not be a coherent statement to the outside world, but only a memory aid to the conversation. The mapping of the elements onto the constructs produces the two-dimensional grid of relationships.

The most common method used for eliciting a construct is what has come to be known as "the three card trick". This is the minimal context form or triad method. The elements are presented in groups of three, three being the minimum number which will produce both a similarity and a difference, and the subject is asked to say in what way two are alike and thereby different from the third. This is called the "emergent pole" of the construct. The "implicit pole" may be elicited by the "difference" method (in what way does the singleton differ from the pair?) or by the "opposite" method (what would be the opposite of the description of the pair?). Epting, Suchman and Nickeson (1971) have found the "opposite" method to produce a greater number of differentiated constructs, but the author has occasionally varied the method used to accord with the inclination of the subject.

An example: think of the three school subjects Mathematics, English Literature and Art. Group these into the two which are similar, and the different one.

Janet says: "Mathematics and English Literature are alike because they are about a body of knowledge, and Art is about self-expression".

Philip says: "English Literature and Art are alike because they are about life, and Mathematics is abstract".

John says: "Mathematics and Art are alike because they are communication by symbols and forms, whereas English Literature is communication by words".

Mary says: "Mathematics and English Literature are alike because they are useful in life, but Art is a waste of time".

Lynn says: "Mathematics and Art are fun and easy, but English Literature is about writing essays which I don't like".

Clearly each person has a different opinion and a different value system. Each of these dimensions is a personal construct because it is expressed in personally meaningful terms, and is significant to the person who used it. As each construct is elicited all the elements are assigned to one pole or the other. In the above example Jane's construct became:

	1 Mathematics	2 English Literature	3 Art	4 Music	5 Science	6 History	7 Drama	
Body of knowledge	√	√	×	×	√	√	×	Self-expression
√								×

For a greater degree of differentiation a grading scale is commonly used, usually a five- or seven-point scale.

C. A General Context

Much of Kelly's thinking is part of a more general context of ideas. McCulloch says:

> Our appreciation of the world [is] in pairs of opposites. As Alcmaeon, the first of experimental neuro-physiologists, so well observed, "the majority of things human are

two"—white/black, sweet/bitter, good/bad, great/small. Our sense organs, detecting regularities the same in all respects save one, create dichotomies and decide between opposites.

(*McCulloch, 1965, pp. 73–74*)

Schumacher, basically an economist, says:

If we accept the Aristotelian division of metaphysics into ontology and epistomology, the proposition that there are levels of being is an ontological proposition; I now add an epistomological one: the nature of our thinking is such that we cannot help thinking in opposites.

(*Schumacher, 1973, p. 79*)

And again in the same book:

What matters is the tool-box of ideas with which, by which, through which, we experience and interpret the world.

(*p. 70*)

Many years before the publication of Kelly's theory, a physicist, Sir James Jeans, stated that:

The physical theory of relativity has now shown that electric and magnetic forces are not real at all; they are merely mental constructs of our own, resulting from our rather misguided efforts to understand the motions of the particles. It is the same with the Newtonian force of gravitation, and with energy, momentum, and other concepts which were introduced to help us understand the activities of the world—all prove to be mere mental constructs, and do not even pass the test of objectivity.

(*Jeans, 1942, p. 200*)

He describes part of Dirac's formal theory which includes as special cases the theories of Schrödinger and Heisenberg:

Events in the phenomenal world are not uniquely associated with events in the substratum; different events in the substratum may result in phenomena which are precisely similar, at least to our observation.

(*p. 172*)

This seems to be analogous to the interpretation of behaviour resulting from different construct systems. And again when discussing the theory of quanta:

Complete objectivity can only be regained by treating observer and observed as parts of a single system; these must now be supposed to constitute an indivisible whole, which we must now identify with nature, the object of our studies. It now appears that this does not consist of something we perceive, but of our perceptions; it is not the object of the subject–object relation, but the relation itself.

(*p. 143*)

Until recently some mainline psychologists have tended to look to science as being "objective" and concerned with "facts", but are now realising that objectivity is an agreement to view the world from the same position. When dealing with the real world no observation can be totally objective, and a specialised branch of a physical science is merely a set of agreed conventions and observation points. As Wittgenstein has remarked:

> The mathematician is an inventor, not a discoverer.
>
> (*Wittgenstein, 1967, No. 167*)

This surely applies to all the articulate branches of science, physical and social. The rigorous and systematic control of experimental methods, the collection of data and precision of measurement, the analysis and evaluation of the data, reliability and validity, and the use of inductive and deductive logic are all powerful tools which lead to the formulation of hypotheses and the growth of theories, in both the physical and social sciences. None of these methods, however, can guarantee the findings of absolute truths, for in each generation theories must be used as stepping-stones for the next. McGrath and Altman have a similar point of view:

> Given latitude and freedom, the scientist is an artist in that he will conduct research stemming from his own personal feelings, impressions, and insights. Of course, the scientist proceeds quite differently from the artist; he applies a specific set of procedures and criteria (the scientific method) to confirm or refute his hypotheses, intuitions, and hunches. But basically, the hunches are subjective in origin. ... And we value this personal aspect of science positively, for this is how creative concepts are forged and new directions charted.
>
> (*McGrath and Altman, 1966, p. 86*)

D. The Theory

Kelly's formal presentation of his theory was in the form of a fundamental postulate and eleven corollaries. The fundamental postulate states that "a person's processes are psychologically channelized by the ways in which he anticipates events". Each word has been carefully chosen, and its implications are spelled out by Kelly (1955). He further elaborated his theory with the corollaries, some of which are of particular interest in the present context, and all of which will be detailed in Chapter 2.

About the theory, Kelly says:

> Some have suggested that personal construct theory not be called a psychological theory at all, but a metatheory. That is all right with me. It suggests that it is a theory about theories, and that is pretty much what I have in mind.... There is also the question of whether or not it is a cognitive theory. Some have said that it was; others have classed it as existential.... Personal construct theory has also been categorised by responsible scholars as an emotional theory, a learning theory, a psycho-analytic theory (Freudian, Adlerian, and Jungian—all three), a typically American theory, a Marxist theory, a humanistic theory, a logical positivistic theory, a Zen Buddhistic theory, a Thomistic theory, a behaviouristic theory, an Appollonian theory, a pragmatistic theory, a reflexive theory, and no theory at all. It has also been classified as nonsense.... In each case there were some convincing arguments offered for the categorization, but I have forgotten what most of them were.
>
> (*Kelly, 1966a, pp. 9–10*)

More detail and specific instances are given by Kelly (1965a).

Maybe it is just a way of seeing people as process, as "becoming", as developing their potentialities in seeking what Bartlett (1932) has described as "effort after meaning". The fact that the theory can be seen in this variety of ways and from widely differing perspectives indicates that it is a general theory which can be applied in a diversity of contexts.

To some extent personal construct theory, and in particular the repertory grid, has had less impact than might have been expected. It is over 20 years since Kelly first published his theory, and although it has been used a little in clinical psychology, only in recent years have the educationalists and industrialists begun to realise its potential. Many experimenters and psychotherapists have rejected the use of the grid because of the unsatisfactoriness of analysing data produced in this format, and many others use it in a partial way well below its potential for learning and psychotherapy. In order to use the content of the grid fully as a feedback device, the method of representation should clarify the content as much as possible. Used as a tool within a physical science paradigm, the grid is no more than a test in the same way as a personality inventory or an attitude scale is a test. That is, the results are collected by the psychologist and interpreted by him without reference to the meaning system of the subject, who then feels distanced from the content and less inclined to commitment. Much of the use of grids in psychotherapy and educational research has fallen into this category. However, used as a tool within a conversational paradigm, the elicitee can use the grid to become more aware of links he is implicitly making in his interaction with the world, so becoming more deeply involved and committed to the content of the grid in the elicitation stage.

E. Learning-centred Grids

If the grid user approaches the technique with the view to heightening his awareness of himself in the light of the sorts of differentiation he does and might bring to bear in a particular universe of discourse, he may be able to distinguish the structural foundations of his psychological modelling. Kelly envisaged a personal scientist as anticipating events and acting on the basis of that anticipation; the quality of a person's models are directly linked to his skill and competence in anticipation. If the technique of grid-elicitation together with grid-feedback is used in a "learning-centred" way the models may be brought into awareness, revised and refined, or even rebuilt to enable learning to be more successful in those areas where inadequate modelling was hindering the learning process. Creative change is the essence of learning, but change can too easily take place in such a way as to have no anchoring points, and hence act as such a disruptive influence as to force the frustrated learner to resort to his old ways and models. Support is needed for anchoring to take place, and the support can be reliably given by the content-free, elastic but firm structure of the grid. Ardrey recommends that we must know ourselves to make the best of our potentialities; this is one way of starting to do that.

> The animal within us, whose existence is denied, whose ways are ignored ... remains a wild animal. But the animal who is accepted, whose ways become known to us ... may become a tame animal.
>
> (*Ardrey, 1970, p. 356*)

V. Grid Analysis

The problems of the analysis of the grid for feedback purposes fall into two major categories: methods for exhibiting pattern and structure in the grid responses, and methods for psychological scaling in general. The traditional methods of grid-analysis have been the D^2 (non-metric) method of factor analysis (Kelly, 1955; Osgood, Suci and Tannenbaum, 1957; Kelly, 1964; Bonarius, 1965), other methods of factor analysis both metric and non-metric (Cronbach, 1955; Coombs, 1964), principal component analysis (Slater, 1964, 1967, 1968, 1972), and multidimensional scaling (Torgerson, 1958; Shepard, 1962; Kruskal, 1964; Coombs, 1964). These three methods are quite closely related, the main differences being in the number of dimensions extracted and the form of representation used. The use of the term "non-metric" indicates that only ordinal properties of the data are assumed (Shepard, Romney and Nerlove, 1972). There are many arguments to be put forward for and against each of these methods. More recently cluster analysis has been used to identify patterning in the grid responses (Rosenberg, 1976; Thomas and Mendoza, 1970).

Whichever method is used to analyse the grid, the subject or user must be reassured that the "computer" has not invented or misconstrued his intentions, or the experimenter imposed his own meaning system on the results. Although willing to be impressed and overwhelmed by complex computer output, neither the experimenter nor the subject is always willing to try to understand it. It is important, therefore, that for human interaction the computer is used as a tool by the psychologist as craftsman to help him to tease out forms and structures which are natural rather than imposed. This attitude leaves the computer in a subservient relationship to the psychologist, not one in which the psychologist has to accept the demands of the computer in terms of language or communication. This applies equally to the software of statistics and statistical packages which are too often master of the psychologist, dictating to him what data he must collect in order to have it processed by available procedures. Hudson supports this view:

> I wish to argue that although psychologists—and mental testers especially—are known for the subtlety and variety of their statistical techniques, these are often inappropriate. At present psychology is an exploratory science, and as a consequence most of our statistical needs are simple. If—in the course of our research—we find ourselves teasing out a result with the statistical scalpel, working out our correlations to three places of decimals, this is surely a sign either of a poorly designed experiment, or of a result too trifling to pursue.
>
> (*Hudson, 1966, p. 2*)

VI. Sharing of Meaning

The personal scientist must also be a personal artist and craftsman, not a mass-producer or a machine-minder. Meaning is relative, and is a function of the position of the participant. Not only can the grid map out an individual's personal space to assist him in looking at his own perceptual and conceptual styles, but it can also help to map out shared space and enable him to relate his individual perceptions to the styles of communication of others. Two people engaged in conversation assume that they have some common ground of shared understanding, but it sometimes happens that this is not so, and communication is impossible. This problem becomes particularly acute when constructs are offered by the experimenter, and even when terms used by the subject are translated by the experimenter as he records them. The public language system seems to assume that the same word is used by different people in exactly the same way, but this is an assumption which is not born out in practice. Verbal labels are used quite differently by different people and are applied in some cases to quite distinct groups of observations. Each individual has a private meaning system which maps on to the public language systems to a greater or lesser extent. If communication is less than adequate between two people it may be that each have different referents, and the relational terms used—all terms are subjectively relational—will be mismatched. This may happen without the knowledge of the participants in the conversation, who then allow the situation to become irreversible, causing a breakdown of present and future interchange.

Rather than the shared part of the communication being in the lowest terms common to the pair, different points of view may be evaluated against the whole system. General systems theory offers a view of a system composed of a structured set of subsystems, and is in turn itself seen in the context of a larger system. This model can be used for groups and individuals. Mead offers a similar viewpoint:

> No very sharp line can be drawn between social psychology and individual psychology. Social psychology is especially interested in the effect which the social group has in the determination of the experience and conduct of the individual member.
>
> *(Mead, 1934, p. 1)*

Sharing can be accomplished in different ways: by one person taking on another person's constructs, or by exhibiting his own in such a way as to provide an interface, or by the development of new constructs in a joint negotiation. Instruction, psychotherapy and discovery learning can all be approached from each of these perspectives, the relative success of the method being dependent not on the method itself but rather on the way in which the situation is modelled by the participants. If management development is seen as an opportunity for personal growth this may be a more personally significant situation than a course of psychotherapy where the client is held at a distance, only being offered the endpoint of an interpretation.

Personal meaning is dependent on the number systems and language of the culture (e.g. Whorf, 1941; Bernstein, 1971; Piaget, 1968; Vygotsky, 1962; Galperin, 1954). Whorf's theory is concerned with language as a vehicle for transmitting to the next generation concepts specific to a particular society, whereas Piaget places more emphasis on language as a tool which may contribute to cognitive development but is somewhat dependent on the understanding of the underlying concept. Vygotsky's view of the two functions of language for external communication with other people and for the internal manipulation of thoughts exposes four fundamental issues:

1. How language facilities our thinking processes.
2. How, nevertheless, social language may constrain and limit internal mental activity.

3. How we are able to translate the results of our thinking processes into a form that can be understood by others.
4. How we are able to decode other people's language to arrive at the thoughts they are trying to express.

(*Greene, 1975, p. 77*)

Chomsky (1965) is especially interested in the latter two issues.

Lorenz cites Humboldt's work on language:

> Language is the formative organ of thought. Intellectual activity, something totally interior that passes almost without trace, is made exterior in speech through sound and becomes accessible to the senses, also receiving permanent form through writing. ... Mental activity and language are therefore one and inseparable: it is not even possible to say that the former is the producer and the latter the product.
>
> (*Humboldt, cited in Lorenz, 1977, p. 249*)

Also cited by Lorenz, Höpp says:

> Language is not only a means of communications but an integral part of reason itself.
>
> (*Höpp, 1970, cited in Lorenz, 1977, p. 129*)

Sharing opens up the area of language and thought by allowing the creative encounter to provide a platform in the language for the take-off of thought. If another person's construct system is indiscriminatingly assumed, the language is a constraint on the thought processes. Gasset has a general warning about this problem:

> The advantage of the words which offer material support to thought has the disadvantage that they tend to supplant that thought; and if some fine day we should set ourselves to plumb the repertory of our most customary and habitual thoughts, we would find ourselves painfully surprised to discover that we do not have actual thoughts but merely the words for them, or certain images attached to them.
>
> (*Gasset, 1959, pp. 30–31*)

The repertory grid indicates a method for each individual to share his ideas with the group in such a way as to keep the individual viewpoints uncontaminated by averaging or taking the lowest denominator as a group representative. The mapping of pairs of grids identifies subgroups of commonality and places these in the perspective of the entire group.

The group, however, may consist of alternative P-Individuals or "personalities" within one brain. Ouspensky introduces the idea of "personalities" which in general operate independently, separated by "buffers".

> *Q.* Could you explain a little more what you mean by buffers?
>
> *A.* Buffers are ... kind of partitions in us that keep us from observing ourselves. You may have different emotional attitudes towards the same thing in the morning, at midday, and in the evening, without noticing it. Or in a certain set of circumstances you have one kind of opinions and in other circumstances another kind of opinions, and buffers are walls that stand between them.
>
> (*Ouspensky, 1957, p. 154*)

About "personalities":

Q. What is the difference between personalities and "I"s?

A. You can say that personalities consist of different "I"s. Everyone can find several personalities in himself, and real self-study begins with the study of these different personalities.

(*p. 163*)

Self-actualisation may be the solving of the space/time allocation problem of the P-Individuals sharing the M-Individual which is bounded by the skin.

Personal construct theory, therefore, is a theoretical position within psychology which accepts the way in which a person attributes meaning to events as the central psychological process. The assumption made is that events do not directly influence behaviour or experience but rather that the meaning attached by the individual to the events has this impact. The same event may have different meanings for different people, or for the same person at different times; and, similarly, different events may have the same meaning for different people. The repertory grid may be used as a vehicle for a person to move from where he is to where he wants to be. Constructs are ideas about the universe of discourse, not words describing a partitioning of the universe. The use of the computer as a tool to aid the craftsman in his creative enterprise enables the philosophy of personal construct theory to be both the underpinning and the superstructure supporting the technology of the repertory grid and the methodology of conversation.

Chapter Two

The Repertory Grid As A Conversational Tool

I. The Fundamental Postulate and the Corollaries

Kelly presents his theory formally as a fundamental postulate with eleven corollaries which elaborate the postulate in different directions. The fundamental postulate states that "a person's processes are psychologically channelized by the ways in which he anticipates events". Bannister and Mair say:

> Kelly was careful in wording the central statement of this theory to surmount or avoid three of the most persistently knotty problems in psychology—namely, why people do anything at all; why over a period of time, or at any choice point, they do certain things rather than others; and how people who are so obviously different in so many ways can yet be compared within some consistent conceptual framework.
>
> (*Bannister and Mair, 1968, p. 10*)

The corollaries are extensions of this position. They are attempts to expand the theory in a strict formulation and hence may appear to be of different types and levels.

The construction corollary states that "a person anticipates events by construing their replications". In construing or "placing an interpretation on" events the individual categorises those which are similar and different from others, building up a set of constructs which enable him to pick out recurring patterns he can then use to anticipate and predict. It is this tendency which makes an adequate model an essential part of success in any field. One does not always build a new model when faced with new events, but anticipates on the basis of the present one.

The individuality corollary states that "persons differ from each other in their construction of events". Kelly (1966a) extended this idea: "it seems unlikely that any two persons would ever happen to concoct identical systems". Many studies have been carried out, the results of which coincide with this view, concluding that subjects prefer personal constructs to constructs offered by the experimenter or psychotherapist (Fager, 1954; Cromwell and Caldwell, 1962; Landfield, 1965, 1968; Bonarius, 1965, 1967, 1968; Isaacson, 1962, 1966). Very little evidence has been submitted to the contrary, only that if offered constructs are sensitively and empathically produced then there is no preference (Warr and Coffman, 1970).

The organisation corollary states that "each person characteristically evolves for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs". This implied that not only are constructs ways of ordering the world, but also that they in turn are organised into a hierarchical or heterarchical framework, similar to the TOTE system of Miller, Galanter and Pribram (1960); or into a lattice.

> A construct is construed as superordinate to another if the other is utilized as one of its contextual elements. A construct is construed as subordinate to another if it appears as one of the elements in the other's context.
>
> (*Kelly, 1955, p. 479*)

Since superordinate constructs span a greater range than those subordinate to them, a threat to the former would produce a more significant impact than a threat to the latter. Similarly, to reconstrue a superordinate construct can be a significant undertaking, involving much reconstruing to subordinate constructs simultaneously (Hinkle, 1965).

The dichotomy corollary states that "a person's construction system is composed of a finite number of dichotomous constructs". This does not necessarily imply that each element lies either at one or other pole, or is out of the range of applicability of the construct, but rather that the grading on each construct is a product of the relationships between the elements; and the paths of thought to which any one person has access are limited in number.

> This relativism applies only to the objects; the construct of good versus bad is itself absolute. It may not be accurate, and it may not be stable from time to time, but as a construct, it has to be absolute. Still, by its successive application to events one may create a scale with a great number of points differentiated along its length. Now a person who likes grays can have them—as many as he likes.
>
> (*Kelly, 1966a, p. 14*)

The choice corollary states that "a person chooses for himself that alternative in a dichotomized construct through which he anticipates the greater possibility for extension and definition of his system". Man chooses not those alternatives which have been carefully cut, dried and weighed up intellectually, but those which feel to him most like the way he wants to go. The "wrong" decisions made by others are being assessed through another construct system and are hence invalid for the individual. If any change is to be made it must be made by the person himself, not merely on the objects around him.

> Men change things by changing themselves first, and they accomplish their objectives, if at all, only by paying the price of altering themselves.
>
> (*Kelly, 1966a, p. 16*)

The range corollary states that "a construct is convenient for the anticipation of a finite range of events only". This identifies the fact that each construct applies only to a limited range of elements. The more superordinate in the system, the more extensive will be the applicability of the construct, but at each stage there are some elements which will be outside this "range of convenience".

The experience corollary states that "a person's construction system varies as he successively construes the replications of events". This is merely confirming that we can learn through experience. If a person's construct system is not totally frozen, he can build up a more successfully predictive system by incorporating results of confirming and disconfirming instances. If he is unable to do this for himself he may need psychotherapy or help in "learning-to-learn". However, much of the everyday learning about life by building, revising and extending cognitive models may be classed as experience.

The modulation corollary states that "the variation in a person's construction system is limited by the permeability of the constructs within whose range of convenience the variants lie". By the "permeability" of a construct Kelly means its adaptability to the incorporation of new objects or events. This is a similar idea to Lewin's (1936) permeable boundaries of a life space. If, when a new construct is added to the system, the person already has a superordinate construct available to incorporate it, the system will be enhanced. Otherwise, the construct may conflict with the existing system, causing apparent inconsistency in his construing.

The fragmentation corollary states that "a person may successively employ a variety of construction subsystems which are inferentially incompatible with each other". Here Kelly attempts to explain apparent inconsistencies in a person's behaviour. If the behaviour appears alternately to represent conflicting constructs, it is possibly related to a superordinate construct which subsumes those which lead to the apparently inconsistent behaviour. Since the referent to the person concerned is superordinate, he may fail to be aware of the conflicting behaviour which he is exhibiting.

> Both of these ideas concerning aspects of logical consistency and inconsistency are important in Kelly's conception of construct systems, the one indicating that certain incompatibilities may be more apparent than real, and the other, that people are not aware of the blind spots and contradictions within their own systems.
>
> (*Bannister and Mair, 1968, pp. 22–23*)

The commonality corollary states that "to the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person". In his most recent version Kelly revises the last clause to be:

> ... his processes are psychologically similar to those of the other person.
>
> (*Kelly, 1966a, p. 20*)

This corollary has implications for interpersonal relationships. One cannot assume that two people behaving in the same way are necessarily construing the events they are encountering similarly or attaching the same significance to them. In the same way, one cannot assume that a construct with the same labels such as "good–bad" will have the same meaning for two different people, or split a set of elements in the same way for them. Construct names are merely labels to remind the person of the thoughts and feelings which the construct provoked, and hence are not transferable to another person without discussion and negotiation. Rather, the extent to which two constructs array the elements in the same way indicates the similarity of the two processing systems.

The sociality corollary states that "to the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person". In making personal sense of the actions of other people, an individual may be able to adapt his behaviour to mutual advantage. Kelly uses the example of driving in traffic. One can be totally unaware of an oncoming driver, but still have sufficient confidence in the understanding of his construction processes to risk life and limb on the basis of anticipating his behaviour on the road, and adapting one's own accordingly. What is actually being discussed is understanding. The level of understanding which can be achieved by one person of another is indicative of the depth of interaction which could be achieved. Kelly (1955) defines "role" as "an ongoing pattern of behaviour that follows from a person's understanding of how the others who are associated with him in his task think". The role a person plays in interaction with another results from his interpretation of the other person's perception of the events both are encountering. Brubacher thinks that the understanding of others is essential to the understanding of oneself:

> Learning to know oneself is not just an affair of private introspection. It is also an affair of seeing how others behave and of recognizing and identifying feelings of theirs with feelings of one's own.
>
> (*Brubacher, 1969, p. 9*)

The set of corollaries therefore indicates a set of directions in which a technology might be developed, and Kelly has also provided the means for developing the technology in the form of the repertory grid. With the use of the now generally available computer this structure is amenable to mathematical treatment for extracting the patterns of construing used by an individual.

II. Grid Analysis

The analysis of the grid is dependent on general methods of analysing statistical data; in particular, the computation of the "similarity matrices" or "correlation matrices" between the columns of elements and between the rows of constructs on which specific methods for exhibiting pattern and structure in the grid responses can operate. The practical problems of access to computer power are now negligible. Most clinicians and researchers in hospitals, and all university students and staff, have at least one machine available and usually a choice of facilities. The software may be more of a problem. A more serious difficulty, however, is the validity of the statistics involved when interpreted in the psychological context. Many questions need to be asked about the nature of the scaling and its relevance to the meaning system of the subject. Consideration of this is deferred until Appendix A.

The methods of analysis which have been commonly applied to grids, briefly mentioned in Chapter 1, are factor analysis, principal component analysis, multidimensional scaling and cluster analysis. The first three of these extract factors in slightly different ways, while the last produces a grouping or patterning indicating common attributes. General problems concerned with the use of factor analytic types of analysis applied to grids are the temptation to name the factors or components and, more seriously, the temptation to justify the use of the method which is most easily available, and hence to organise experiments and data collection to suit that particular method. These methods are generally of an iterative nature and so can only be used in the form of a computer package. Describing methods of obtaining a two-dimensional plot of the data, Everitt says:

> The most common mapping technique is to plot the data in the space of pairs of the principal components. However, other mapping techniques may perhaps be more useful. For instance, that due to Sammon (1969) was found to give a far better two-dimensional representation than principal components analysis when applied to some sets of artificially constructed data. Kruskal's multidimensional scaling technique could also be used to obtain a two-dimensional mapping, although it is only really suitable for small sets of data, and is perhaps more usefully employed on an inter-group distance matrix.
>
> (*Everitt, 1974, pp. 94–95*)

These comments, however, do not apply specifically to analysis of repertory grids.

There are several types of cluster analysis available, those most commonly used being hierarchical methods in which the groups formed are themselves formed into groups at a higher level; optimisation–partitioning techniques in which some criterion for partitioning is optimised by allowing entities to be reconsidered, thus correcting any early mismatching; density methods, where highly dense areas are sought to identify the groups; and clumping techniques in which an entity may be a member of more than one group. Bonner (1964) has suggested that the most satisfactory criterion for a cluster is the value judgement of the user, and the particular cluster analytic technique of focusing was developed in that precise manner. The author has found this technique sensitive and empathic for helping a person to explore his private phenomenological world rather than the use of more sophisticated and obscure relationships apparently exhibited by other methods.

The focusing algorithm was developed especially to make the patterning of the grid responses meaningful to the subject and suitable for talking him back through the connections partially made visible during the elicitation process. This is done in two ways. Firstly, the procedure is very simple. Although it is carefully validated mathematically, and complex subroutines are used to wind up and unwind the clusters as they are identified, the computer output is very simple. The maximum given is: the two matrices of element and construct matching scores, the focused grid and the two trees of clusters which are fitted on to the grid; and this can be reduced by choice to just those pieces of output required. The focused grid is clearly only a rearrangement of the raw grid responses, and hence the mathematics is almost hidden. The subject is therefore not disturbed by "mathematical magic" being performed behind his back, or factors produced out of a hat. He can imagine how the transformation could have been performed, and can see his own actual grid responses on display. Secondly, on the level of the actual content of the results, the rows of constructs and columns of elements have been sorted in such a way as to produce least change between any two adjacent rows or columns down and across the grid, together with visual diagrams showing the extent of the similarity of adjacent lines. The grid analysis results can then be fed back to the elicitee, and lend themselves easily to self-interpretation by the user of the grid.

Used in a conversational mode the grid can be an articulator of conversation, the clustering of responses providing a starting point for discussing individual differences and points of view. One may begin to empathise with a person by seeing how he makes his divisions, and how and why he groups his elements in a particular way.

Grids may be shared in several ways. One which is absorbing and intriguing to observe is of two people negotiating to elicit a single grid together. The elements must be well known to both, for example mutual friends or colleagues, shared experiences or physical objects. One participant suggests a construct from a given triad, explaining carefully to the other its meaning for him, and ratings are carefully suggested, challenged, negotiated and refined, often leading to a renewed explanation of the precise meaning being attached to the pole names before misunderstandings are ironed out and agreement is reached. The process is then repeated with the other person initiating the discussion. Sometimes agreement cannot be reached, and a compromise must be made to restrict certain meanings or implications. In this way an awareness is developed of other people's views and styles, often surprising people who thought they knew each other very well.

Using the grid structure as the first approximation to "a hard tool for soft psychologists", one by one constraints may be varied, and other structures may grow out of this form. Representations of a problem may not quite conform to the general form of elements, and constructs could be elicited by top-down as well as bottom-up methods, or by placing an example on the middle point between the poles and working outward from there. Personal uses of ratings could be elicited simultaneously, and hence the algorithm for re-sorting may in turn become a personal one. A rectangular block may not be the best form of display for the responses, perhaps Venn or Carroll diagrams, linked lists or various tree structures may add more pattern to the meaning. Hierarchical and heterarchical systems of superordinate and subordinate constructs may be discovered in new ways and represented by graphs or networks (e.g. Hollan, 1975).

III. The Computer as a Tool

The repertory grid is only the beginning of a technology for eliciting and developing personal models of the world, and helping each individual to be more effective in his aim to become a personal scientist. A personal scientist uses structures and mechanisms in a necessarily "human" way, that is in such a way that they enhance his power, not become his master. Coomaraswamy puts the Buddhist point of view:

> The craftsman himself can always, if allowed to, draw the delicate distinction between the machine and the tool. The carpet loom is a tool, a contrivance for holding warp threads at a stretch for the pile to be woven round them by the craftsman's fingers; but the power loom is a machine, and its significance as a destroyer of culture lies in the fact that it does the essentially human part of the work.
>
> (*Coomaraswamy, cited in Schumacher, 1973, p. 46*)

The computer used as a tool to enhance the powers of the craftsman rather than as a machine which takes from the person that essentially human element in a job, may be a new experience for some computer users. A long-standing computer user may become so accustomed to batch runs where he hands over his deck of cards in a reception area, with hardly a glance towards the air-conditioned, germ-free sanctuary where the monster lives, that he dismisses any other possible interaction as less efficient. Even the user of a terminal who communicates with the computer in an interactive mode becomes used to thinking of interactive computing as a branch of programmed instruction. Now, however, the computer can be and is being used in a truly interactive capacity, content-free but possessing a structure which helps the user to express himself in his own terms about his own problems, in a conversation with himself.

Chapter Three

The Programs

I. Introduction to the Programs

Each of the programs written for this project uses the repertory grid structure. All are written in the BASIC computer language and were initially implemented on the PDP 12 in the Psychology Department of Brunel University. Versions have since been written for other machines, which necessarily incorporate slight variations. The programs are to be seen as at least a partial answer to the need for a set of tools for eliciting and developing personal models of the world. A brief description of each program is given.

FOCUS is a method of grid analysis which uses a two-way cluster analytic technique to reorder systematically the rows of constructs and columns of elements to produce a focused grid showing the least variation between adjacent constructs and adjacent elements. This is done with respect to the way in which the constructs order the elements rather than to the verbal labels given to the poles of the construct. In this way the results are presented in a form which lends itself to the conversational feedback of the clusters, an example of which follows shortly.

FOCI is the FOCUS program with Interpretation of the results. It does not attempt to explain the repertory grid or its usage, but concentrates on the units of output given by the FOCUS program, suggesting a framework within which each may be examined and interpreted in the specific context of the given grid. An example of the output is given in Appendix B.

SPACED is a variation of the final printout which blocks the focused grid in order to indicate those elements and constructs which are most alike. This is achieved by spacing adjacent rows and columns according to the degree of similarity between them.

PEGASUS is a suite of interactive programs, each of which may elicit a repertory grid. MIN–PEGASUS is the version which is closest to the usual paper-and-pencil technique. No ongoing feedback is given, but opportunities to review and revise the content are given. An example is shown in Appendix C.

The most commonly used version of PEGASUS incorporates continual commentary on patterns in the responses. Six elements are initially chosen by the user with special attention to the purpose for eliciting the grid. The first four constructs are elicited from fixed triads and thereafter random or chosen triads are offered. Real-time data processing allows feedback about highly matched constructs and elements. Options offered are: to add an element to split highly matched constructs; to replace two highly matched constructs by one; to add a construct to split highly matched elements; to delete one or more element; to delete one or more construct; to add a construct without using a triad; to add an element; to change the level of feedback commentary; to redefine the purpose for eliciting the grid; to see the grid focused at stages during the run. When the elicitation is completed a choice of printout of the analysis of the grid is given together with the lists of elements and constructs. Examples are given in Chapter 5 and Appendix D.

PEGASUS–BANK provides an "expert" grid which the user does not at first see, but against which the elicited constructs are matched. Feedback is given not only on how the user's constructs match each other, but also on how they relate to the "expert" constructs. Finally the total grid is focused to show how the two sets of constructs are interrelated. This is demonstrated in Appendix E. Alternatively, PEGASUS–BANK may be used to negotiate differences between two equals in conversation. One point of view may be used to form the bank with which the other then interacts. This process may be iterated by adapting and modifying the bank at each stage until a joint agreement is reached.

PRE–PEGASUS allows the user to continue an elicitation started at an earlier date either with the computer or as a separate operation. In all versions the text is stored in such a way as to make it easily replaceable by text written in another language or in another type of speech.

MINUS subtracts equivalently positioned responses from two grids each with the same elements and constructs. The pattern of differences is printed out, together with the percentage difference between the two. An example is given in Appendix F.

CORE is an interactive program which starts with two repertory grids each with the same elements and constructs. These are grids elicited either from the same person at different times or from different people to investigate agreement and understanding between them. The two grids are processed by successively determining the element which is seen least similarly and the construct which is used least similarly in both grids. The user is then offered the opportunity to delete the element or construct at each stage, given the extent of the discrepancy. The CORE grids may then be focused in the usual way. An example of the CORE program is shown in Appendix G.

SOCIOGRIDS analyses a set of repertory grids elicited from a small group of people who share a set of elements. It focuses the grids singly and in pairs, the PAIRS algorithm being used to compute the measure of similarity between the two grids, and produces a set of "socionets" showing the shared construing within the group. A "mode grid" of the most highly matched constructs is extracted and then focused. Each grid is focused with this mode grid and a measure of overlap of each with the mode is calculated. This technique is used for investigating the relative positions of the members of the group, and the content of the sharing of terms and values. A run is shown in Appendix H. It can be used in conjunction with the Delphi technique (Pill, 1971; Dalkey and Helmer, 1963) to promote understanding in the group.

ARGUS elicits a set of grids simultaneously from one person holding several roles or points of view. Firstly, the elements (roles) are elicited, followed by three constructs from fixed triads. These construct labels are then used for a new set of ratings to be entered for each role name in turn, and at each stage another construct which is felt to be important for that role is added. A run is shown in Appendix I. Finally, the set of grids all having the same element and construct labels, but with different ratings, are processed on SOCIOGRIDS, CORE or MINUS.

II. Talk-back of a Grid on Programs

Figure 3.1 shows a focused grid together with the element and construct trees. The elements are the programs just described, having been construed by the author with the help of the PEGASUS elicitation program. The version used here was MIN–PEGASUS.

The following description shows how the patterns are extracted and used to talk the subject through the grid event.

The elements have been briefly described. CORE has been split into two elements, CORE(1) for two grids from one person and CORE(2) for grids from different people. If these two elements were in fact being construed in the same way they would be highly clustered in the final analysis. In this case, however, there are several tighter clusters, CORE(1) and CORE(2) being matched at 72%.

The highest match is cluster 13 between PRE–PEG and PEGASUS. These two elements are essentially describing the same procedure, the only differences being on constructs 11, 4 and 1, all of which describe types of program rather than usage. MIN–PEG joins this cluster and then at a lower level PEGBANK. This central cluster then encompasses the PEGASUS set as might be expected.

The element cluster on the left includes FOCUS, FOCI and SPACED, again all from the same algorithm. The differences can be found where part of a contour line divides the columns, for example between FOCUS and FOCI on constructs 11, 10 and 1. The main division into two clusters occurs between elements 4 and 10. On the right side are all the programs which use more than one grid, with the exception of PEGASUS–BANK. This exclusion may be explained as being due to the fact that the bank is hidden to the user during the elicitation. The right-hand cluster shows CORE(2), that is with grids from different people, and MINUS to be most similar, with CORE(1) being quite similar to CORE(2). SOCIOGRIDS joins this group, and lastly ARGUS. ARGUS is the element most different from all the other elements, the highest match shown in the tree being 66%. In fact, looking at the element matching scores matrix, the highest match of all is only 68%, jointly with PEGASUS and PRE–PEG. (This is not shown in the tree as the latter elements are more highly related elsewhere.)

Looking now at the constructs, 1 and 4 were reversed during the FOCUS procedure. This means that the highest match of 1 with another construct was with all the ratings and pole names reversed, and similarly for construct 4. The highest match is between 2 and 3 at 83%, and also between 7 and 6 at the same level. This means that 83% of the time a program was "elicitation" it was also "demanding for user", and when it was "analysis" it was "easy for user". Similarly, 83% of the time a program was "conversation with self" it

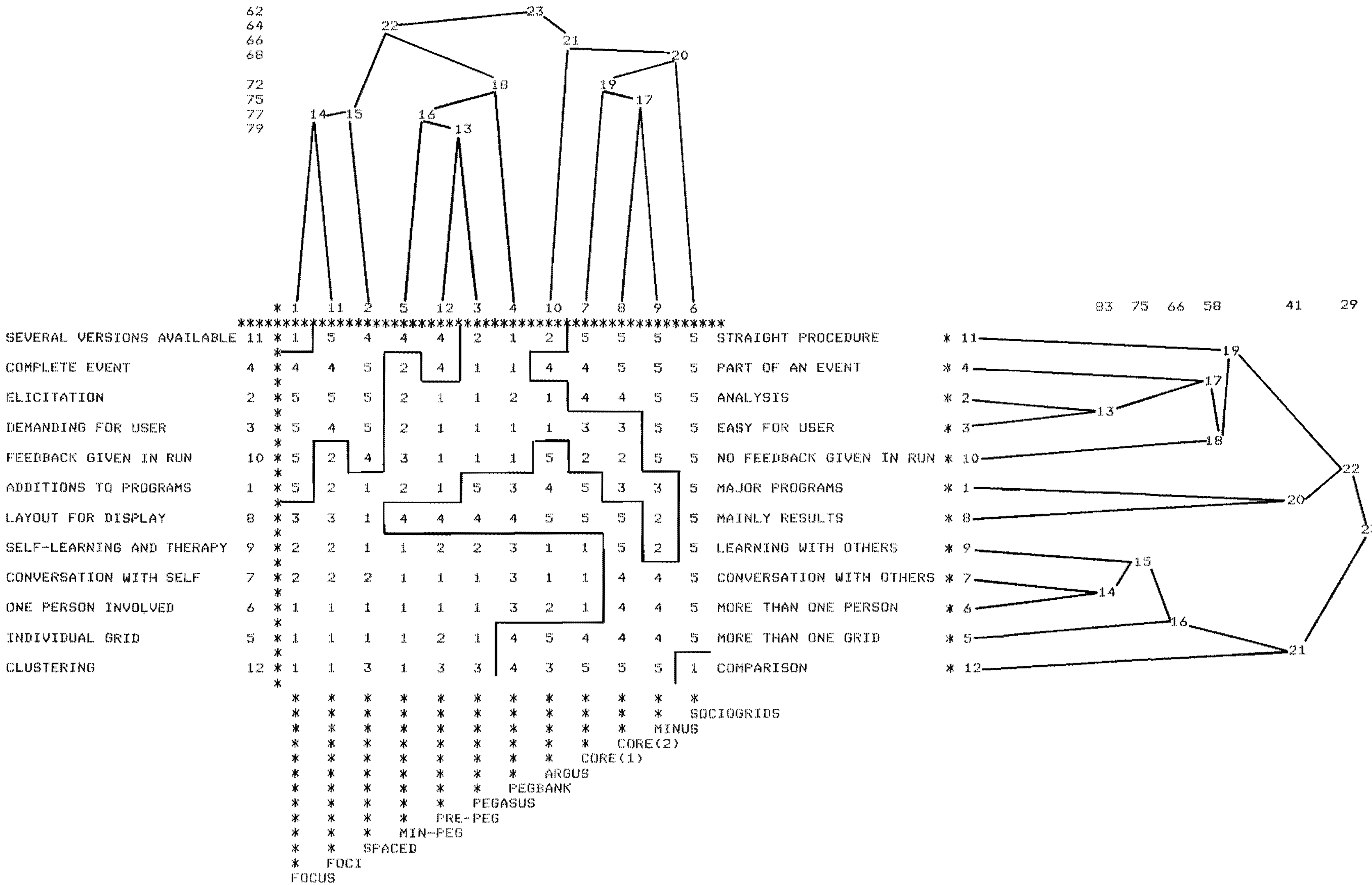


Fig. 3.1. A grid on the programs using a five-point scale.

was "one person involved", and when it was "conversation with others" it was "more than one person". Clearly "person" is being used here as "M-Individual". The second of these seems to be almost the same construct expressed in different words, but the first shows a link which might have gone unnoticed, and is purely a personal causal link.

The construct clusters seem to split into three main groups. The top group comprises 11, 4, 2, 3 and 10. Following the close link of 2 and 3, 10 joins the cluster, indicating the link between "feedback", "demanding" and "elicitation", as against "no feedback", "easy", and "analysis". Constructs 4 and 11 are more loosely connected, and do not appear to be as conceptually linked as the others.

The second main cluster is a loose one containing only 1 and 8. There is a slight connection only between "additions to programs", "layout for display", and "major programs", "mainly results".

The third construct cluster, however, is more interesting. After the tight connection of 7 and 6, construct 9 joins showing "self-learning and therapy" to be linked to "conversation with self", and "learning with others" linked to "conversations with others". Construct 5 "more than one grid" is clearly linked to "more than one person", and the loosest link is with the "clustering" against "comparison" of construct 12. This can be explained by the fact that several grids are usually compared whereas individual grids tend to be only clustered.

The major splits between these three clusters show the different types of construct used. The bottom cluster is mainly concerning the content of the programs as they may be construed by a user, the middle cluster is about the functions of the programs and the ends they achieve, whereas the top cluster is connected with the view of the experimenter. The elicitee in this case experiences each of these roles. Constructs about the structure and writing of the programs were carefully monitored and excluded, being irrelevant to the present purpose of explaining the possible applications of the programs and the relationships between them, together with demonstrating the grid technique as currently used by the author.

The contour lines are drawn to separate the ratings of 1 and 2 from those of 4 and 5, where 3 may appear with either group. These lines now indicate groups of elements construed similarly and show on which constructs these likenesses occur. They also help to indicate major divisions, such as that between constructs 8 and 9 where elements 5, 12, 3, 4, 10 and 7 are construed differently and are separated by part of a contour line. Two constructs with no line separating them are 7 and 6. The difference here is made up of several changes of only 1 in the ratings on the left poles from 1 to 2 and from 2 to 1.

This grid is atypical of most grids experienced by the author as experimenter, in that there is not one side with clearly preferred poles. This is most likely to be either a personal characteristic or a product of experience with the grid technique. The stated purpose was "to explore relationships between programs". The elements chosen were all the programs then available, and the constructs highlighted a personal opinion of the programs and the relationships between them. If the PEGASUS program with feedback had been used, a different grid may have resulted. Those constructs which are highly related would have been challenged, and probably modified. MIN–PEGASUS was explicitly chosen to avoid this contingency and to present the picture as it is rather than as it could be. The resulting grid therefore highlights both relationships between the programs that were intended and explicitly developed, and those which were unintended and maybe unacknowledged.

III. Plan of the Book

Figure 0.1 (p. xii) is a plan of the programs in the book. Each horizontal line is contained in one chapter, whereas the vertical lines show the development and interrelationships of the contributory themes. The blocked sections indicate the numbers of grids involved—individual, pairs or groups. An equally valid division would be into the types of conversation as described in the previous chapters, with oneself or with others. However, of the many possible ways of organisation, the one presented was chosen for clarity and perspicuity.

The "program" chapters contain some examples of the programs (complete outputs of selected versions of each program are given in the appendices), and Chapter 9 describes a number of projects in which different combinations of the programs were used.

IV. Summary of the Programs

FOCUS Feedback Of Clustering Using Similarities
  FOCI Feedback Of Clusters with Interpretation
  SPACED

These are explained in more detail in Chapter 4 with output in Appendix B. There are several versions of FOCUS giving different options on the size of grid and the choice of printout.

PEGASUS Program Elicits Grid And Sorts Using Similarities
  MIN–PEGASUS with no feedback commentary
  PEGASUS–BANK using a stored bank of constructs
  PRE–PEGASUS continuing a previously started grid

These are explained in more detail in Chapter 5 with runs shown in Appendices C, D and E.

MINUS Mapping of Identical Names Using Subtraction
CORE Comparison Of Repeated Elications

These are explained in more detail in Chapter 6 with runs shown in Appendices F and G.

SOCIOGRIDS with subsidiary PAIRS is explained in more detail in Chapter 7 with output in Appendix H.

ARGUS Alternative Roles Grids Using SOCIOGRIDS

This has two versions, one using roles and the other using significant others as perspectives. More detail is given in Chapter 8 and a run is shown in Appendix I.

Chapter Four

FOCUS

I. Introduction

When the grid is used as a conversational tool—the conversation taking place either between the eliciter and elicitee, or within the elicitee—there are two stages where the subject is likely to experience heightened awareness. The first is in the actual process of elicitation. As the elements are sorted and re-sorted onto the different constructs the subject often begins to experience a feeling of links being made, elements grouping together, in ways which feel intuitively right. Consequently much of the understanding which comes from the elicitation procedure in fact comes from the silent processes taking place at the back of the mind, appearing only partially on the grid form.

For many experimenters, psychotherapists and self-eliciters alike, this is the end of the procedure. However, the second stage is to analyse the grid and make some use of the results of the analysis. If the grid is being used as a research tool to give information only to the experimenter and not to the elicitee there are various methods of analysis available which will indicate the major factors underlying the responses, the extent to which these represent all the responses, and the relative positions of the constructs and elements with respect to this particular representation. Many experimenters have difficulty understanding the computer output. Many try to see through the eyes of the elicitee to name the factors in such a way as to incorporate as much of the relative positioning of the elements and constructs as possible. This is very difficult even with experience and practice. If the constructs have been normalised the verbal pole labels will no longer have the same meanings as those intended by the elicitee; the results therefore begin to represent an intermingling of the construct systems of both the elicitee and the experimenter.

This can be partly overcome by consulting the elicitee about how the factors can be named, but this can too easily result in the elicitee being made to feel bewildered and inadequate as he peruses factor loadings, angular distances and other mathematical mysteries. If the purpose of the grid elicitation is awareness raising then the feedback of the principal components can be difficult. This is due to the form of the results which leads to the distancing of the person from his original grid. The different levels of the involvement of the elicitee therefore produce different amounts of distortion in slightly different ways. To comply with the spirit of psychologists such as Rogers and Kelly one must aim to interpret the results as little as possible, leaving this to the subject.

The focused grid was developed in answer to this problem, producing results in a form which allows the person to reflect on his patterns of meaning by retaining the original responses, grouped using cluster analytic techniques. The purpose of the feedback is to offer to the elicitee a pattern of the groupings of the elements on the constructs and the constructs on the elements. The ensuing conversation is an exploration of the personal meaning attached to these groupings by the elicitee. The validity of the analysis is measured only in terms of the subjective feeling of personal significance assessed by the occurrence or otherwise of what has been called the "aha" experience (e.g. Ruger, 1910; Durkin, 1937), or what Lorenz (1977) calls "the creative flash". Keen (1977) quotes the test–retest reliability on grids as being less than 0·2 and not significant when feedback is provided but significant at the 0·1 level when feedback is withheld. This clearly indicates that some reconstruction takes place as a result of the feedback process.

A. Methods of Grid Analysis

Cluster analysis is one of the most recent techniques used to analyse repertory grids. Most methods of cluster analysis have been developed and made generally available in the last ten to fifteen years, and a wide variety of these have been used for many types of problem. The term "cluster" has been variously defined:

> a group of contiguous elements of a statistical population
> (*Kendall and Buckland, 1971*)

> a subset of entities which may usefully be treated as equivalent in some discussion
> (*Wallace and Boulton, 1968*)

> an aggregate of points in the test space such that the distance between any two points in the cluster is less than the distance between any point in the cluster and any point not in it
> (*Gengerelli, 1963*)

The different definitions and purposes tend to lead to the development of different methods, but the majority of methods start from a matrix of similarities or distances between the elements of data. Methods used to obtain these are discussed in Appendix A, together with a brief rationale for the choice of the city block metric used for focusing in the major part of the present work. The distances d_{ij} between elements or constructs i and j calculated from the city block metric are functions of the number of constructs or elements respectively in the grid, together with the rating scale used. These are therefore scaled to give "percentage matching scores".

The construct matching score is derived from the mapping

$$d_{ij} \rightarrow \frac{-200d_{ij}}{(n-1)e} + 100$$

where n is the maximum value of the rating scale running $1(1)n$, and e is the number of elements. This produces a value of 100 for perfect match, 0 for no similarity, through to -100 for perfect negative or crossed match. Unless the ratings on each construct are symmetrically distributed, matching scores will not in general be balanced about zero. This point is again discussed in Appendix A. As a construct is a bipolar dimension a negative matching score indicates that the best match is made with the opposite poles of the other construct.

For example:

	E1	E2	E3	E4	
C1 long	3	1	3	5	short
C2 red	5	4	2	1	green
C2′ green	1	2	4	5	red
d_{12}	2	3	1	4	total 10
$d_{12'}$	2	1	1	0	total 4

$$d_{12} \quad \rightarrow \quad \frac{-200 \times 10}{4 \times 4} + 100, \text{ i.e.} \quad -25\%$$

$$d_{12'} \quad \rightarrow \quad \frac{-200 \times 4}{4 \times 4} + 100, \text{ i.e.} \quad 50\%$$

showing that "long–short" matches better with "green–red" than vice versa.

When computing element matching scores the mapping used is

$$d_{ij} \rightarrow \frac{-100d_{ij}}{(n-1)c} + 100$$

where c is the number of constructs and n is as defined before. This produces values from 100 for perfect match to 0 for no similarity. Since elements are in general not bipolar no negative values can be produced.

The first method used by Thomas and Mendoza (1970) to cluster analyse a repertory grid was the hierarchical method of McQuitty (1960). This was then superseded by the focusing technique developed by the author, which was so denoted to suggest the use of an optical instrument to sharpen and clarify the pattern of responses in the grid. Although the algorithm is somewhat similar to the single linkage or nearest neighbour hierarchical method, it is not strictly a hierarchical method, although nearer in character to that type than to many other types such as partitioning, clumping or density search described by Everitt (1974).

The matrices of element and construct matching scores are produced from the city block metric. The major criterion for forming clusters is that linear reorderings of the constructs and elements respectively will result in the final grid displaying a minimum total difference between all adjacent pairs of rows and columns.

For example:

	E1		E2		E3		E4		E5	no. of diffs
C1	√		×		√		×		√	
										1
C2	√		×		√		√		√	
										2
C3	×		×		√		×		√	
										2
C4	√		×		√		√		√	
no. of diffs		3		4		2		2		

becomes

	E3		E5		E1		E4		E2	no. of diffs
C2	√		√		√		√		×	
										0
C4	√		√		√		√		×	
										1
C1	√		√		√		×		×	
										1
C3	√		√		×		×		×	
no. of diffs		0		1		1		2		

This leaves the patterning in blocks of like responses, often but not necessarily diagonally across the grid.

II. Algorithm and Flowchart

The flowchart for the FOCUS algorithm is shown in Fig. 4.1.

1. Data of the grid is input.
2. Construct matching scores matrix is computed and printed. Each construct is included twice, once with all the ratings reversed.
3. Construct tree is computed. The actual choice of original or reversed form of each construct is made at the time of incorporation into a cluster.
4. Element matching scores matrix is computed and printed.
5. Element tree is computed.
6. The original grid responses are reordered on the basis of the new element and construct lists.
7. The re-sorted grid and the two trees are printed.

The data is input in such a form as to preclude a rating scale of more than nine points. However, only a minor adjustment is needed should such a requirement be made.

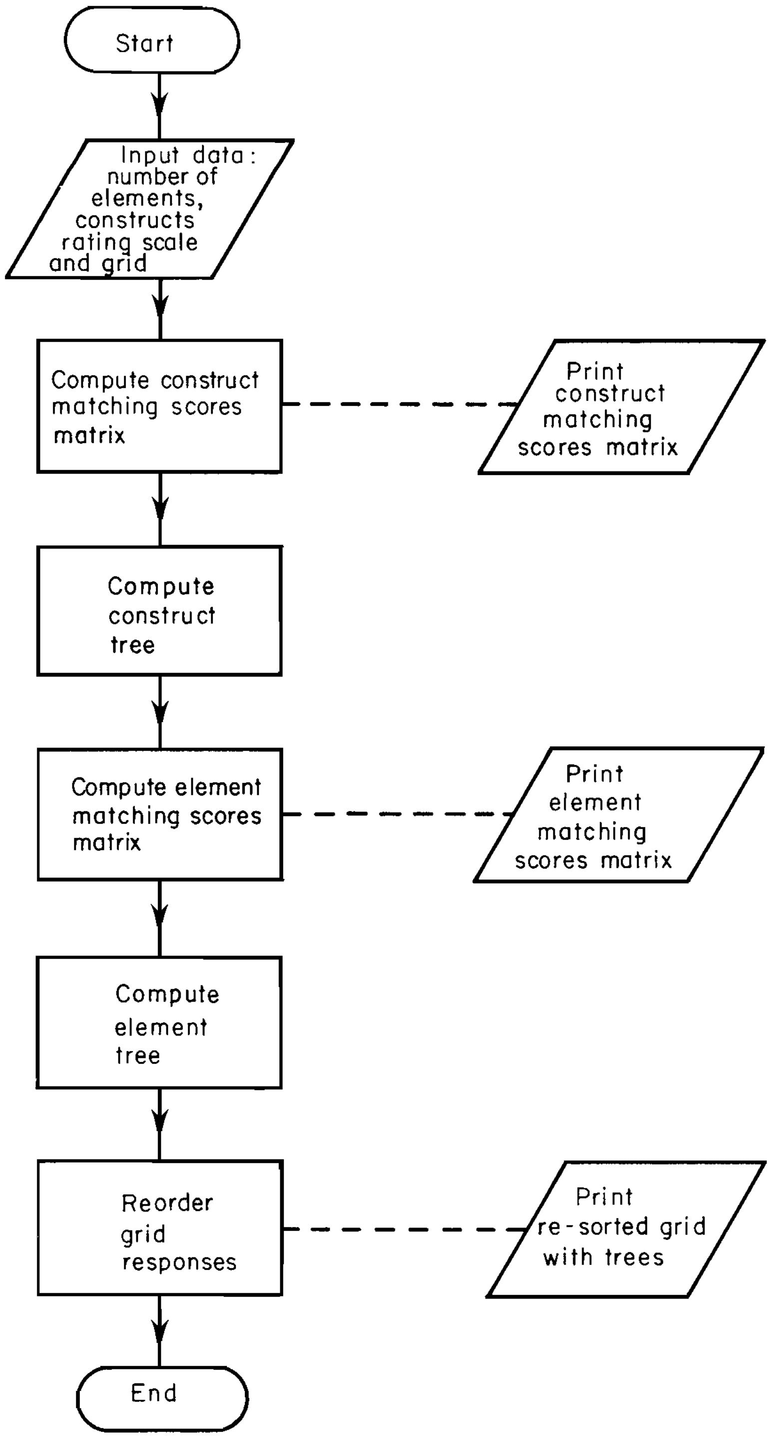
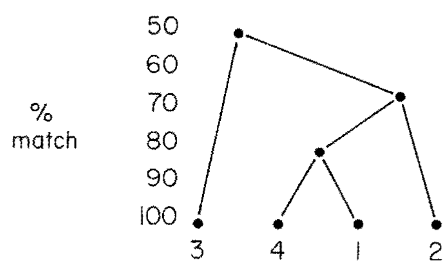


Fig. 4.1. Flowchart for the FOCUS algorithm.

Example: given the following matrix of matching scores, a tree is derived.

	1	2	3	4
1		68	42	83
2	68		51	30
3	42	51		52
4	83	30	52	

The highest match is 1 with 4 at 83 %. Columns 1 and 4 are marked, this match listed, and the procedure repeated excluding this value. The highest match is now 1 with 2 at 68 %. Again columns 1 and 2 are marked, 1 being totally excluded as it is now matched on both sides, the value listed and the procedure repeated. The next match is 3 and 4 at 52 %. The final list of values is: 1 and 4 at 83 %, 1 and 2 at 68 %, 3 and 4 at 52 %, all the original elements now having been incorporated. The ordering produced is therefore 3, 4, 1, 2, the tree having the following pattern:



In this way the required criteria are satisfied.

The same example produces not only a different structure but a different ordering with the McQuitty hierarchical cluster analysis program previously used (Thomas and Garnons-Williams, 1973). Using the same matrix of matching scores:

	1	2	3	4
1		68	42	83
2	68		51	30
3	42	51		52
4	83	30	52	

The highest match is between 1 and 4 at 83 %. The new element (14) is added to the matrix, replacing the two which constitute the pair, the match values being calculated thus:

$$d_{(pq)k} = \tfrac{1}{2}(d_{pk} + d_{kq}) \qquad \text{for} \quad k \neq p, q, \quad k = 1(1)e.$$

So the new matrix is formed.

$$d_{(14)2} = \frac{d_{12} + d_{24}}{2} = \frac{68 + 30}{2} = 49$$

$$d_{(14)3} = \frac{d_{13} + d_{34}}{2} = \frac{42 + 52}{2} = 47$$

giving

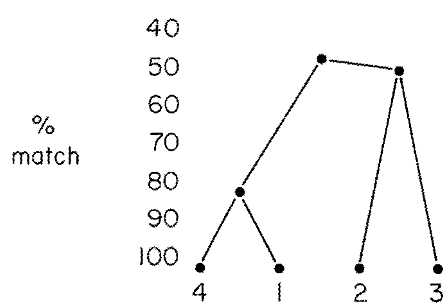
	(14)	2	3
(14)		49	47
2	49		51
3	47	51	

The highest match is between 2 and 3 at 51 %, so (23) is added and lines 2 and 3 deleted. The new matrix is formed:

$$d_{(14)(23)} = \frac{d_{(14)2} + d_{(14)3}}{2} = \frac{49 + 47}{2} = 48$$

	(14)	(23)
(14)		48
(23)	48	

The two clusters so formed may be put together (14)(23), (14)(32), (41)(23), (41)(32). The maximum value of the link between the two clusters is then chosen from the original matrix. $d_{42} = 30$, $d_{43} = 52$, $d_{12} = 68$, $d_{13} = 42$, so 1 and 2 is the chosen link, giving the order 4, 1, 2, 3. The hierarchy then formed is:



This last step is due not to McQuitty but to Thomas and Garnons-Williams (1973).

Due to the constraint of inclusion in a strict hierarchy the high match between 1 and 2 of 68 % is subservient to the centroid weighting of (14) with (23) of 48. Consequently, a highly valued criterion of repatterning like with like in the clustered grid is being excluded. In the above example, 2 is more like 1 than 3, failing the definition of Gengerelli (1963) and also that of McQuitty himself (1957). Also the high match between 3 and 4 is totally lost here.

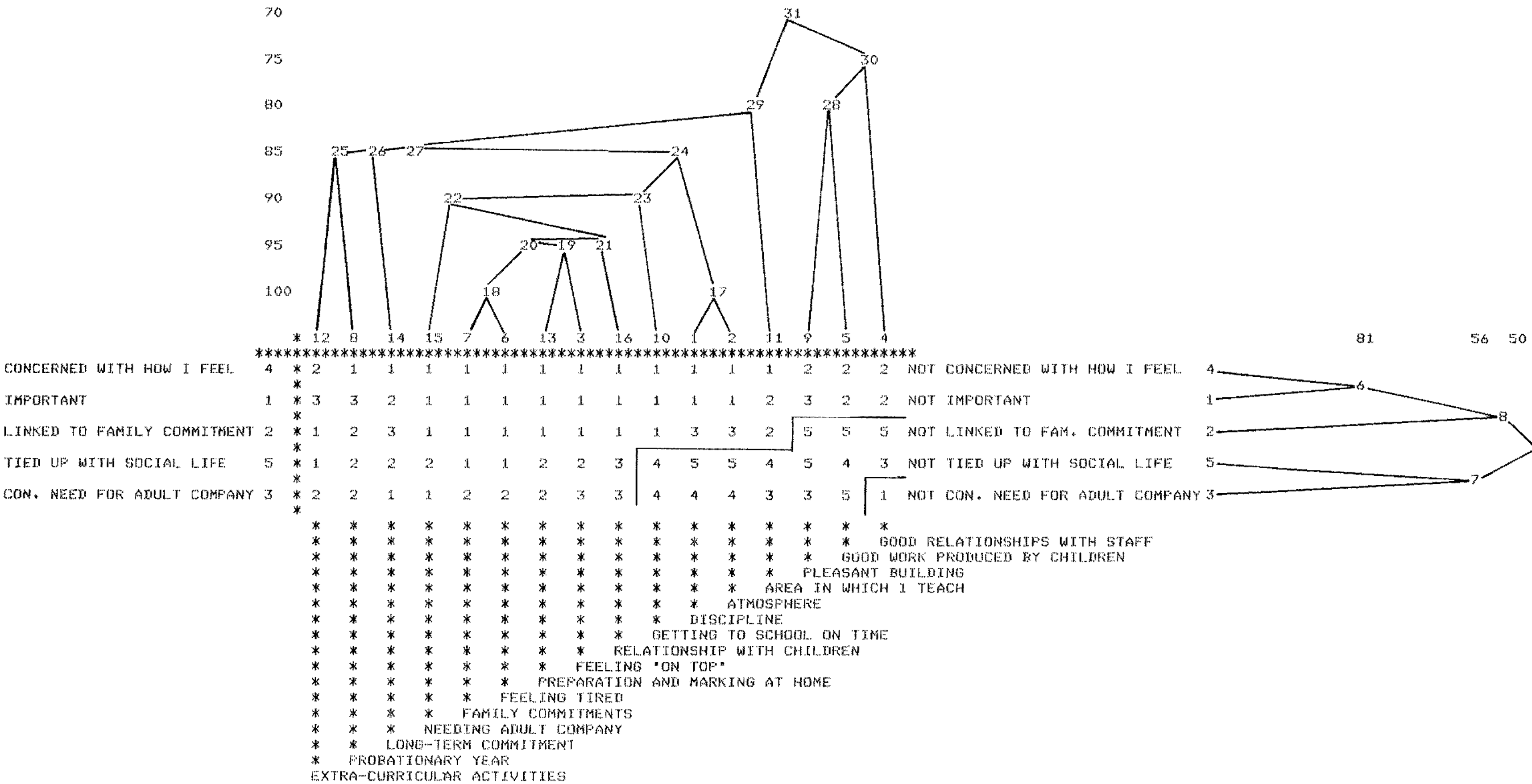


Fig. 4.2. A grid on aspects of teaching using a five-point scale.

Hence the FOCUS algorithm is more appropriate for grid analysis when the required output is to be produced in a form which will encourage participation by the elicitee in interpreting the analysis of the grid, and will enable users of grids to elicit and feed back the grid by themselves without fear of other construct systems interfering, and with the minimum of distortion of the original ratings.

III. Applications

A. Teaching Practice

The study by Pope (1977) of the use of repertory grids to raise awareness of a teaching practice session shows the value of the feedback process. Volunteer subjects were randomly assigned to one of three groups: Group 1—subjects interviewed before and after teaching practice; Group 2—subjects interviewed before and after teaching practice, and completed three grids—before, during and after teaching practice respectively; Group 3—subjects completed the same schedule as Group 2 with the addition of feedback sessions during which the grid results were discussed. Each individual who completed a grid provided both the elements and constructs, the elements being whatever the person thought of when asked to think about teaching. Tape recordings of interviews and feedback discussions were made.

Appendix B shows the output from the FOCI program which indicates how each part of the output can be read. The grid shown in Fig. 4.2 is from a subject in Group 3 in the middle of her teaching practice.

Clearly, this subject has included personally significant elements such as "needing adult company" which would not have figured in a standard list of supplied elements. Commenting on the cluster including "family commitments", "feeling tired", "marking at home" and "feeling on top" she explained:

> that she was very pressurised during Teaching Practice and found it difficult to cope with both family and school work. She now realised how important the *atmosphere* in the classroom was for the general *discipline* of the children. She commented on the fact that *good work from children* and *pleasant building* seemed to be linked—she was not surprised by this and felt it represented her feelings and experience during T.P., as the following extract from her tape recording indicates: "It was a Victorian school with very high ceilings, and very little display space, and it was very difficult to organise the classroom so that it looked attractive. The vast ceilings, and you had to stick things on the wall with cellotope and it looked messy. There weren't any nice display boards. You felt you wanted to—it would be more incentive to get the classrooms looking nice and get the children producing stuff if you could in fact have displayed it nicely, but it was very difficult."
>
> (*Pope, 1977, pp.* 8–9)

Figure 4.3 shows the teaching practice assessments for the three groups of students from two colleges which were used for the study. The results are clearly indicative of a high correlation between the full feedback procedure and the high grades obtained by the student for practical teaching.

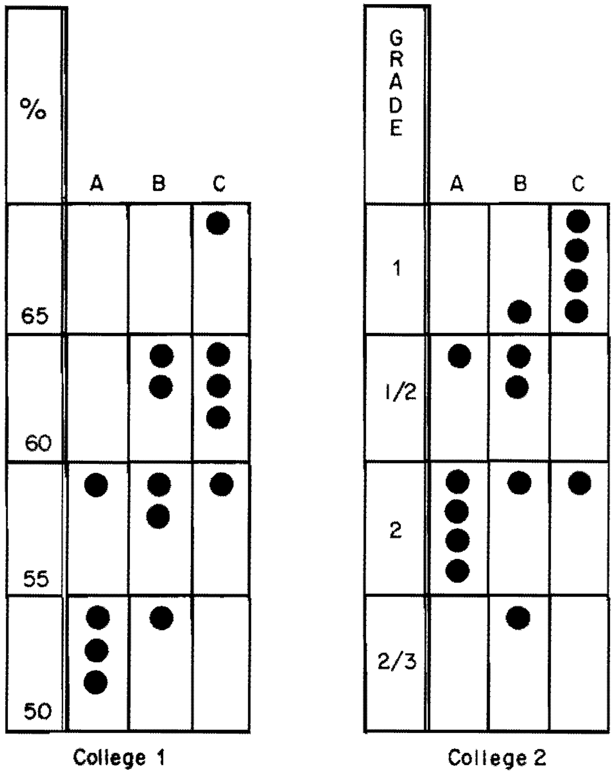


Fig. 4.3. Teaching practice assessment. C = feedback group; B = grid only group; A = no grid group.

B. Examples of Grids

The program has also been used in industry for quality control, management selection and development, appraisal of subordinates, and the selection of observers in assessment centres (see Chapter 9). In psychotherapy it has been used mainly in work with handicapped children and psychiatric adolescents (Ovretveit, 1978); in education to investigate the content of children's reading (Beard, 1977), and the ways in which architecture students construe space (Glanville, 1977). In addition it has been used for the evaluation of courses, and in the investigation of magistrates decision-making (McKnight, 1977a). A few selected examples are shown in Figs 4.4 to 4.8. Although the grids presented here are relatively small for convenience of printing, versions of the program are available which allow as many as sixty elements and constructs.

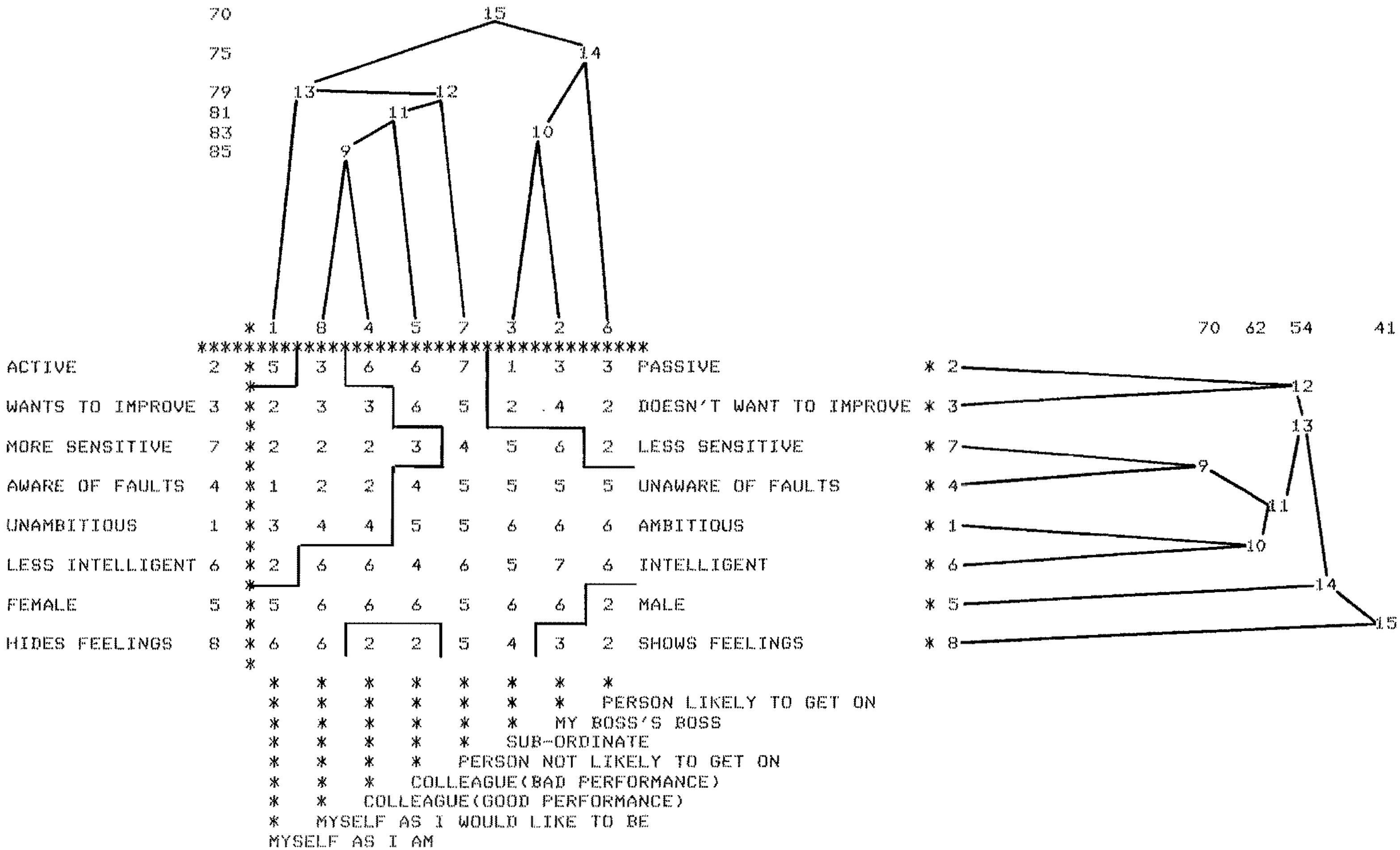


Fig. 4.4. A grid on management development using a seven-point scale.

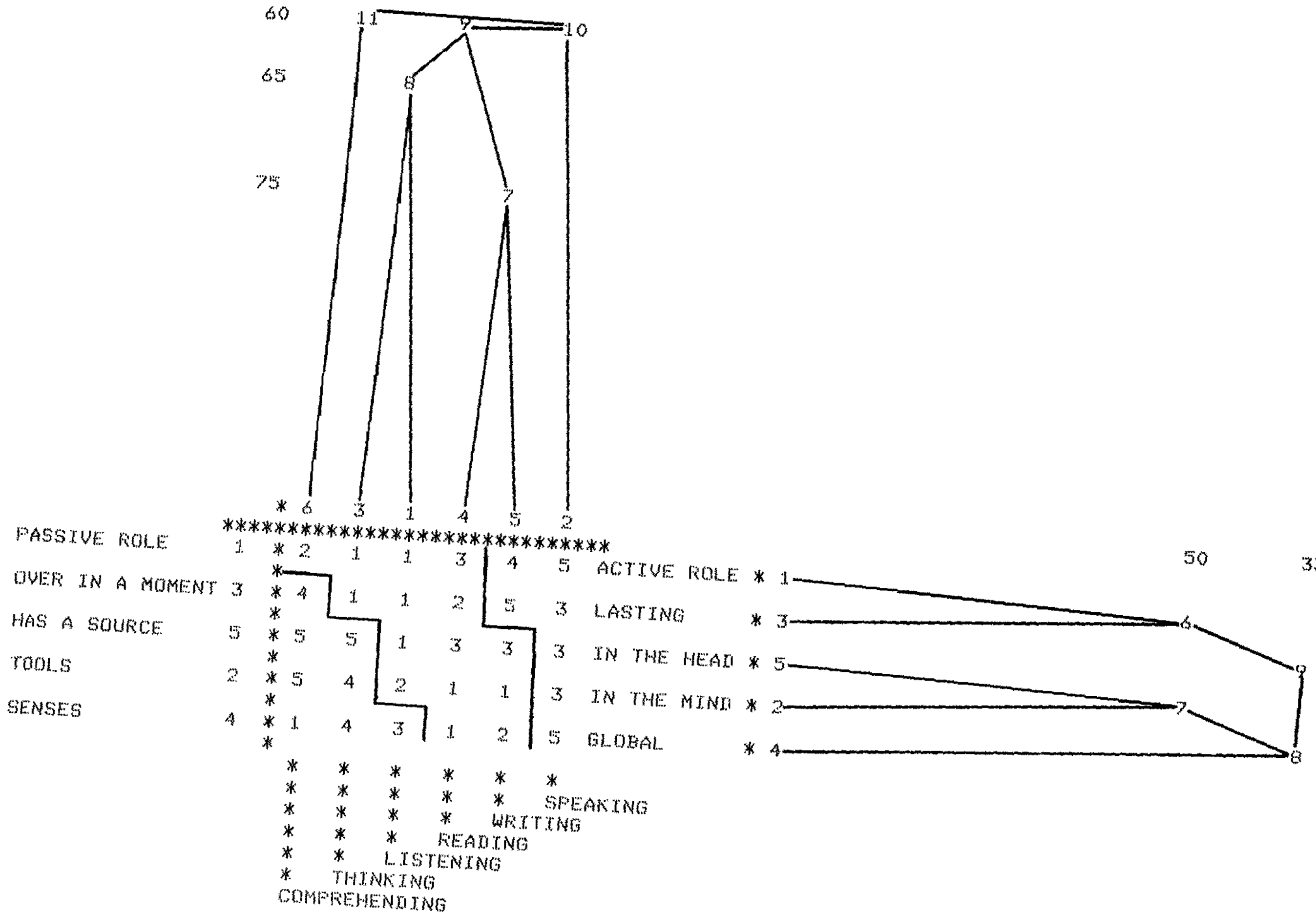
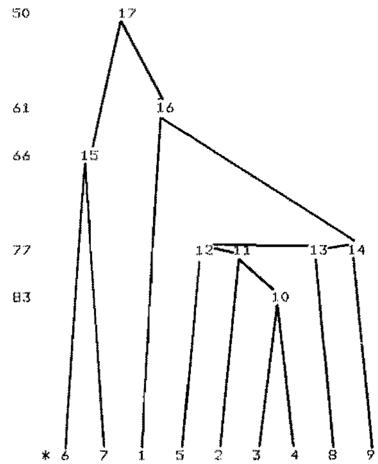
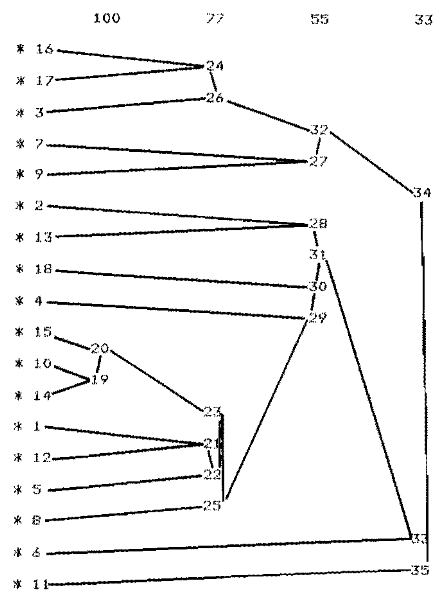


Fig. 4.5. A grid on modes of learning using a five-point scale.

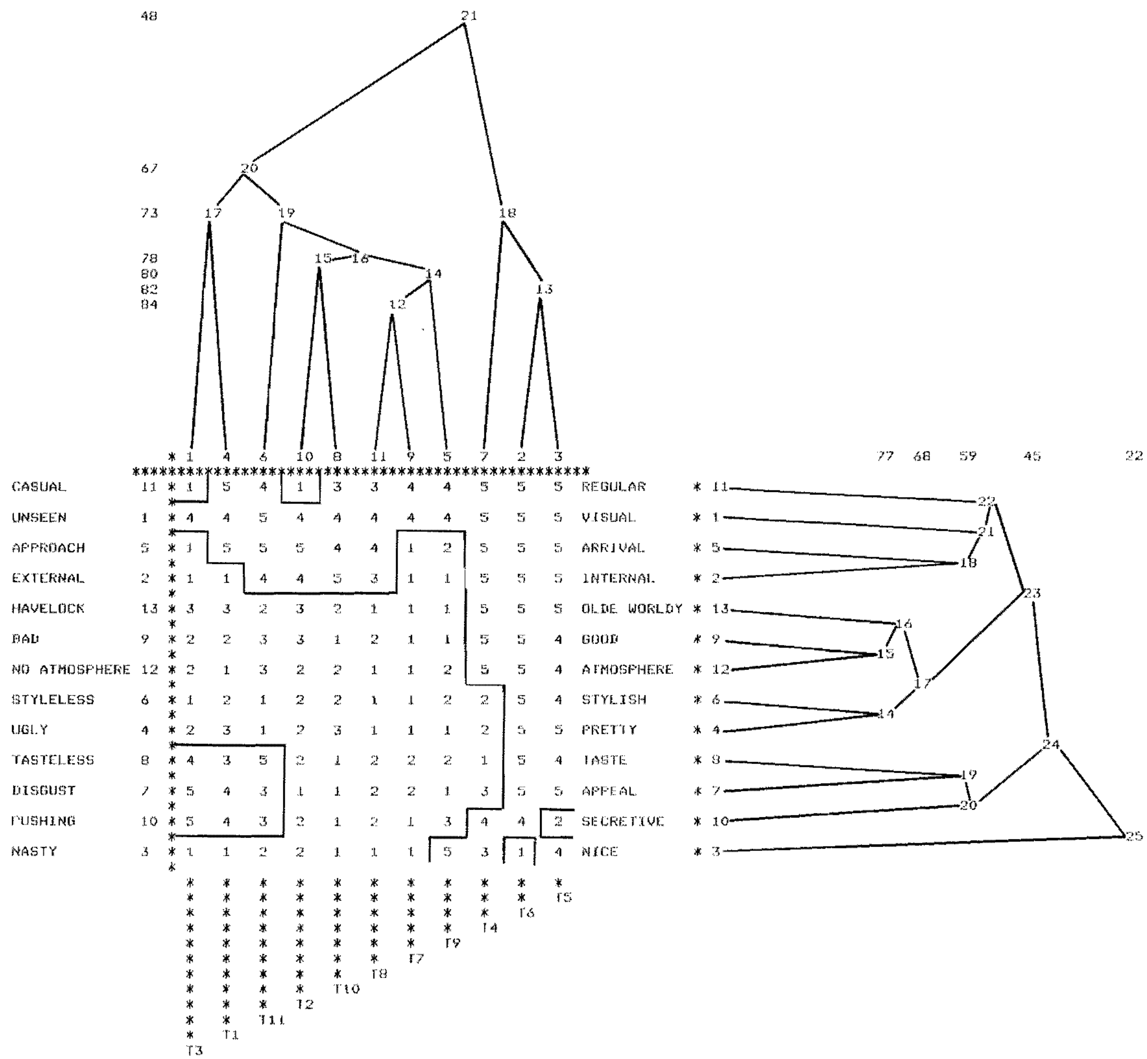


		6	7	1	5	2	3	4	8	9	
NO QUESTIONS	16	1	2	1	1	1	1	1	1	2	QUESTIONS
NO SUMS	17	1	1	1	1	1	1	1	1	2	SUMS
DON'T HAVE TO MAKE ANYTHING	3	1	1	1	1	1	1	1	2	2	HAVE TO MAKE THINGS
USED FOR WRITING	7	2	1	1	1	1	1	1	2	1	DON'T USE FOR WRITING
THICK	9	2	2	1	1	1	1	2	2	1	THIN
ABOUT ALL KINDS OF THINGS	2	1	2	1	1	1	2	2	1	1	ABOUT THE SAME THING
NO CHAPTERS	13	1	1	1	1	1	2	1	1	1	HAS CHAPTERS
NOT MACDONALD	18	1	1	1	2	1	1	1	1	1	MACDONALD BOOK
NOT IN ALPHABETICAL ORDER	4	1	1	2	2	2	1	1	1	1	ALPHABETICAL ORDER
HAVE DIFFERENT COLOURS	15	1	1	2	1	1	1	1	1	1	JUST BLACK AND BLUE
PICTURES ON FRONT	10	1	1	2	1	1	1	1	1	1	NO PICTURES
DOESN'T TELL MEANING	14	1	1	2	1	1	1	1	1	1	TELLS MEANING OF WORDS
HAVE WRITING	1	1	2	2	1	1	1	1	1	1	HAS WORDS
LIBRARY BOOKS	12	2	2	2	1	1	1	1	1	1	BOUGHT BOOKS
HARD COVER	5	2	2	1	1	1	1	1	1	1	SOFT COVER
STORY	8	2	2	1	2	1	1	1	1	1	NOT STORY
SMALL	6	2	1	1	1	2	1	1	1	1	BIG
NO PEOPLE	11	2	1	1	1	2	2	1	2	2	PICTURES OF PEOPLE



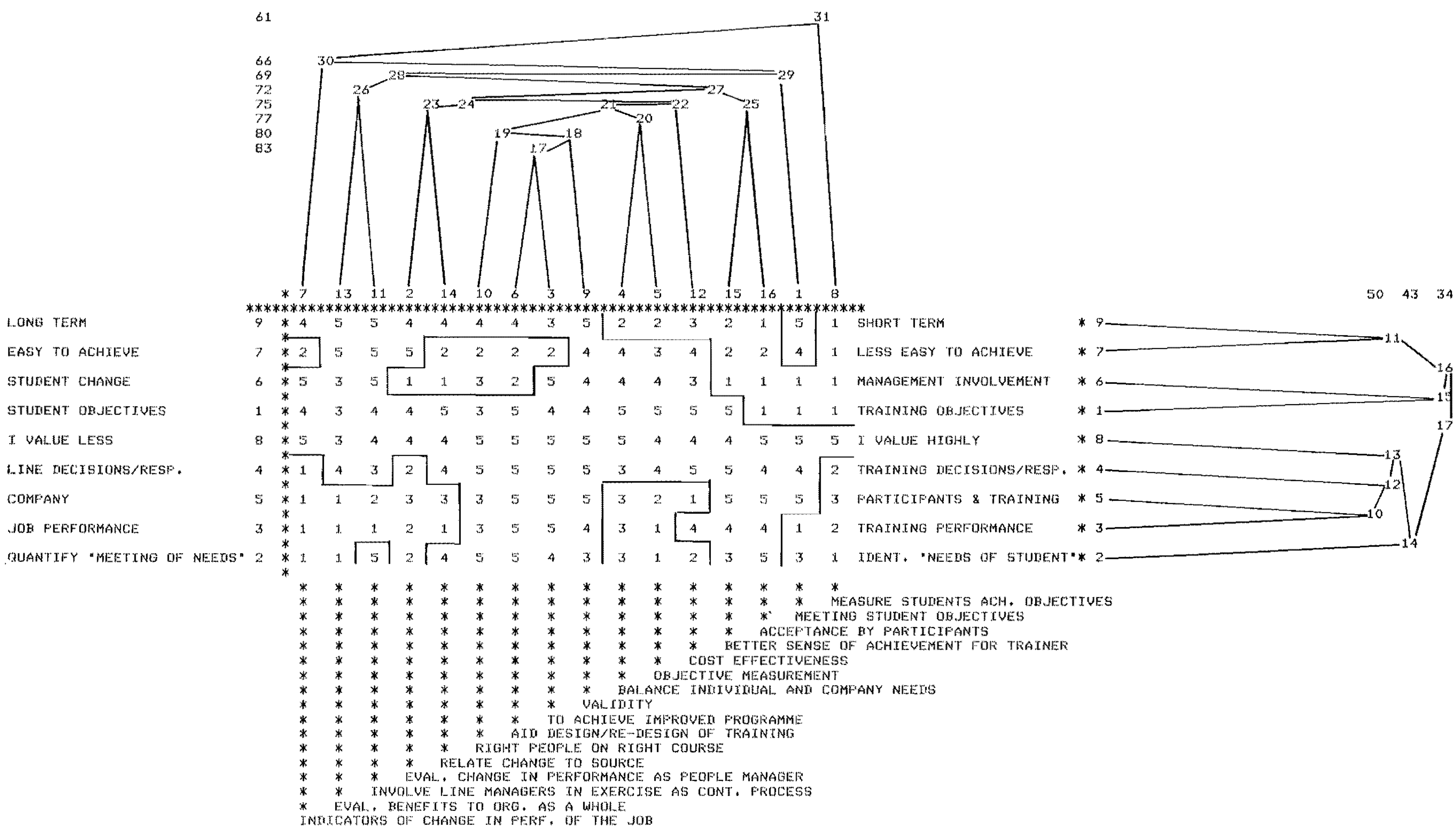
MATHS. TEXT(FLETCHER)
INSTRUCTION BOOK
ANTS(SPECIFIC FACTUAL)
STORY
ENCYCLOPAEDIA
INSECTS(GENERAL FACTUAL)
DICTIONARY
READING LAB. WORK CARD
COMIC

Fig. 4.6. A grid on children's reading materials using a two-point scale.



		1	4	6	10	8	11	9	5	7	2	3		
CASUAL	11	1	5	4	1	3	3	4	4	5	5	5	REGULAR	11
UNSEEN	1	4	4	5	4	4	4	4	4	5	5	5	VISUAL	1
APPROACH	5	1	5	5	5	4	4	1	2	5	5	5	ARRIVAL	5
EXTERNAL	2	1	1	4	4	5	3	1	1	5	5	5	INTERNAL	2
HAVELOCK	13	3	3	2	3	2	1	1	1	5	5	5	OLDE WORLDY	13
BAD	9	2	2	3	3	1	2	1	1	5	5	4	GOOD	9
NO ATMOSPHERE	12	2	1	3	2	2	1	1	2	5	5	4	ATMOSPHERE	12
STYLELESS	6	1	2	1	2	2	1	1	2	2	5	4	STYLISH	6
UGLY	4	2	3	1	2	3	1	1	1	2	5	5	PRETTY	4
TASTELESS	8	4	3	5	2	1	2	2	2	1	5	4	TASTE	8
DISGUST	7	5	4	3	1	1	2	2	1	3	5	5	APPEAL	7
PUSHING	10	5	4	3	2	1	2	1	3	4	4	2	SECRETIVE	10
NASTY	3	1	1	2	2	1	1	1	5	3	1	4	NICE	3

Fig. 4.7. A grid on photographs of public houses using a five-point scale.



		7	13	11	2	14	10	6	3	9	4	5	12	15	16	1	8		
LONG TERM	9	4	5	5	4	4	4	4	3	5	2	2	3	2	1	5	1	SHORT TERM	9
EASY TO ACHIEVE	7	2	5	5	5	2	2	2	2	4	4	3	4	2	2	4	1	LESS EASY TO ACHIEVE	7
STUDENT CHANGE	6	5	3	5	1	1	3	2	5	4	4	4	3	1	1	1	1	MANAGEMENT INVOLVEMENT	6
STUDENT OBJECTIVES	1	4	3	4	4	5	3	5	4	4	5	5	5	5	1	1	1	TRAINING OBJECTIVES	1
I VALUE LESS	8	5	3	4	4	4	5	5	5	5	5	4	4	4	5	5	5	I VALUE HIGHLY	8
LINE DECISIONS/RESP.	4	1	4	3	2	4	5	5	5	5	3	4	5	5	4	4	2	TRAINING DECISIONS/RESP.	4
COMPANY	5	1	1	2	3	3	3	5	5	5	3	2	1	5	5	5	3	PARTICIPANTS & TRAINING	5
JOB PERFORMANCE	3	1	1	1	2	1	3	5	5	4	3	1	4	4	4	1	2	TRAINING PERFORMANCE	3
QUANTIFY 'MEETING OF NEEDS'	2	1	1	5	2	4	5	5	4	3	3	1	2	3	5	3	1	IDENT. 'NEEDS OF STUDENT'	2

Fig. 4.8. A grid on courses for the training of teachers using a five-point scale.

IV. Developments

Various forms of display for maximum visibility of the patterning have been tried. The most effective of these is exemplified in the SPACED program. This takes a focused grid and separates the rows and columns according to the degree of likeness between adjacent lines. The display produced intensifies the effect of blocks of like ratings, and together with the trees helps to indicate clusters of elements which are construed similarly, and clusters of constructs which are operating on groups of elements similarly. Figure 4.9 shows the SPACED version of Fig. 4.7. One or more of these groups may then be chosen for separate focusing to investigate further relationships not currently visible.

```
               *************************
        CASUAL *  1 5  4 13344     5 55 *  REGULAR
               *                        *
        UNSEEN *  4 4  5 44444     5 55 *  VISUAL
               *                        *
      APPROACH *  1 5  5 54412     5 55 *  ARRIVAL
      EXTERNAL *  1 1  4 45311     5 55 *  INTERNAL
               *                        *
               *                        *
      HAVELOCK *  3 3  2 32111     5 55 *  OLDE WORLDY
           BAD *  2 2  3 31211     5 54 *  GOOD
 NO ATMOSPHERE *  2 1  3 22112     5 54 *  ATMOSPHERE
     STYLELESS *  1 2  1 22112     2 54 *  STYLISH
          UGLY *  2 3  1 23111     2 55 *  PRETTY
               *                        *
               *                        *
               *                        *
     TASTELESS *  4 3  5 21222     1 54 *  TASTE
       DISGUST *  5 4  3 11221     3 55 *  APPEAL
       PUSHING *  5 4  3 21213     4 42 *  SECRETIVE
               *                        *
               *                        *
               *                        *
               *                        *
               *                        *
         NASTY *  1 1  2 21115     3 14 *  NICE
               *************************
```

Fig. 4.9. The SPACED version of the grid on photographs of public houses shown in Fig. 4.7.

As an articulator of conversation, the focused grid is a crude but useful tool. It is the beginnings of a psychological reflector which can reflect back to a person a view of himself as seen with his own eyes. However, it has limitations. As the feedback procedure continues the elicitee may wish to add new constructs or elements as one particular cluster suggests other members or contrasts. The question then is: what does one do with this new data? If two constructs are highly matched they may be the same idea with different verbal labels, one may subsume the other by having a larger range of convenience, one may imply the other, or they may just be operating similarly on that particular element set. What arrangements can be made for the elicitee to make the best use of this new insight in the current grid? The FOCUS algorithm analyses the results of a conversation either with oneself, or partially with or through the interaction with the eliciter. It would be very much more satisfactory if the feedback could occur as the elicitation proceeds, thereby allowing the elicitee to act on the basis of the feedback. This is in part possible by focusing the grid at stages during the elicitation, but would be even more satisfactory if the two stages could take place concurrently. PEGASUS was developed for this purpose, to do exactly that.

Chapter Five

PEGASUS

I. Introduction

When a repertory grid is elicited by the experimenter or psychotherapist, or by a friend or colleague, the resulting grid is a product of the interaction and of the relationship between the eliciter and the elicitee. The triads presented will have an effect on the constructs produced, as will the sampling of the universe of discourse by the element set.

When the elements are chosen, the universe of discourse must be sampled as representatively as possible with respect to the purpose for eliciting the grid. For example, when choosing the project managers to discover the dimensions in which the elicitee values effectiveness, as in the grid in Fig. 4.4, he was asked to include the best one he had personally known and the worst one he had personally known, as well as a cross-section of others. However, as the elicitation continues it would be a valuable experience if a particularly interesting group which may emerge could be pursued in more depth by including more elements belonging with those in that group. If constructs and elements are matched as they are elicited, such groups of elements may be identified during the elicitation, and new elements added as old ones are dropped to slant the purpose slightly in a new direction.

The type of feedback needed when a grid is elicited is mainly in terms of which elements and constructs have remained undifferentiated. If two constructs are being used identically there may exist an element not yet in the set of elements but in the universe of discourse which would discriminate between the two constructs by being rated differently on each. If no such element can be found, it may be that the two constructs are expressing the same idea and may usefully be combined. Similarly, if two elements are being construed in the same way they will be highly clustered. If the elicitee is made aware of the high match, he may wish to add a construct which would separate these two elements by putting one at the left pole with the other at the right pole of the new construct. The following computer output (pp. 50–65) demonstrates a short run on the PEGASUS program. It is annotated with the numbers marked on Fig. 5.1.

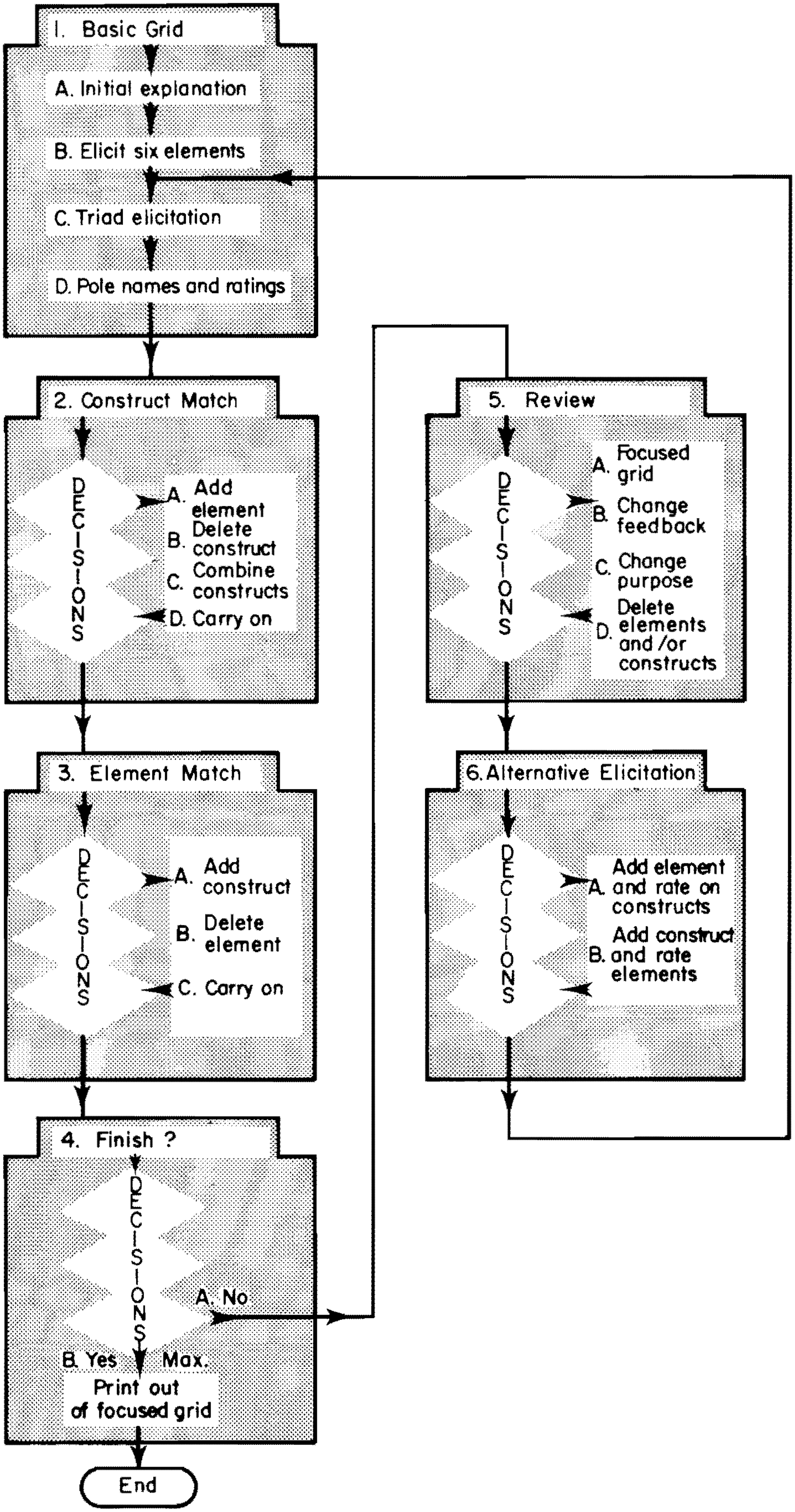


Fig. 5.1. Flowchart for the PEGASUS procedure.

c

```
THIS PROGRAM INCORPORATES FOUR VERSIONS OF PEGASUS.
 1. A PEGASUS GRID ELICITATION STARTING A NEW GRID;
 2. A PEGASUS GRID ELICITATION WITH PART ALREADY
    ELICITED BY YOU RECENTLY;
 3. A PEGASUS GRID ELICITATION USING A STORED BANK
    OF CONSTRUCTS;
 4. A STRAIGHT KELLY REPERTORY GRID ELICITATION
    WITHOUT COMMENTARY.
WHAT IS THE NUMBER OF THE VERSION YOU WISH TO USE?1




                       PEGASUS II
                      ************
                      ************

PROGRAM ELICITS GRID AND SORTS USING SIMILARITIES


THIS IS A PROGRAM TO ELICIT A KELLY REPERTORY GRID.
PLEASE READ CAREFULLY EVERYTHING THAT IS PRINTED, AND
MAKE SURE YOU UNDERSTAND WHAT YOU HAVE TO DO.
A REPERTORY GRID IS A TECHNIQUE DEVISED BY KELLY TO
HELP YOU EXPLORE THE DIMENSIONS OF YOUR THINKING.


YOU MUST DECIDE ON A PURPOSE FOR DOING THE GRID AND
KEEP THIS IN MIND WHEN YOU CHOOSE THE ELEMENTS--THE
THINGS YOU ARE GOING TO THINK ABOUT DURING THE PROGRAM.
THESE ELEMENTS WILL THEN BE USED TO ELICIT CONSTRUCTS.


YOU ARE LIMITED TO 25 LETTERS AND SPACES FOR YOUR ELEMENT
AND CONSTRUCT NAMES.
IF YOU MAKE A TYPING ERROR PRESS THE DELETE KEY AS MANY
TIMES AS YOU WANT TO ERASE A CHARACTER,THEN CARRY ON.
THROUGHOUT THIS PROGRAM THE QUESTION WILL BE ASKED --
DO YOU NEED HELP? EACH TIME JUST TYPE  YES IF YOU DO AND
PRESS THE RETURN KEY
BEFORE YOU START THIS GRID, WHAT IS YOUR NAME OR IDENTIFICATION


?ARTHUR
TYPE IN ON ONE LINE YOUR PURPOSE FOR DOING THIS GRID


?EXPLORING LEARNING SITUATIONS
```

IA

```
NAME SIX ELEMENTS.
YOU MUST CHOOSE A SET OF SIX ELEMENTS KEEPING IN MIND
WHY YOU WANT TO DO THIS GRID. THEY COULD BE PEOPLE,EVENTS,
PIECES OF MUSIC, PICTURES, BOOKS OR WHAT YOU WANT BUT
WHATEVER YOU CHOOSE THEY MUST BE OF THE SAME TYPE AND
EACH MUST BE WELL KNOWN TO YOU. TRY TO CHOOSE SPECIFIC
THINGS. NOW TYPE EACH ONE AFTER EACH QUESTION MARK.
DO NOT FORGET TO PRESS THE RETURN KEY AFTER EACH.


ELEMENT  1 ?LECTURE
ELEMENT  2 ?TUTORIAL
ELEMENT  3 ?SEMINAR
ELEMENT  4 ?PRACTICAL
ELEMENT  5 ?FILM
ELEMENT  6 ?LIBRARY
```

IB

```
TRIAD FOR ELICITATION OF CONSTRUCT 1
 1 LECTURE
 2 TUTORIAL
 3 SEMINAR


NAME THE PAIR


CAN YOU CHOOSE TWO OF THIS TRIAD OF ELEMENTS WHICH ARE IN
SOME WAY ALIKE AND DIFFERENT FROM THE OTHER ONE ?
TYPE IN THE NUMBERS OF THE PAIR ONE AFTER EACH QUESTION
MARK. DONT FORGET TO PRESS THE RETURN KEY AFTER EACH.




?2

?3
```

IC

```
NAME THE POLES OF YOUR CONSTRUCT


NOW I WANT YOU TO THINK ABOUT WHAT YOU HAVE IN MIND WHEN YOU
SEPARATE THE PAIR FROM THE OTHER ONE.HOW CAN YOU DESCRIBE
THE TWO ENDS OR POLES OF THE SCALE WHICH DISCRIMINATE


TUTORIAL AND SEMINAR FROM LECTURE
JUST TYPE ONE OR TWO WORDS FOR EACH POLE TO REMIND YOU WHAT
YOU ARE THINKING OR FEELING WHEN YOU USE THIS CONSTRUCT.



LEFT POLE RATED 1 --?INVOLVEMENT
RIGHT POLE RATED 5 --?REMOTENESS
```

ID

```
TYPE IN THE RATINGS


NOW IF TUTORIAL AND SEMINAR ARE
ASSIGNED THE VALUE 1 AND LECTURE IS
ASSIGNED THE VALUE 5

ACCORDING TO HOW YOU FEEL ABOUT THEM, PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5


 2 TUTORIAL     1
 3 SEMINAR      1
 1 LECTURE      5
 4 PRACTICAL   ?1
 5 FILM        ?5
 6 LIBRARY     ?1


POLE 1 --INVOLVEMENT

 2 TUTORIAL     1
 3 SEMINAR      1
 4 PRACTICAL    1
 6 LIBRARY      1



 1 LECTURE      5
 5 FILM         5

POLE 5 --REMOTENESS
```

ID

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
IF YOU HAVE CHANGED YOUR MIND ABOUT ANY OF THESE VALUES
INCLUDING THE ELEMENTS YOU HAD IN THE TRIAD,
TYPE IN HOW MANY YOU WANT TO ALTER WHEN YOU ARE ASKED.
THEN TYPE THE NUMBER OF THE FIRST ELEMENT AND PRESS THE RETURN KEY.
ON THE NEXT LINE TYPE IN THE VALUE YOU WANT IT TO HAVE,
AND CONTINUE UNTIL YOU HAVE DONE THEM ALL.
DONT FORGET RETURN AT THE END OF EACH LINE.



HOW MANY?2
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?2
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?4


POLE 1 --INVOLVEMENT

 3 SEMINAR      1
 4 PRACTICAL    1
 6 LIBRARY      1

 2 TUTORIAL     2


 1 LECTURE      4

 5 FILM         5

POLE 5 --REMOTENESS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
IF YOU HAVE CHANGED YOUR MIND ABOUT ANY OF THESE VALUES
INCLUDING THE ELEMENTS YOU HAD IN THE TRIAD,
TYPE IN HOW MANY YOU WANT TO ALTER WHEN YOU ARE ASKED.
THEN TYPE THE NUMBER OF THE FIRST ELEMENT AND PRESS THE RETURN KEY.
ON THE NEXT LINE TYPE IN THE VALUE YOU WANT IT TO HAVE,
AND CONTINUE UNTIL YOU HAVE DONE THEM ALL.
DONT FORGET RETURN AT THE END OF EACH LINE.



HOW MANY?2
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?3
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?2


POLE 1 --INVOLVEMENT

 4 PRACTICAL    1
 6 LIBRARY      1

 3 SEMINAR      2

 2 TUTORIAL     3

 1 LECTURE      4

 5 FILM         5

POLE 5 --REMOTENESS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
```

ID

ID

```
NOW YOU HAVE GOT ONE CONSTRUCT YOU KNOW WHAT TO DO.
A CONSTRUCT CAN BE THOUGHT OF AS A LINE ALONG WHICH
EACH OF YOUR ELEMENTS HAS A PLACE IN RELATION TO ALL THE
OTHER ELEMENTS.
PLEASE DO NOT USE CONSTRUCTS WHICH DO NOT APPLY TO ALL
YOUR ELEMENTS. AN EXAMPLE OF THIS IS:
REDHEAD---BLOND, AS IT IS IMPOSSIBLE TO RATE A PERSON
WITH BLACK HAIR ON THIS CONSTRUCT.
ONE POLE MUST BE IN SOME SENSE WHAT THE OTHER IS NOT,
AND THEY MUST DIVIDE YOUR ELEMENTS INTO TWO APPROXIMATELY
EQUAL GROUPS, SO PLEASE TRY TO AVOID CONSTRUCTS
WHERE NEARLY ALL THE ELEMENTS ARE AT ONE END. AN EXAMPLE MIGHT BE
A GREEN-EYED MONSTER---NOT A GREEN-EYED MONSTER
```

IA

```
TRIAD FOR ELICITATION OF CONSTRUCT 2
 4 PRACTICAL
 5 FILM
 6 LIBRARY


NAME THE PAIR


DO YOU NEED HELP?NO


?4

?6
```

IC

```
NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?NO


LEFT POLE RATED 1 --?FLEXIBLE
RIGHT POLE RATED 5 --?RIGID

TYPE IN THE RATINGS


DO YOU NEED HELP?NO


 4 PRACTICAL    1
 6 LIBRARY      1
 5 FILM         5
 1 LECTURE     ?4
 2 TUTORIAL    ?4
 3 SEMINAR     ?3


POLE 1 --FLEXIBLE

 4 PRACTICAL    1
 6 LIBRARY      1


 3 SEMINAR      3

 1 LECTURE      4
 2 TUTORIAL     4

 5 FILM         5

POLE 5 --RIGID
```

ID

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
DO YOU NEED HELP?NO


HOW MANY?1
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?2


POLE 1 --FLEXIBLE

 6 LIBRARY      1

 4 PRACTICAL    2

 3 SEMINAR      3

 1 LECTURE      4
 2 TUTORIAL     4

 5 FILM         5

POLE 5 --RIGID


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
```

1D

```
THE TWO CONSTRUCTS YOU CALLED
 1 INVOLVEMENT--REMOTENESS
 2 FLEXIBLE--RIGID
ARE MATCHED AT THE  75 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
INVOLVEMENT YOU ARE ALSO SAYING
FLEXIBLE
AND MOST OF THE TIME YOU ARE SAYING
REMOTENESS YOU ARE ALSO SAYING
RIGID


THINK OF ANOTHER ELEMENT WHICH IS EITHER INVOLVEMENT AND RIGID
OR FLEXIBLE AND REMOTENESS
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?PROGRAMMED TEXT
RATINGS :


INVOLVEMENT--REMOTENESS?2
FLEXIBLE--RIGID?5

ELEMENT 7 --PROGRAMMED TEXT
```

2A

```
TRIAD FOR ELICITATION OF CONSTRUCT 3
 1 LECTURE
 3 SEMINAR
 5 FILM


NAME THE PAIR


DO YOU NEED HELP?NO
```

1C

```
?LECTIRE
PLEASE TYPE A NUMBER BETWEEN 1 AND 7                              *  IC
?1

?3


NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?NO


LEFT POLE RATED 1 --?NO EQUIPMENT
RIGHT POLE RATED 5 --?EQUIPMENT

TYPE IN THE RATINGS


DO YOU NEED HELP?NO


 1 LECTURE      1
 3 SEMINAR      1
 5 FILM         5
 2 TUTORIAL    ?1
 4 PRACTICAL   ?5
 6 LIBRARY     ?2
 7 PROGRAMMED TEXT           ?4


POLE 1 --NO EQUIPMENT

 1 LECTURE      1
 2 TUTORIAL     1
 3 SEMINAR      1

 6 LIBRARY      2
                                                                     ID

 7 PROGRAMMED TEXT            4

 4 PRACTICAL    5
 5 FILM         5

POLE 5 --EQUIPMENT


DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
DO YOU NEED HELP?NO


HOW MANY?2
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?2
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?3


POLE 1 --NO EQUIPMENT

 2 TUTORIAL     1
 3 SEMINAR      1

 1 LECTURE      2

 6 LIBRARY      3

 7 PROGRAMMED TEXT            4

 4 PRACTICAL    5
 5 FILM         5

POLE 5 --EQUIPMENT
```

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO THANK T\YOU

DO YOU WANT TO CHANGE THE POLE NAMES?NO THANK YOU
```

ID

```
TRIAD FOR ELICITATION OF CONSTRUCT 4
 2 TUTORIAL
 4 PRACTICAL
 6 LIBRARY


NAME THE PAIR


DO YOU NEED HELP?NO


?2

?4
```

IC

```
NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?NO


LEFT POLE RATED 1 --?STAFF-ORGANISED
RIGHT POLE RATED 5 --?SELF-ORGANISED

TYPE IN THE RATINGS


DO YOU NEED HELP?NO


 2 TUTORIAL     1
 4 PRACTICAL    1
 6 LIBRARY      5
 1 LECTURE     ?1
 3 SEMINAR     ?2
 5 FILM        ?1
 7 PROGRAMMED TEXT           ?3


POLE 1 --STAFF-ORGANISED

 1 LECTURE      1
 2 TUTORIAL     1
 4 PRACTICAL    1
 5 FILM         1

 3 SEMINAR      2

 7 PROGRAMMED TEXT            3


 6 LIBRARY      5

POLE 5 --SELF-ORGANISED
```

ID

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
DO YOU NEED HELP?3


HOW MANY?2
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?4\2
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?3


POLE 1 --STAFF-ORGANISED

 1 LECTURE      1
 5 FILM         1

 2 TUTORIAL     2
 3 SEMINAR      2

 4 PRACTICAL    3
 7 PROGRAMMED TEXT              3


 6 LIBRARY      5

POLE 5 --SELF-ORGANISED                                          ID


DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
DO YOU NEED HELP?NO


HOW MANY?1
ELEMENT NUMBER?7
NEW RATING FOR ELEMENT 7 ?4


POLE 1 --STAFF-ORGANISED

 1 LECTURE      1
 5 FILM         1

 2 TUTORIAL     2
 3 SEMINAR      2

 4 PRACTICAL    3

 7 PROGRAMMED TEXT              4

 6 LIBRARY      5

POLE 5 --SELF-ORGANISED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO


THE TWO ELEMENTS  2 TUTORIAL AND  3 SEMINAR
ARE MATCHED AT THE  87 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN TUTORIAL AND SEMINAR
DO YOU WANT TO SPLIT THESE?YES                              *    3A


HELP?YES


THINK OF A CONSTRUCT WHICH SEPARATES THESE
TWO ELEMENTS, AND THEN KEEPING THIS IN MIND
```

```
ACCORDING TO HOW YOU FEEL ABOUT THEM, PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5        3A


NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?SMALL GROUP
RIGHT POLE RATED 5 --?LARGE GROUP

TYPE IN THE RATINGS


 2 TUTORIAL     1
 3 SEMINAR      5
 1 LECTURE     ?5
 4 PRACTICAL   ?4
 5 FILM        ?5
 6 LIBRARY     ?1
 7 PROGRAMMED TEXT          ?1


POLE 1 --SMALL GROUP

 2 TUTORIAL     1
 6 LIBRARY      1
 7 PROGRAMMED TEXT           1

                                                                      1D

 4 PRACTICAL    4

 1 LECTURE      5
 3 SEMINAR      5
 5 FILM         5

POLE 5 --LARGE GROUP


DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
HELP?NO


HOW MANY?2
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?2
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?4


POLE 1 --SMALL GROUP

 6 LIBRARY      1
 7 PROGRAMMED TEXT           1

 2 TUTORIAL     2


 3 SEMINAR      4
 4 PRACTICAL    4

 1 LECTURE      5
 5 FILM         5

POLE 5 --LARGE GROUP


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
DO YOU WANT TO FINISH NOW?NO                                          4A
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?YES                 5A
```

```
    * 5   1   2   3   4   6   7
**********************************
 5  * 5   5   2   4   4   1   1  * 5
    *
 4  * 5   5   4   4   3   1   2  * 4
    *
 1  * 5   4   3   2   1   1   2  * 1
    *
 2  * 5   4   4   3   2   1   5  * 2
    *
 3  * 1   4   5   5   1   3   2  * 3
    *
      *   *   *   *   *   *   *
      *   *   *   *   *   *   PROGRAMMED TEXT
      *   *   *   *   *   LIBRARY
      *   *   *   *   PRACTICAL
      *   *   *   SEMINAR
      *   *   TUTORIAL
      *   LECTURE
      FILM


                      SMALL GROUP    ---  LARGE GROUP

                   SELF-ORGANISED    ---  STAFF-ORGANISED

                      INVOLVEMENT    ---  REMOTENESS

                         FLEXIBLE    ---  RIGID

                        EQUIPMENT    ---  NO EQUIPMENT


THIS IS ARTHUR'S GRID
PURPOSE:
EXPLORING LEARNING SITUATIONS
```

5 A

```
YOU HAVE NOW GOT 5 CONSTRUCTS AND 7 ELEMENTS
AND YOU MUST DECIDE WHETHER THEY ARE THE IMPORTANT
ONES FOR YOU IN THE PURPOSE YOU HAD FOR DOING THIS
GRID WHICH YOU SAID WAS


EXPLORING LEARNING SITUATIONS


IF YOU FEEL THAT ONE OR MORE OF YOUR CONSTRUCTS OR ELEMENTS
DOES NOT BELONG WITH THE OTHERS YOU MAY DELETE THEM


HERE IS A LIST OF YOUR ELEMENTS
```

5D

```
 1 LECTURE
 2 TUTORIAL
 3 SEMINAR
 4 PRACTICAL
 5 FILM
 6 LIBRARY
 7 PROGRAMMED TEXT

DO YOU WANT TO DELETE AN ELEMENT?NO

HERE IS A LIST OF YOUR CONSTRUCTS


 1 INVOLVEMENT--REMOTENESS
 2 FLEXIBLE--RIGID
 3 EQUIPMENT--NO EQUIPMENT
 4 SELF-ORGANISED--STAFF-ORGANISED
 5 SMALL GROUP--LARGE GROUP

DO YOU WANT TO DELETE A CONSTRUCT?NO
```

5D

```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?1
```

6C

```
IS YOUR REASON FOR DOING THIS GRID STILL


EXPLORING LEARNING SITUATIONS
?YES
```

5C

```
TRIAD FOR ELICITATION OF CONSTRUCT 6
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?YES
 1 LECTURE
 2 TUTORIAL
 3 SEMINAR
 4 PRACTICAL
 5 FILM
 6 LIBRARY
 7 PROGRAMMED TEXT
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?5
 5 FILM
?7
 7 PROGRAMMED TEXT
?6
 6 LIBRARY


NAME THE PAIR


HELP?NO


?2

 2 IS NOT ONE OF YOUR TRIAD PLEASE RETYPE IT
```

1C

```
?FILM
PLEASE TYPE A NUMBER BETWEEN 1 AND 7
?5

?7
```

* 1C

```
NAME THE POLES OF YOUR CONSTRUCT


HELP?NO


LEFT POLE RATED 1 --?SPECIFIC CONTENT
RIGHT POLE RATED 5 --?VARIABLE CONTENT

TYPE IN THE RATINGS


HELP?NO


 5 FILM         1
 7 PROGRAMMED TEXT             1
 6 LIBRARY      5
 1 LECTURE     ?2
 2 TUTORIAL    ?2
 3 SEMINAR     ?4
 4 PRACTICAL   ?3


POLE 1 --SPECIFIC CONTENT

 5 FILM         1
 7 PROGRAMMED TEXT             1

 1 LECTURE      2
 2 TUTORIAL     2

 4 PRACTICAL    3

 3 SEMINAR      4

 6 LIBRARY      5

POLE 5 --VARIABLE CONTENT


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
```

1D

```
THE TWO CONSTRUCTS YOU CALLED
 2 FLEXIBLE--RIGID
 6 VARIABLE CONTENT--SPECIFIC CONTENT
ARE MATCHED AT THE  85 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
FLEXIBLE YOU ARE ALSO SAYING
VARIABLE CONTENT
AND MOST OF THE TIME YOU ARE SAYING
RIGID YOU ARE ALSO SAYING
SPECIFIC CONTENT


THINK OF ANOTHER ELEMENT WHICH IS EITHER FLEXIBLE AND SPECIFIC CONTENT
OR VARIABLE CONTENT AND RIGID
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
     IS YOUR ELEMENT?VIDEO TAPE
```

2A

```
RATINGS :


INVOLVEMENT--REMOTENESS?3
FLEXIBLE--RIGID?2
EQUIPMENT--NO EQUIPMENT?1
SELF-ORGANISED--STAFF-ORGANISED?2
SMALL GROUP--LARGE GROUP?1
VARIABLE CONTENT--SPECIFIC CONTENT?5

ELEMENT 8 --VIDEO TAPE
```

2A

```
DO YOU WANT TO FINISH NOW?NO
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?NO
```

- 4A
- 5A

```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?2
WHAT IS YOUR ELEMENT?INFORMAL INTERACTION
RATINGS :


INVOLVEMENT--REMOTENESS?1
FLEXIBLE--RIGID?1
EQUIPMENT--NO EQUIPMENT?5
SELF-ORGANISED--STAFF-ORGANISED?1
SMALL GROUP--LARGE GROUP?3
VARIABLE CONTENT--SPECIFIC CONTENT?1

ELEMENT 9 --INFORMAL INTERACTION
```

6A

```
TRIAD FOR ELICITATION OF CONSTRUCT 7
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?NO
 8 VIDEO TAPE
 6 LIBRARY
 3 SEMINAR


NAME THE PAIR


HELP?YEX\S


CAN YOU CHOOSE TWO OF THIS TRIAD OF ELEMENTS WHICH ARE IN
SOME WAY ALIKE AND DIFFERENT FROM THE OTHER ONE ?
TYPE IN THE NUMBERS OF THE PAIR ONE AFTER EACH QUESTION
MARK. DONT FORGET TO PRESS THE RETURN KEY AFTER EACH.



?8

?3
```

1C

```
NAME THE POLES OF YOUR CONSTRUCT
```

- 1D

```
HELP?NO

LEFT POLE RATED 1 --?DISLIKE
RIGHT POLE RATED 5 --?LIKE

TYPE IN THE RATINGS

HELP?NO

 8 VIDEO TAPE  1
 3 SEMINAR     1
 6 LIBRARY     5
 1 LECTURE    ?1
 2 TUTORIAL   ?2
 4 PRACTICAL  ?4
 5 FILM       ?1
 7 PROGRAMMED TEXT          ?1
 9 INFORMAL INTERACTION     ?5

POLE 1 --DISLIKE

 1 LECTURE     1
 3 SEMINAR     1
 5 FILM        1
 7 PROGRAMMED TEXT           1
 8 VIDEO TAPE  1

 2 TUTORIAL    2

 4 PRACTICAL   4

 6 LIBRARY     5
 9 INFORMAL INTERACTION      5

POLE 5 --LIKE

DO YOU WANT TO CHANGE ANY OF THESE VALUES?YES
HELP?NO

HOW MANY?1
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?4

POLE 1 --DISLIKE

 1 LECTURE     1
 5 FILM        1
 7 PROGRAMMED TEXT           1
 8 VIDEO TAPE  1

 2 TUTORIAL    2

 3 SEMINAR     4
 4 PRACTICAL   4

 6 LIBRARY     5
 9 INFORMAL INTERACTION      5

POLE 5 --LIKE
```

ID

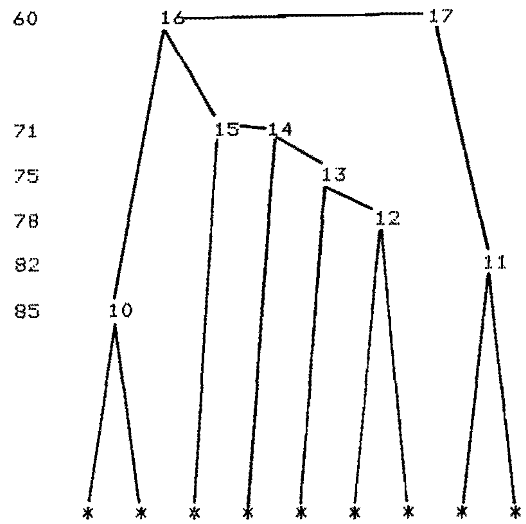
```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
```
1D

```
THE TWO CONSTRUCTS YOU CALLED
 6 VARIABLE CONTENT--SPECIFIC CONTENT
 7 LIKE--DISLIKE
ARE MATCHED AT THE  88 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
VARIABLE CONTENT YOU ARE ALSO SAYING
LIKE
AND MOST OF THE TIME YOU ARE SAYING
SPECIFIC CONTENT YOU ARE ALSO SAYING
DISLIKE


THINK OF ANOTHER ELEMENT WHICH IS EITHER VARIABLE CONTENT AND DISLIKE
OR LIKE AND SPECIFIC CONTENT
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?

WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
```
2D

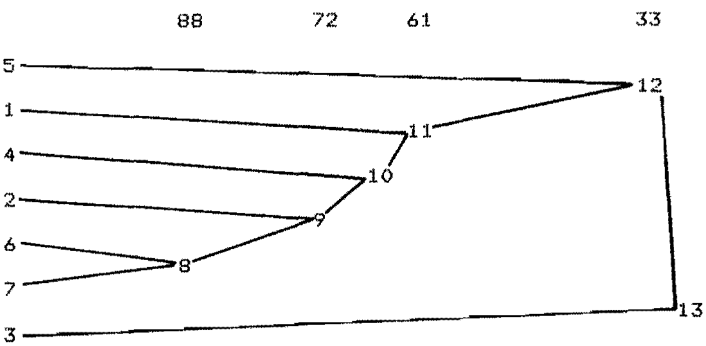
```
THE TWO ELEMENTS  6 LIBRARY AND  9 INFORMAL INTERACTION
ARE MATCHED AT THE  85 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN LIBRARY AND INFORMAL INTERACTION
DO YOU WANT TO SPLIT THESE?NO
```
3C

```
DO YOU WANT TO DELETE AN ELEMENT ?NO
DO YOU WANT TO FINISH NOW?YES


DO YOU WANT:
    1) A COMPLETE PRINTOUT OF THE ANALYSIS OF YOUR GRID
    2) ONLY THE RESULTS OF THE ANALYSIS
WHAT IS THE NUMBER OF YOUR CHOICE?2



CONSTRUCT  3  REVERSED
```
4B

FOCUSED GRID




```
        *    *    *    *    *    *    *    *    *
      * 9    6    4    3    2    1    5    7    8
**********************************************
5     * 3    1    4    4    2    5    5    1    1    * 5
      *
1     * 1    1    1    2    3    4    5    2    3    * 1
      *
4     * 1    1    3    4    4    5    5    2    2    * 4
      *
2     * 1    1    2    3    4    4    5    5    2    * 2
      *
6     * 1    1    3    2    4    4    5    5    5    * 6
      *
7     * 1    1    2    2    4    5    5    5    5    * 7
      *
3     * 1    3    5    1    1    2    5    4    5    * 3
      *
        *    *    *    *    *    *    *    *    *
        *    *    *    *    *    *    *    *    VIDEO TAPE
        *    *    *    *    *    *    *    PROGRAMMED TEXT
        *    *    *    *    *    *    FILM
        *    *    *    *    *    LECTURE
        *    *    *    *    TUTORIAL
        *    *    *    SEMINAR
        *    *    PRACTICAL
        *    LIBRARY
        INFORMAL INTERACTION
```



4B

SMALL GROUP	---	LARGE GROUP
INVOLVEMENT	---	REMOTENESS
SELF-ORGANISED	---	STAFF-ORGANISED
FLEXIBLE	---	RIGID
VARIABLE CONTENT	---	SPECIFIC CONTENT
LIKE	---	DISLIKE
NO EQUIPMENT	---	EQUIPMENT

4B

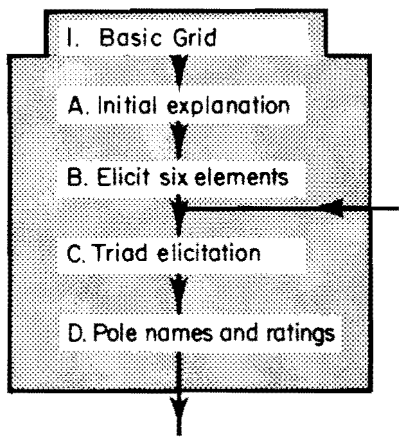
THIS IS ARTHUR'S GRID
PURPOSE:
EXPLORING LEARNING SITUATIONS
DO YOU WANT YOUR GRID PUT ON FILE?NO

II. Algorithm and Flowchart

The flowchart shown in Fig. 5.1 is a user's view of the PEGASUS interaction; it shows the six sections and roughly indicates the operational flow. The decisions may vary according to the number of times that point has been reached previously, and a different variety of choices offered on separate occasions. A "help" facility is provided which is optional, and if called upon prints out a few lines of explanation of the input required and the form in which it should be typed. If the response of the user is unacceptable to the computer a comment will be made on the type of input needed, and another opportunity given to reply. Examples of this are marked with an asterisk on the computer output.

A. The Basic Grid

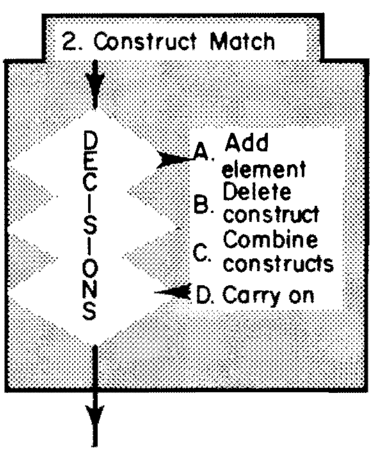
The first section is the Basic Grid in which explanations are given and the first four constructs are elicited.



The instructions given at the start of the interaction are for the use of the terminal and information about the help facility. After one construct has been elicited more explanation is given concerning the statistical properties of constructs. The user is asked to find constructs which have a range of convenience encompassing all the elements, and to choose bipolar dimensions which roughly split the elements equally and thereby avoid lopsided constructs where most of the elements are on one pole. Before choosing his elements the user is asked to think of his purpose for eliciting the grid. In the example given it was *Exploring learning situations.* This is of great importance for the interaction which is to follow, as it sets both the intentionalities and the universe of discourse. It is essential that initially the elements are of the same type so that meaningful comparisons can be made. Later this restriction may be relaxed resulting in an increase in the depth of interaction and greater awareness of implications. Element sets which have been used include learning skills (Fig. 4.5); prospective careers; birds; project managers (Fig. 4.4); buildings (Fig. 4.7); groups of students; chapters of a book; children's reading (Fig. 4.6); court sentences; faults in garments (Fig. 9.2); course assessment (Fig. 4.8); and, inevitably, significant others (Fig. 9.25). The minimal context form or triad method is used for eliciting constructs. Three elements are presented which for construct 1 in the above example were *Lecture*, *Tutorial*, *Seminar*, and the user is asked to say which two are in some way alike and differ from the third. The left pole is named from a short description of the similarity of the pair, in this case *Involvement*, and the right pole is named by describing how the third differs, which was *Remoteness*. The two poles are then used to represent the ends of a five-point scale on which each element is then rated. The rating of 1 is assigned to the pair, 5 to the singleton, and the user then assigns a value to each of the other elements. When this has been done they are then printed out in groups according to the ratings given, showing the scale distribution, and the user may then change the rating value of any element he feels to be incorrectly placed, including those which were positioned on the ends of the scale for him initially. He may change the values several times until he is satisfied that the scale is adequately described, and then change the pole names if he wishes to do so. This is shown several times in the output and is marked 1D. This procedure ensures that the construct has space to develop, and consequently if it should change slightly as the elements are placed on it, opportunity is given to relabel the poles. The first four constructs are elicited from fixed triads, then the user is offered the option of choosing his own triad in order to explore groupings of elements he may have in mind. In the above example this is illustrated in the *Elicitation of construct 6*. If he does not wish to do this, a pseudo-random number routine is used to generate the next triad, as shown in the *Elicitation of construct 7*.

B. Construct Match

The second section is Construct Match which provides feedback when two constructs are highly related. This is the beginning of the difference between a paper-and-pencil grid elicitation conducted in two stages—grid elicitation and grid analysis—and the



PEGASUS grid elicitation where the two stages are combined. As the second construct is added, the pattern of ratings is matched against that of the first construct using the construct matching score described in Chapter 4. If the match is higher than a certain preset level a comment is made, and the user is asked if he can think of a new element which would reduce the level of match between the two constructs. In the example the two constructs

1. *Involvement–Remoteness*
2. *Flexible–Rigid*

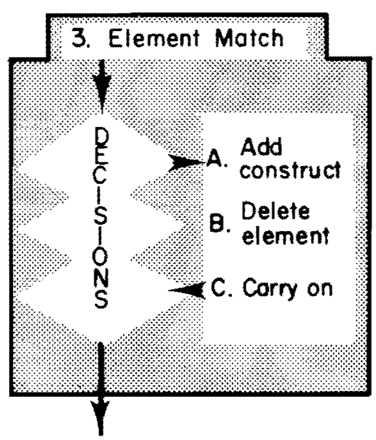
were matched at the 75% level, and a new element *Programmed text* was introduced to split these. If he is able to do this, the new element must then be rated on the constructs. In this case it was rated 2 on construct 1, and 5 on construct 2. As each subsequent construct is elicited it is matched with all the preceding constructs, and the same algorithm applied. If he cannot or does not wish to add such an element, the user is invited to delete a construct if he feels it is subsumed by the other, or replace the two constructs by one if they are in fact expressing the same idea and differ only slightly. The alternative is to leave the two constructs and continue with the elicitation, as happened with the two constructs

6. *Variable content–Specific content*
7. *Like–Dislike*

matched at the 88% level.

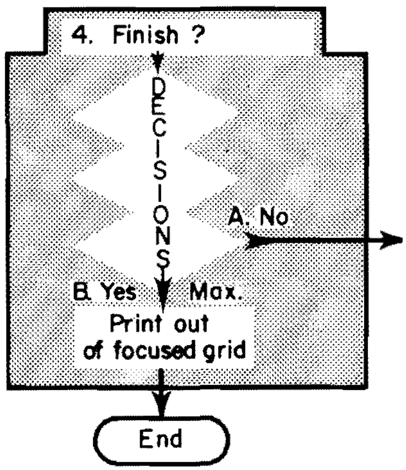
C. Element Match

In section three, Element Match, a similar algorithm is used.



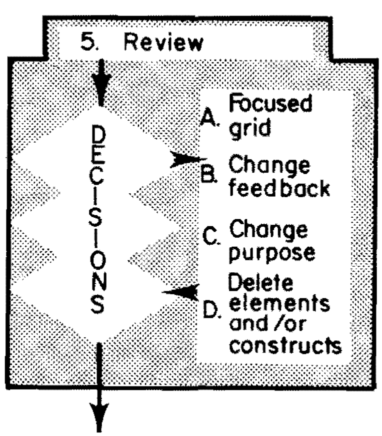
After four constructs have been entered, the patterns of ratings down columns of elements are matched using the element matching score. Every time the Element Match routine is entered every element is matched with every other element and the highest match commented on if it exceeds the preset criterion. In this example the elements 2 *Tutorial* and 3 *Seminar* were matched at the 87% level. Two highly matched elements may be distinguished by adding a new construct on which the matched elements are placed on opposite poles, in this case *Small group–Large group*, the ratings entered, the elements regrouped and rerated in the usual way. Alternatively an element may be deleted, or no action taken. If at some stage an element appears to be inconsistently construed it may be split into two aspects of the element, for example "myself" might become "myself as I am" and "myself as I could be". If these are then being construed in the same way a comment will be made in the Element Match section, and it may be appropriate to delete one of them at that stage. In this way the program encourages the user into differentiations he *can* make as opposed to the usual grid method which only elicits differentiations he *does* habitually make. With feedback of this nature, the user can proceed with much greater insight into himself and his own processes, examining in his own mind as well as in the interaction exactly what his personal meanings are and how he is applying them for his current purposes.

D. Finish?



In Finish?, the fourth section, the option is given to finish if the grid is felt to be complete, and an option of printout is given of the FOCUS analysis of the final grid. If the maximum size of fifteen elements and fifteen constructs has been reached, the final analysis proceeds automatically, but if fifteen elements have been elicited before the maximum number of constructs, then constructs may be added to complete the grid if this is felt to be desirable.

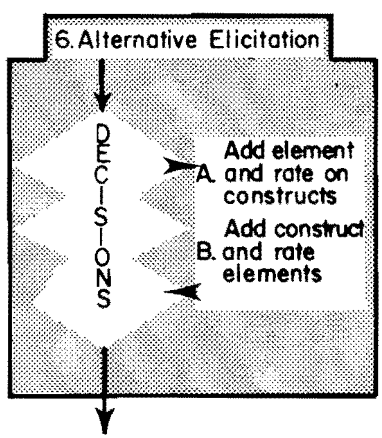
E. Review



In the Review section, if the user has chosen to continue with the elicitation he is offered a focused version of his current grid. This will indicate to him how his elements and constructs are beginning to group together, and which are most alike. He may also alter the level of match which leads to feedback commentary. If he feels he is being given insufficient feedback he can reduce the level, and if he feels that comments are being made unnecessarily he may increase the level. In this case it was felt to be *Okay*. This will be affected mainly by the universe of discourse, the individuality of the user and the level of construct being employed. For example, if the universe of discourse is "books" a lower level of match may be more significant than if the universe of discourse was "the novels of Nevil Shute" where more similarity may be expected.

On some occasions as the elicitation proceeds the purpose may begin to shift slightly as the user is able to see more clearly what is happening. As the nature and depth of interaction is finely balanced on the mutual dependencies of the universe of discourse (and hence the elements) on the purpose, the constructs on the elements, and the purpose jointly on the elements and constructs, an iterative approach is needed to keep two of these variables fixed whilst the third is made stable, rotating gently until the whole is brought into equilibrium. In this way maximum use can be made of the fuzzy properties of these sets (Zadeh, 1968, 1971, 1973; Gaines, 1976). Opportunity is given in the Review section to revise and refine the purpose, and to delete any elements or constructs whose grade of membership becomes negligible.

F. Alternative Elicitation



In the sixth section, Alternative Elicitation, the user may add a new element which must then be rated on all constructs, or add a construct without using the minimal context form of triadic elicitation. This is more like the full context form where the elicitee is presented with all the elements together, and asked to group them into piles representing the rating values along the construct. The construct then added must have elements assigned to it in the usual way. Alternatively, chosen or random triads may continue to be used. Instances are given in the example.

III. Applications

By using combinations of reviewing the purpose, adding and deleting constructs and elements, a depth of interaction may be achieved which could not at the start have been envisaged. Thus the user is given the opportunity to reflect on his understanding of the area of the universe of discourse, to examine and explore his thoughts and feelings in this atmosphere of heightened awareness of personal knowing. He "sees" (Castaneda, 1971). That is, his perception may be changed in a way which by other means can take years to accomplish. Kelly (1966a) calls this "constructive alternativism". The grid is acting as a cognitive mirror, reflecting back to the user his models of construing. Kelly's view of a personal scientist grew out of his assumptions about the universe. He says that the world is real, and:

> ...man is gradually coming to understand it by making increasingly adequate interpretations of it.
>
> *(Kelly, 1955, p. 6)*

He also maintains that all parts of a person's world are interrelated, and that a personal scientist makes sense of his world by discovering relationships with which to form an integral whole. He assumes that the universe exists in time, implying that the constructions of the present can only be interpreted in the context of the past and the future. The grid can be seen as a photograph of a specific situation at a specific time, but must be given meaning from the person's own perspectives on the world.

The concept of a personal scientist is that each person orders his life by behaving like a scientist. He makes predictions, tests them out, revises his thinking, and forms theories in the light of his results. Kelly's belief in constructive alternativism means that he believes each individual could totally alter his personal circumstances by reconstruing his situation.

> ... even the most obvious occurrences of everyday life might appear utterly transformed if we were inventive enough to construe them differently.
>
> *(Kelly, 1966a, p. 1)*

PEGASUS offers the opportunity to do this. It exhibits to an individual his models of reality—people, events, things—and encourages him to become more aware of them, review them and revise them in the light of his perception. Kelly saw his theory as enabling a personal scientist to anticipate events and to use his anticipation as a basis for action. The quality of a person's models, both specific and general, will determine the level of skill, coping, competence and creativity he will be able to achieve.

The essence of learning is constructive and creative change. Learning is often measured in terms of behavioural objectives devised by the teacher or, one step further removed from the learner, the course designer. For the learner himself, learning is the revision of his cognitive model in order to make his anticipation of events more effective, that is in the way he perceives and construes events and behaves in the situation. PEGASUS actively encourages the consideration and revision of tentative hypotheses of the personal scientist approach, hence supporting the reconstruction of cognitive models and the change which is the "seeing" and learning of constructive alternativism.

PEGASUS is therefore a content-free heuristic in a conversational mode, allowing the user to fill it with the content of his head and heart, and see it reordered and restructured in ways he was unable to achieve without the computer as a tool which he begins to use as a craftsman uses his carpet loom. The PEGASUS process gives to the user an enlightening experience which may not be visible in the results or the printout of the interaction. He may see himself through his own eyes for the first time; he may talk to himself through the computer in a more meaningful way than ever before. Most internal talk is used to maintain our world.

> We renew [our world], we kindle it with life, we uphold it with our internal talk. Not only that, but we also choose our paths as we talk to ourselves. Thus we repeat the same choices over and over until the day we die.
>
> (*Castaneda, 1971, p. 225*)

By continuing an internal conversation a person is not necessarily changing anything, but on the contrary tending to readjust any discrepancies to fit his existing model. By employing constructive alternativism through PEGASUS one is then able to rebuild one's world in new and productive directions. A personal scientist applies his theories to his practical advantage.

IV. Developments

The suggestion is that the PEGASUS procedure is an ideal example of the working of P-Individuation. The two participants A and B within the individual are in conversation via the two M-Individuals, the PEGASUS program and the user, one of which offers the structure and the other the content for the conversation (Pask, 1975). In Luft's Johari Window model, PEGASUS is offering a facility to move behaviour, feelings and other material from the blind area into openness. Luft says:

> How does one learn more about one's blind area, Q2? There are many answers, but nobody really knows. This is not sophistry but an accurate statement of prevailing knowledge. And for very good reason—the most complicated subject is man, man in relations with others and in relation to himself. Nothing is more important; and yet systematic, confirmable inquiry has only just begun in this century.
>
> (*Luft, 1969, p. 29*)

PEGASUS is the vanguard of a technology to achieve this knowledge in a personally meaningful form.

One alternative form of the program is PRE–PEGASUS which allows the user to continue or complete his grid on a separate occasion from that of starting it. This leads to a different sort of result from that obtained when the grid is completed in one session, since some of the construing becomes more or less relevant after a passage of time. This may have the consequence of elements and constructs being dropped and new ones added on subsequent occasions, a situation which is discussed in more detail in Chapter 6.

MIN–PEGASUS is a version which is much closer to the paper-and-pencil technique. Although elements and constructs may be deleted and added at appropriate stages, and the purpose reviewed, this is not done as a result of feedback commentary on high levels of match. This version is ideal to discover how someone is construing in a situation at a given time rather than pushing him into differentiations he is not in the habit of making.

PEGASUS–BANK is an addition to the PEGASUS program. This is based on the idea put forward by Thomas (1976). There are two ways in which it can be used: to explore shared construing of an area, and to interface with an area construed by an "expert". The first use assumes that the two participants have equally valid views of the area; one produces a PEGASUS grid which is stored as a bank to be accessed by the other. As the second person elicits his own grid, comparison is made between his constructs and those already in the bank, high similarities provoking comment. The bank may then be modified in the light of the interaction before the first person, or possibly a new participant, uses it again. In this way it is possible to build up a coherent view of the universe of discourse, with an indication as to the amount of overlap between the participants.

In the second way of using PEGASUS–BANK, the bank of constructs stored in the computer represents an "expert" view of an area of public knowledge. As the processing takes place, continual comparison with the bank gives feedback to the user on the extent to which his constructs map on to the expert's construing of the same elements. Since the comparison is made in terms of how the construct orders the elements, rather than in terms of the verbal labels, it is often found that although a person may have only a vague idea of the technical terms, he may actually be using very similar constructs. An example of this is in a grid with animals as elements. The biologist had elicited a grid which was stored in the bank, the user had elicited a construct which he called "horrible creepy crawlies–nice, soft cuddly ones". The computer's feedback response was that this construct was highly matched with that of the biologist designated "arachnida–warm-blooded mammals". Very often the user is both surprised and enlightened to find the similarity between the patterning in his grid and that of the expert, despite the diverse labels. The PEGASUS–BANK technique therefore provides a sound basis for assessment and a useful starting point for training. If a technical group wishes to recruit new members, this method could be used as an induction into the terminology as used by the group. Further, it could be used to pass on non-verbal experience gathered by an expert especially in areas of subjective judgement, "feeling right", and judging atmosphere. The major difference between the expert and the beginner is in the perception of the situation, and the way the incoming information is "chunked" (Biggs, 1967; Newell and Simon, 1972; Miller, 1956). Using PEGASUS–BANK, the acquisition of experience could be vastly accelerated.

The PEGASUS program can be used in any situation where one might use a standard grid, or where one wishes to articulate an internal conversation. It has been used informally by many students, visitors and university staff to sort out their personal problems from domestic affairs to choosing a career; the option of using a version where no data file is retained allows the elicitee complete freedom of expression. It has been used in appraisal schemes in industrial concerns, for staff development and management selection. Architecture students have construed their favourite buildings using their own photographs as elements, clinical psychologists have explored relationships with and between their clients, and teachers have seen their classes in a new light. In this "grid-centred" way, the PEGASUS program extends the use and application of the repertory grid by presenting the elicitation and analysis in a convenient package form. Beyond the traditional grid it offers feedback on all the responses by making use of the real-time data processing capacities of the computer, and focusing the results immediately on completion. However, the combination of the data processing and the conversational heuristic of the PEGASUS procedure makes the computer a superb tool for the "learning-centred" approach of cognitive modelling. The nature of the heuristic determines the nature of the model of meaning elicited, the mental processes used and the modelling facility which is amplified and brought to bear. Used in this "learning-centred" way, learning and psychotherapy can be encouraged by allowing the "hidden" component in the third quadrant of the Johari Window, and the "blind" component in the second quadrant to be transferred to the openness of the first quadrant as the awareness of self and self-processes deepens and grows. The model of construing can be restructured or reinforced as the weak and less useful parts are perceived and found to be inadequate. And by using PEGASUS–BANK in a "learning-centred" way, a personal scientist can transform public knowledge into personal understanding.

> Tearing away the paper screen of graphs, equations and computations, I have tried to lay bare the inarticulate manifestations of intelligence by which we know things in a purely personal manner.
>
> (*Polanyi, 1969, p. 64*)

Chapter Six

MINUS And CORE

I. Introduction

The PEGASUS–BANK technique of storing in the computer a bank of constructs which represents an area of public knowledge or the construing of a group of specialists shows how an individual can use the grid methodology to interface between his early gropings and the articulate formulations of the group. When used in the form which encourages two participants to take on each other's construct systems by mapping out the similarities between the patterning, meanings can be exchanged between the pair. Alternatively, if each elicits a grid independently the overlap may also be compared using the patterning of the responses.

A. The MINUS Program

Whether or not the grids have been elicited on separate occasions, if the element and construct labels are the same in both grids they can be compared with respect to the similar or different uses of these names by examining the differences in the patterning in each grid. MINUS is a program which identifies the difference and similarity between the two grids by superimposing one on the other. The resulting matrix is then focused to identify those constructs and elements which are being used in the same way. A measure of overlap is produced based on the matching scores algorithm which is given as a percentage of the possible similarity in the two patterns of responses. An example is given in Fig. 6.1, with the focused version in Fig. 6.2.

This has different implications if the two grids have been elicited from the same person, as opposed to being elicited from different people, as it is very difficult to assess the commonality in the use of the verbal labels. Duck (1973) has had a measure of success using verbal labels in his work on friendship formation, showing that long-standing friendships exhibit greater similarity of construing than control pairs. He used two

```
                         * 1   2   3   4   5   6   7   8   9   10
                     **********************************************
FAMILIAR              1  *     1       1       1       1       1   DIFFERENT VIEW
                         *
GIVE UP ANY TIME      2  *     1       2   1   1       1   1   1   ADDICTIVE
                         *
LOW LASTING INFLUENCE 3  *         1   1   2           2   2       HIGH LASTING INFLUENCE
                         *
LESS ATTRACTIVE       4  * 1           2           1   1           ATTRACTIVE
                         *
EASY                  5  *     1   1           1   2   1           DIFFICULT
                         *
SERIOUS               6  *             2   1       2               ENTERTAINING
                         *
FACTS MORE IMPORTANT  7  *             1       1                   IDEAS MORE IMPORTANT
                         *
COGNITIVE IMPACT      8  * 1   2       1   1   1   2   1   1       EMOTIONAL IMPACT
                         *
                           *   *   *   *   *   *   *   *   *   *
                           *   *   *   *   *   *   *   *   *   CLUSTER ANALYSIS
                           *   *   *   *   *   *   *   *   THE FOURTH WAY
                           *   *   *   *   *   *   *   PSYCH OF LEARNING MATHEMATICS
                           *   *   *   *   *   *   ZEN & THE ART OF M'CYCLE MAINT'CE
                           *   *   *   *   *   JUDE THE OBSCURE
                           *   *   *   *   GESTALT THERAPY VERBATIM
                           *   *   *   SOCIAL CONTRACT(ARDREY)
                           *   *   THEORIES OF LEARNING
                           *   COMPUTER LIB
                           DICE MAN
```

Fig. 6.1. The MINUS grid on books.

criteria: "literal similarity" if the two people used precisely the same words; and "conceptual similarity" if different words were used by the two people to express the same idea. For example, the two grids in Figs 6.3 and 6.4 were elicited from a married couple who chose as their elements mutual friends and acquaintances. Although the elements

```
                         * 7   3   1   10  2   6   8   9   5   4
                     **********************************************
EASY                  5  * 2   1           1   1   1               DIFFICULT
                         *
COGNITIVE IMPACT      8  * 2       1       2   1   1   1   1   1   EMOTIONAL IMPACT
                         *
GIVE UP ANY TIME      2  *             1   1   1   1   1   1   2   ADDICTIVE
                         *
FAMILIAR              1  *             1   1   1   1           1   DIFFERENT VIEW
                         *
FACTS MORE IMPORTANT  7  *                     1               1   IDEAS MORE IMPORTANT
                         *
LESS ATTRACTIVE       4  * 1       1               1           2   ATTRACTIVE
                         *
SERIOUS               6  * 2                               1   2   ENTERTAINING
                         *
LOW LASTING INFLUENCE 3  *     1                   2   2   2   1   HIGH LASTING INFLUENCE
                         *
                           *   *   *   *   *   *   *   *   *   *
                           *   *   *   *   *   *   *   *   *   SOCIAL CONTRACT(ARDREY)
                           *   *   *   *   *   *   *   *   GESTALT THERAPY VERBATIM
                           *   *   *   *   *   *   *   THE FOURTH WAY
                           *   *   *   *   *   *   PSYCH OF LEARNING MATHEMATICS
                           *   *   *   *   *   JUDE THE OBSCURE
                           *   *   *   *   COMPUTER LIB
                           *   *   *   CLUSTER ANALYSIS
                           *   *   DICE MAN
                           *   THEORIES OF LEARNING
                           ZEN & THE ART OF M'CYCLE MAINT'CE
```

Fig. 6.2. The MINUS grid on books in focused form.

were the same, there is a vast difference in both the content and the type of description used for the constructs. The words underlined by Jane represent the pole description she gave, and are later used as an abbreviation. If construct 6 is extracted from grid 1 and construct 8 from grid 2, it can be seen that the actual assessments differ only on one element.

C6G1	ambitious	-	less ambitious	X X X 0 0 0 0 X X X 0 X
C8G2	both need company, gregarious, prepared to compromise, factual approach. Enjoy discussion.	|	Musical. Scientific but also keen on the "unreal" world, fantastical.	X X X X 0 0 0 X X X 0 X

It is doubtful whether these constructs would have been classed as either literally similar or conceptually similar, although one may be able to empathise with the similarity on reflection.

An important property of a construct is its treatment of the elements of construction. If two constructs have been used in relation to the same element set, then the way they act on the elements may be compared. If the same person elicits two grids with the same element and construct names on separate occasions, which are then processed on MINUS, it is possible to see the elements and constructs which have remained the same in meaning, and those which have changed in some respect. For example, in the previous grids on books (Fig. 6.2) construct 7 is being used almost identically on both occasions, as there are only two differences on elements 4 and 6. Similarly, elements 1, 3 and 10 only differ slightly on the two occasions. This may be distinguishing core and peripheral constructs in the construing of this situation.

> Core constructs are those which govern a person's maintenance processes [whereas] peripheral constructs are those which can be altered without serious modification of core structure.
>
> (*Kelly, 1955, pp. 482–3*)

One may therefore assume that those constructs less liable to fluctuation over short periods of time in which no excessive physical or emotional upheaval has taken place are likely to be core constructs. If the same constructs persist over a series of grids this becomes even more likely.

B. The CORE Program

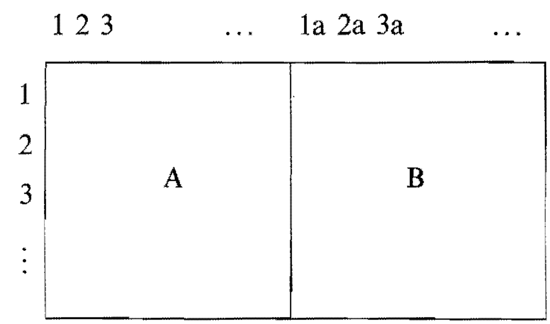
A more flexible approach to identifying core constructs is developed in the CORE program. In order to measure change in the two dimensions of elements and constructs, each is held constant alternately whilst change in the other is calculated. The two grids have the same element and construct names, therefore one assumes, say, the constructs are the same and examines the clustering of the elements when the two grids are analysed as one using part of the FOCUS algorithm.

			ELEMENTS											
	X	O	1	2	3	4	5	6	7	8	9	10	11	12
C1	Less humorous	More humorous	X	X	O	O	X	O	O	X	X	O	O	X
C2	Lacking in a sense of wonder	Having sense of wonder	X	X	X	X	O	O	X	O	O	O	O	O
C3	Weak personal integrity	Strong personal integrity	O	X	O	O	X	O	O	O	X	X	O	O
C4	Explicit personality	Implicit personality	X	O	X	O	X	O	O	X	X	O	O	X
C5	Individuality	Less individuality	O	O	O	X	O	X	X	X	O	X	X	X
C6	Ambitious	Less ambitious	X	X	X	O	O	O	O	X	X	X	O	X
C7	Sense of humility	Less sense of humility	X	O	O	O	X	X	O	X	O	O	X	X
C8	Frank	Less frank	X	O	X	X	O	X	X	X	O	X	O	X

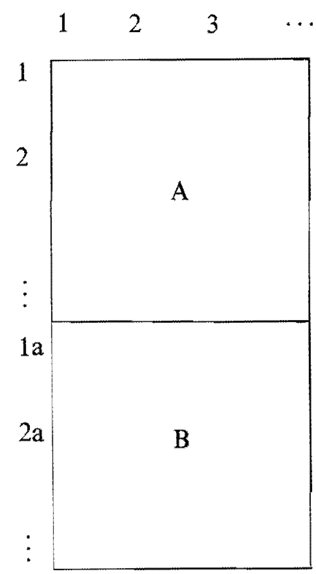
Fig. 6.3. Dave's grid on mutual acquaintances using a two-point scale.

	X	0	1	2	3	4	5	6	7	8	9	10	11	12
			ELEMENTS											
C1	Intensity.They both are interested in other people. Concerned with world problems.Ambitious. Slightly detached.	Humorous.Creative. Unconventional approach to work & relationships. Exciteable.	X	X	0	0	X	0	0	X	0	X	0	0
C2	Individualistic. Musical.Calm(exteriorally).Unconventional. Non-aggressive.Loyal. Interested in myth & fantasy.Homely.Land-loving.Tending toward introversion. Unusual humour.	Self aware.Controlled.Sporting. Experienced in relationships. Attracted to sophistication & the exotic.Extroverted. Light hearted.	0	0	0	0	X	X	0	0	0	0	X	0
C3	Generous.Interested in history.Slow living.Perfectionist in work.Unusual relationships.	Direct.Political. Super active. Strong integrity. Committed.	0	0	0	0	X	X	X	0	X	0	X	0
C4	Ambitious.Questioning. Quick minds.Confident. Interested in "societies ills."	Artistic.Capable. Gentle.Romantic. Exploratory.	X	X	X	X	0	0	0	X	0	X	0	X
C5	Outdoor enthusiasts. Anxious to succeed. Anxious about success with other sex.Active. Enigmatic.Need mental stimulation.	Creative.Enjoys comfort. Relaxed.	X	X	X	X	0	0	0	X	0	0	0	X
C6	Enjoy intellectual discussion.Difficult to understand initially.City livers. Seek challenges.Insecure backgrounds.	Affectionate.Humble. Sensitive.Musical. Involved with those immediately around. Compassionate. Philosophical.	0	X	X	X	0	0	X	X	X	X	0	X
C7	Energetic.Sociable. Politically concerned interests.Dynamic. Restless.Factual approach as opposed to interest in fantasy world.	Thorough.Care for detail.Extremely creative.Not concerned with social success. Gentle.Perceptive.	X	X	X	X	0	0	0	X	X	0	0	X
C8	Both need company. Gregarious.Prepared to compromise.Factual approach .Enjoy discussion.	Musical.Scientific but also keen on the "unreal" world.Fantastical.	X	X	X	X	0	0	0	X	X	X	0	X

Fig. 6.4. Jane's grid on mutual acquaintances using a two-point scale.



If in fact element 1 and element 1a (that is element 1 in the second grid) are being construed in the same way they will be highly matched in the double grid. If then the two grids are processed by keeping the elements constant and allowing the constructs to vary, similarly, the constructs operating on the elements in the same way on both occasions will cluster together.



By alternating in this way no assumption is made about the stability of any element or construct. The following algorithm assumes that the two raw grids have equivalent element and construct labels.

II. Algorithm and Flowchart

The flowchart for the CORE algorithm is shown in Fig. 6.5.

1. The two raw grids are input.
2. Assuming constructs remain constant equivalent elements are matched.
3. The level of match of the most changed element is printed and the option offered to delete it from each grid.

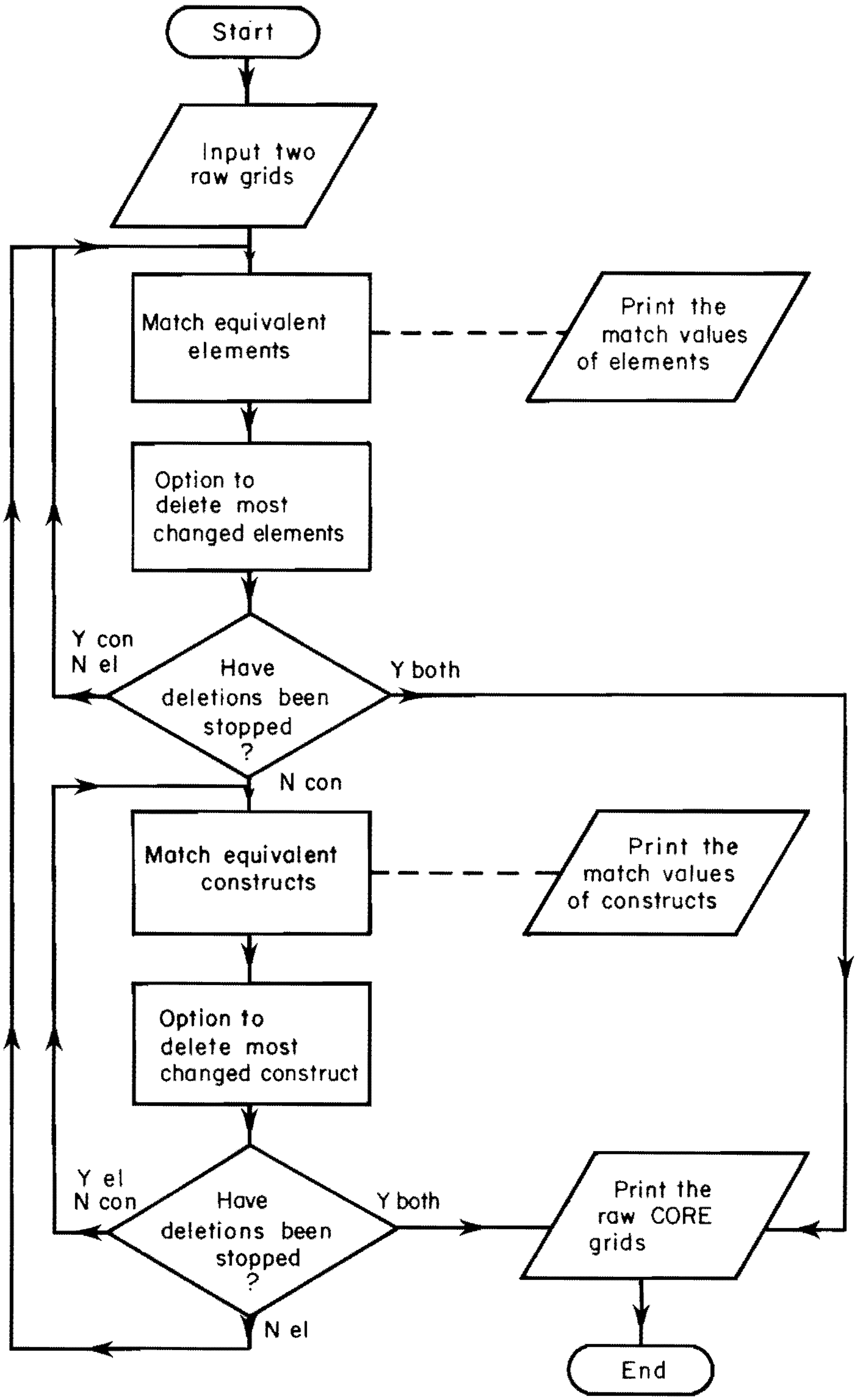


Fig. 6.5. Flowchart for the CORE algorithm.

D

4. The reduced grids are stored.
5. Assuming elements remain constant equivalent constructs are matched.
6. The level of match of the most changed construct is printed and the option offered to delete it from each grid.
7. The reduced grids are stored.
8. Unless option has been chosen to stop, the algorithm is repeated from 2.
9. The two reduced grids are printed out.

This method has been found to be very effective in locating the core constructs which remain the same over time. As the program is interactive, and offers the user the final decision as to what level of match is significant at each iteration, a more personally meaningful "core" is obtained.

If the user is more interested in constructs and does not wish to delete elements, or vice versa, the program allows just constructs to be deleted until the decision is made to stop. Flexibility is thereby given to the person who best understands the content of the grid to use his subjective judgement, rather than taking a statistically significant but nevertheless arbitrary cut-off point. If the user continues until all match values are 100 %, then the two partial grids which remain will be identical and as such may be designated "the core grid".

Figure 6.6 shows the two raw grids previously processed on MINUS reduced by CORE to the common section of identically used constructs and elements. As can be seen, there is some overlap with the elements and constructs shown as least changed by the MINUS procedure, but this "core" grid has been found by extracting those elements and constructs most contributing to the difference on the two occasions, and consequently may be expected to differ from the results of the MINUS grid. The run of CORE which produced this result is shown in Appendix G. When this core grid is focused (Fig. 6.7), it can be seen that the elements and constructs are highly differentiated, indicating that several dimensions of thinking have remained unchanged over the time interval of the two grids.

III. Applications

In practice the situation is not quite so easy as described above. If someone is invited to complete a new grid on a second occasion which contains the same element and construct labels, he will probably have great difficulty doing so. He will undoubtedly find at least one construct or element which is no longer meaningful to him. Confronted with this situation he may try to reinvent the construct, or just say that it can no longer be used. Similarly, new elements and constructs will have occurred to him, which if he is not allowed to use will distort any meaning which might be in the exercise. Pope (1977) found that some students before teaching practice had a very different idea of what was important in teaching from that during and after the practical experience. This has led to the concept of the three-level grid in terms of the "coreness" or "peripherality" of the contents. If the two raw grids contain in the main the same element and construct names, but some occur in the first but not the second, and some in the second but not the first, they could be arranged in the way represented by the following diagram:

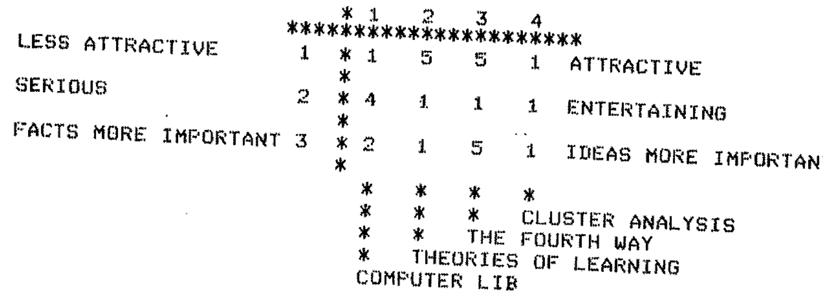


Fig. 6.6. The CORE grid on books.

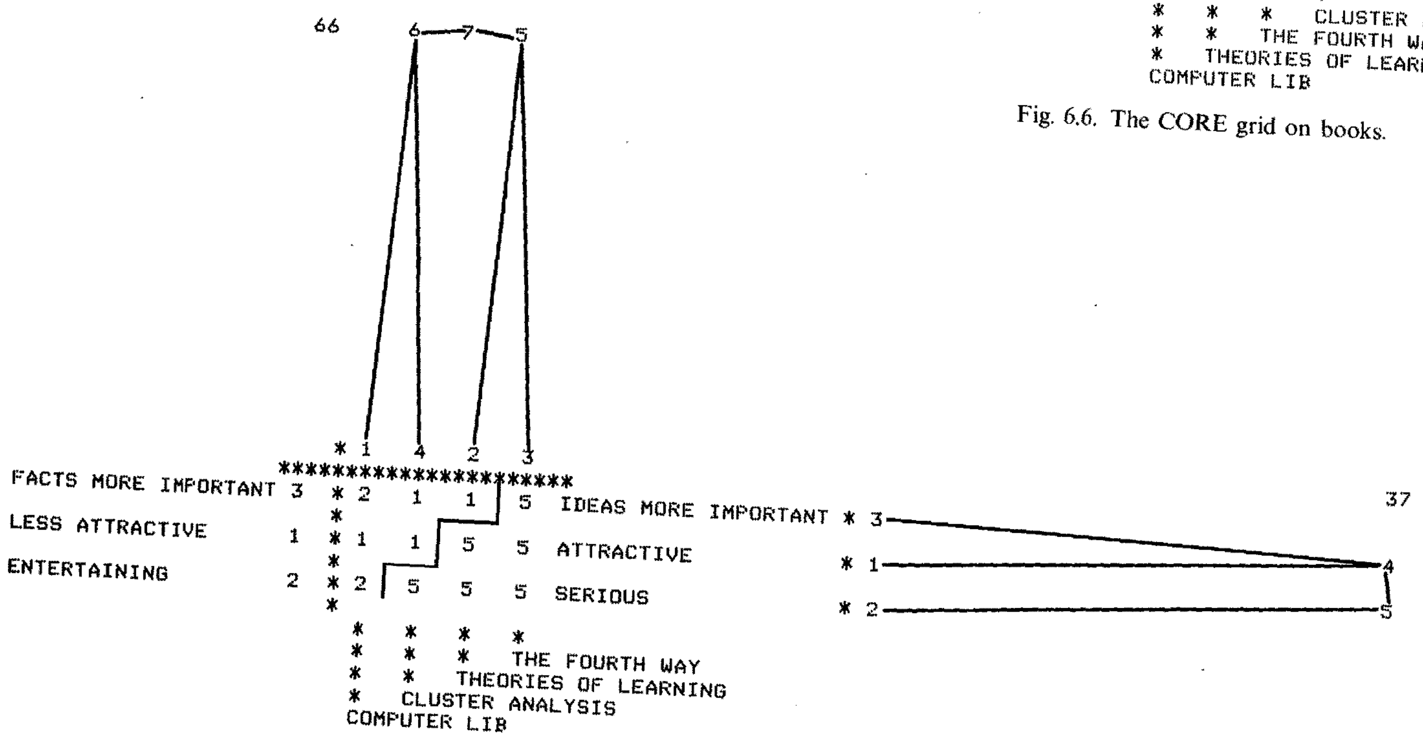
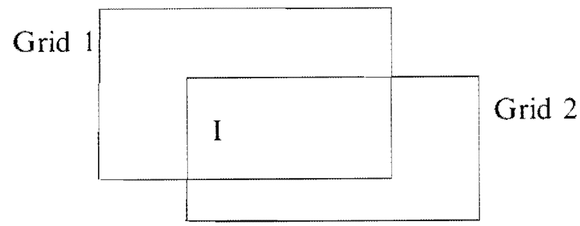
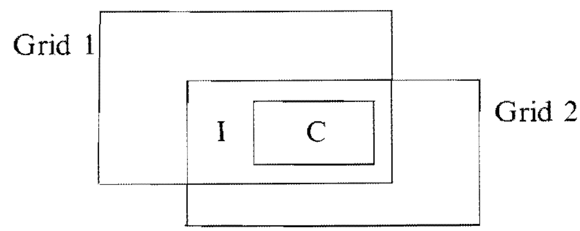


Fig. 6.7. The CORE grid on books in focused form.



where the intersection of the part with names in common is marked with "I". This shows two of the levels of change, the outer parts being made up of the least stable aspects of the situation. The third level is found by running the intersection "I" through the CORE procedure to identify a slightly different meaning between the two grid elicitations.



The core section is marked "C". By comparing the size and content of these three levels one may begin to articulate the nature of the change which has taken place.

IV. Developments

When this procedure is applied to two grids elicited by two individuals, care must be taken over the assumptions made about the degree of commonality. If the two individuals are each presented with a grid form already containing the element and construct names, they will interpret them each within his own meaning system. Conversations may occasionally be overheard, or participated in, where each participant interpreting the meaning of the dialogue in his own personal system is dismayed to find that the other is making quite different interpretations. Although the same words are used, careful negotiation is required to discover the extent of the commonality. In a study of magistrates' decision-making, constructs were elicited from each in relation to the same ten court sentences, such as £5 fine, three-months imprisonment, and each construct compared with every other construct using the matching score algorithm (McKnight, 1977a). Two cases were found in which the elements were treated identically by two magistrates, one of which concerned the two constructs "help–not help" and "short, sharp shock–not short, sharp shock". Although these two constructs treated the elements identically, the magistrate who had used "help–not help" also had a construct "short, sharp shock–not short, sharp shock", and the magistrate who had used "short, sharp shock–not short, sharp shock" also had a construct "help–not help". Hence it would seem that people use radically different words to convey the same idea, and may use the same words to intend different meanings.

With this caution in mind, grids can be used to investigate the extent of the agreement and/or understanding between two people. Pask, Scott and Kallikourdis (1973) use the word "understanding" in such a way as to contain agreement, being not only agreement but also how or why the agreement was reached. I wish to differ, and use the word "understanding" to mean recognition of the relative stand-points not necessarily implying agreement or commonality of the two positions. One might say "understanding could be an agreement to differ". Most of the models we hold are self-validating, as Castaneda (1971) describes "maintaining our internal world". If *A* holds a model of *B* he acts towards *B* on the basis of that model. During a period of interaction, his perception of *B* is selected from *B*'s behaviour on the basis of his model, which serves to validate the model. This quickly becomes self-perpetuating in a truly Laingian situation (e.g. Laing, 1970). Personality becomes a set of self-validating models and behaviours which stabilises beyond the control of the individual.

When art students were negotiating non-verbal grids on sculptures by one student arranging them along a construct, followed by a second student attempting to place his own set of sculptures along the same construct without any explanation but only signals from the first student as to agreement or disagreement, much surprise and insight was gained by realising how others were construing in the same universe of discourse (Pope, 1972.)

A. Exchange Grids

Agreement and understanding can each be negotiated in similar ways using the CORE procedure. To do this two people each elicit a grid in an area of common knowledge or experience. Each may choose his own elements independently of the other, and elicit and rate his constructs quite separately. Each then makes two copies of his grid leaving out the rating values. Both of these copies are filled in by the other person, one as he himself uses those constructs on those elements and the other as he thinks the original was completed. There are now six grids:

1. *A*'s grid.
2. *B*'s grid.
3. *A*'s grid filled in by *B* as *B* wants it filled in.
4. *B*'s grid filled in by *A* as *A* wants it filled in.
5. *A*'s grid filled in by *B* as *B* thinks *A* filled it in.
6. *B*'s grid filled in by *A* as *A* thinks *B* filled it in.

These have been called "exchange grids" (Mendoza, 1970). If these are then processed in pairs on CORE: 1 and 3, 2 and 4 represent agreement; 1 and 5, 2 and 6 represent understanding. The extent of the agreement and of the understanding will be indicated by the relative size of the core grid obtained, and the areas of disagreement and of misunderstanding will be mapped out by those constructs and elements which are discarded at different levels of match during the process. This then opens up an area for conversation, and negotiation can take place securely grounded in the grid structure.

The married couple whose grids are shown in Figs 6.3 and 6.4 also took part in the "exchange" procedure. Each was asked to try to fill in the other's grid as it had originally been filled in. The first grid shows the focused version of the core of Jane and Dave using Jane's constructs. There are seven core elements and three core constructs (matched at 100 % incidentally) showing a high degree of commonality as shown in Fig. 6.8. Both grids use a two-point scale. The other grid shows the focused version of the core of Dave and Jane using Dave's constructs. In this case there are only six core elements and two core constructs, indicating less commonality than the previous core grid. This is shown in Fig. 6.9. One may then be inclined to say that Dave is more able to assume Jane's construct system than Jane is able to assume Dave's; or that Dave is more able to "understand" Jane's way of seeing their friends than Jane is able to "understand" Dave's way.

```
              * 6   2   1   3   5   4   7
          **********************************
DYNAMIC     2 * 1   1   1   1   2   2   2  CARE FOR DETAIL
              *
AMBITIOUS   1 * 1   1   1   1   2   2   2  ARTISTIC
              *
GREGARIOUS  3 * 1   1   1   1   2   2   2  FANTASTICAL
              *
                *   *   *   *   *   *   *
                *   *   *   *   *   *   K
                *   *   *   *   *   F
                *   *   *   *   G
                *   *   *   D
                *   *   B
                *   C
                H
```

Fig. 6.8. The core of Jane's grid and Dave's grid using Jane's constructs.

```
              * 6   3   4   2   1   5
          ******************************
AMBITIOUS 1   * 1   1   1   2   2   2  LESS AMBITIOUS
              *
FRANK     2   * 1   1   1   1   2   2  LESS FRANK
              *
                *   *   *   *   *   *
                *   *   *   *   *   K
                *   *   *   *   E
                *   *   *   G
                *   *   J
                *   H
                L
```

Fig. 6.9. The core of Dave's grid and Jane's grid using Dave's constructs.

This program therefore seems to have a wide range of application in all situations where change is expected. In psychotherapy, it is possible to track the rate of importance and centrality of specific constructs and elements such as "self-esteem", or in self-therapy and learning-to-learn or deutero-learning in Bateson's terms (e.g. Bateson, 1972) the movement of elements such as "tutorials" or "using the library". In course assessment or effectiveness of training this technique offers a vast improvement on the usual before/after measures couched in the terms of the course organiser, or the conventional "happy sheet". The events in the course which were significant to each participant might constitute the elements including such unplanned activities as "talking to Fred over lunch". In this way the organiser can begin to enter the world of the participant, and see what changes actually happened to him rather than those that "should" have happened to him—a rare occurrence at present.

Chapter Seven

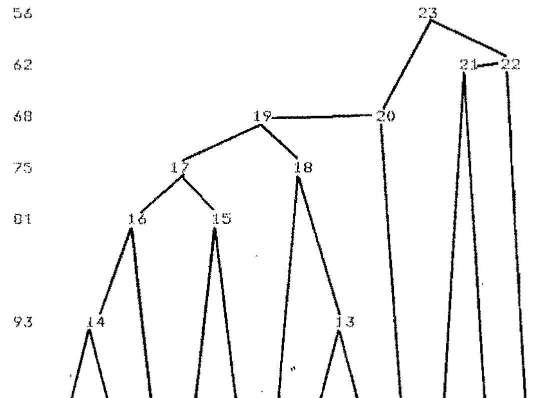
SOCIOGRIDS

I. Introduction

Although CORE offers new potential for investigating understanding between two people, it is not always appropriate to use the same element and construct names. Kelly's position was that both elements and constructs should be elicited from the individual, but when neither elements nor constructs are common, measures of overlap are difficult to derive.

Elements are more easily shared than constructs, since they are representatives of the universe of discourse. If they are physical entities or shared experience both participants are likely to be able to construe them without difficulty. Personal constructs are then elicited individually, resulting in two grids with the same elements but each with different constructs. If these two grids are then focused as one, the first n constructs being from the first grid, and constructs $n \times 1, \ldots, N$ from the second, with common elements, by inspection an intuitive idea of the extent of sharing can be gleaned. When two grids from the married couple (Figs 6.3 and 6.4) construing mutual friends and acquaintances were focused together, the extent to which each person's constructs cluster together as opposed to those clustering with the other person can be roughly assessed. The combined grid is shown in Fig. 7.1. The highest match between a construct from each grid is 6 with 16 where there is only one element rated differently. However, all Jane's constructs are highly clustered with each other, and apart from that one match do not coincide in patterning with those of Dave. Clearly there is little commonality of construing in this case.

The problem was then to find a stable but sensitive measure of the degree of shared meaning. Several crude measures were initially used: the number of times two adjacent constructs were from different grids; the ratio of the number of clusters containing constructs from both grids to the total number of clusters formed, at an arbitrary cut-off point of 70 %; the sum over all pairs of adjacent constructs from different grids of the levels of match at which they were brought together. The early development of this package is described by Thomas, McKnight and Shaw (1976).



		12	8	1	3	4	7	6	11	5	9	2	10	
INTENSITY	9	2	1	1	2	2	2	2	2	1	2	1	1	HUMOROUS
WEAK PERSONAL INTEGRITY	3	2	2	2	2	2	2	2	2	1	1	1	1	STRONG PERSONAL INTEGRITY
LESS FRANK	8	2	2	2	2	2	2	2	1	1	1	1	2	FRANK
LESS INDIVIDUALITY	5	2	2	1	1	2	2	2	2	1	1	1	2	INDIVIDUALITY
EXPLICIT PERSONALITY	4	1	1	1	1	2	2	2	2	1	1	2	2	IMPLICIT PERSONALITY
LESS HUMOUROUS	1	1	1	1	2	2	2	2	2	1	1	1	2	MORE HUMOUROUS
AMBITIOUS	6	1	1	1	1	2	2	2	2	2	1	1	1	LESS AMBITIOUS
GREGARIOUS	16	1	1	1	1	1	2	2	2	2	1	1	1	FANTASTICAL
DYNAMIC	15	1	1	1	1	1	2	2	2	2	1	1	2	CARE FOR DETAIL
ENIGMATIC	13	1	1	1	1	1	2	2	2	2	2	1	2	ENJOYS COMFORT
AMBITIOUS	12	1	1	1	1	1	2	2	2	2	2	1	1	ARTISTIC
DIRECT	11	1	1	1	1	1	2	2	2	2	2	1	1	GENEROUS
SELF AWARE	10	1	1	1	1	1	1	2	2	2	1	1	1	INDIVIDUALISTIC
SEEK CHALLENGES	14	1	1	2	1	1	1	2	2	2	1	1	1	COMPASSIONATE
LESS SENSE OF HUMILITY	7	2	2	2	1	1	1	2	2	2	1	1	1	SENSE OF HUMILITY
LACKING IN A SENSE OF WONDER	2	2	2	1	1	1	1	2	2	2	2	1	2	HAVING A SENSE OF WONDER
		L	H	A	C	D	G	F	K	E	I	B	J	

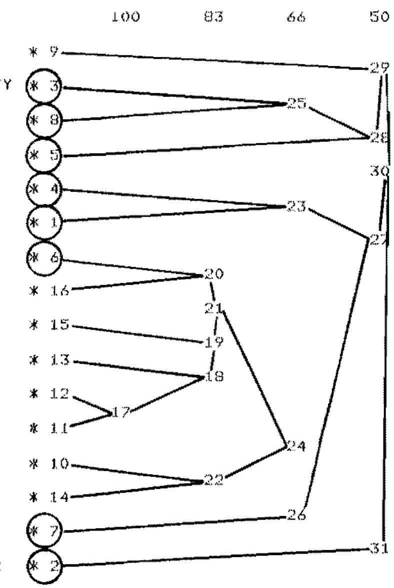
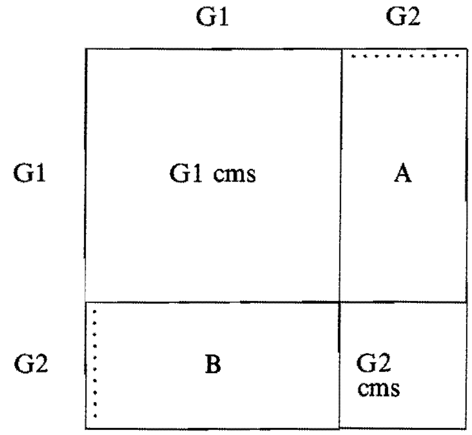


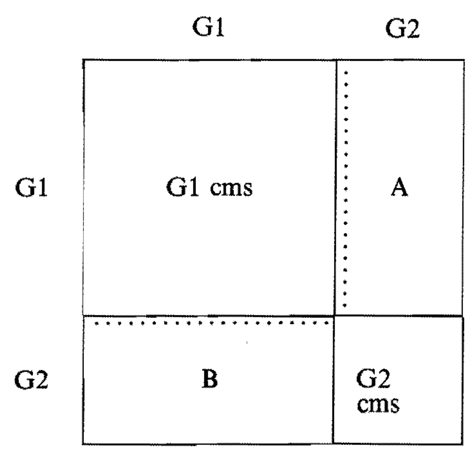
Fig. 7.1. The combined grids of Dave and Jane.

However, each of these methods was finally rejected in favour of the one currently used. This involves the computation of the construct matching scores matrix for the combined grid, and from that the selection of the highest match of each construct into the other grid.



The two square areas show the matching scores within grid 1 and grid 2 respectively. The areas marked "A" and "B" show the matching of grid 1 into grid 2, the marked lines denoting the values for construct 1, grid 1 into grid 2 from which the maximum is selected. This, then, has the effect of selecting from grid 2 that pattern of responses in any construct which matches most highly with the first construct of grid 1, and thereby provides a means of measuring the extent of the similarity between the two grids by repeating the algorithm over all the constructs.

Kelly's commonality corollary states that: "to the extent that one person employs a construction of experience which is similar to that employed by another, his processes are psychologically similar to those of the other person". This does not imply that this similarity is necessarily the totality of his psychological processing. Imagine an extreme case. In construing a certain topic, person *A* habitually uses four constructs while person *B* habitually uses two. The constructs used by *B* are identical to two of *A*'s constructs. Now, when in conversation about this topic, *A* may be able to empathise totally with *B*, as *B* is using exactly the same construing as *A*, but *B* may not be able to empathise with *A* when *A* is using those constructs not common to *B*. The measure of commonality used now is



sensitive to this situation, as the match values of the grid constructs from grid 2 into grid 1 are obtained from a different part of the matrix. Consequently the mapping of grid 1 onto grid 2 produces a different degree of similarity from that of grid 2 onto grid 1. This is the basis of the PAIRS program.

II. Algorithm and Flowchart

The flowchart for the PAIRS algorithm is shown in Fig. 7.2.

1. The two raw grids are input.
2. The two grids are combined into one and for each construct in grid 1, the maximum match with any construct in grid 2 is noted.
3. The measure of similarity of grid 1 onto grid 2 is calculated and printed.

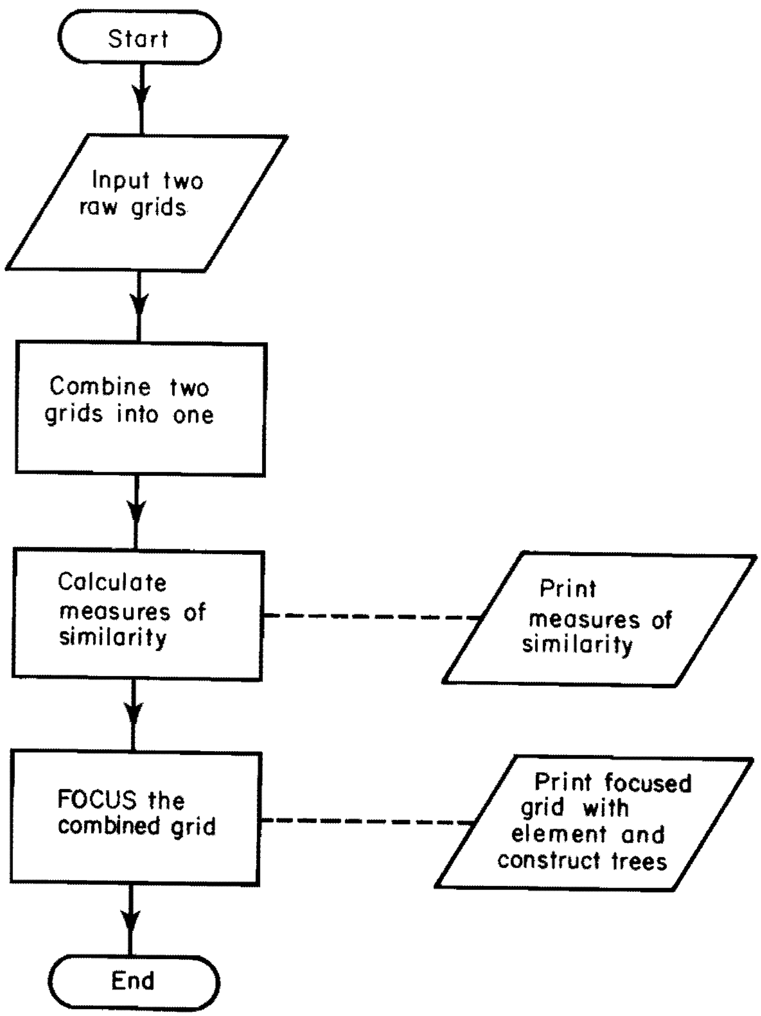


Fig. 7.2. Flowchart for the PAIRS algorithm.

4. The measure of similarity of grid 2 onto grid 1 is calculated and printed.
5. The mean similarity between grids 1 and 2 is calculated and printed.
6. The combined grid is focused, and printed together with the construct and element trees.

This technique can then be used to investigate commonality of construing within a small group. The PAIRS program is therefore incorporated into the SOCIOGRIDS algorithm. The universe of discourse is represented by a set of elements meaningful to all participants, together with a common purpose. Individual grids are elicited, and every pair of grids is focused using the PAIRS algorithm. The resulting data is used to extract subgroups exhibiting similarity of construing, and the content of the construing shared by all the members of the group.

Each individual set of personal constructs represents that person's thoughts and feelings about the universe of discourse. As these are expressions of the person's construct system played out in this domain, ideas are tapped which the individual is bringing to bear on the subject, perhaps without his own knowledge. If some of these ideas are shared by other members of the group, it may benefit all the participants to have them made explicit.

A. The Mode Grid

The "mode" constructs of the group can be extracted from the maximum values obtained in the PAIRS algorithm. These are the constructs most often used by all members of the group, found by listing in descending order of average match values all the constructs from every grid. To find these values, each construct in turn is considered, the total of the maximum match values of this construct with every other construct, scaled over the number of constructs with which it is matched, being computed. A cut-off point on this list may then be taken at a place appropriate to the purpose of the exercise, identifying those constructs which are highly matched with some construct from each of the other grids.

These constructs chosen from the list then make up the "mode grid". Each construct in the mode grid has been obtained from one individual in the group and is in no way changed when used in the mode. This grid then is not a consensus grid which averages out the individualities to produce a pale imitation of the group, but is strongly weighted towards the commonality or intersection of construing within the group. Due to this format, the constructs tend to be highly clustered in the mode grid, and generally these clusters display a high degree of both literal and conceptual similarity in the construct labels as denoted by Duck (1973). One example of this is given by Thomas, McKnight and Shaw (1976) where a group of art students construed examples of graphic art. In the mode grid in Fig. 7.3 three major clusters appeared at the 75 % level, exhibiting some literal and conceptual similarity even to the non-expert.

In a field where more technical language is used it would be impossible for the non-expert to rely on his own judgement of what constituted literal and conceptual similarity. This seems a powerful technique for identifying such similarity by a more reliable process than has been used in the past. The mode grid can then be used as a common referent for the group with which each individual grid may be compared. This is done using the

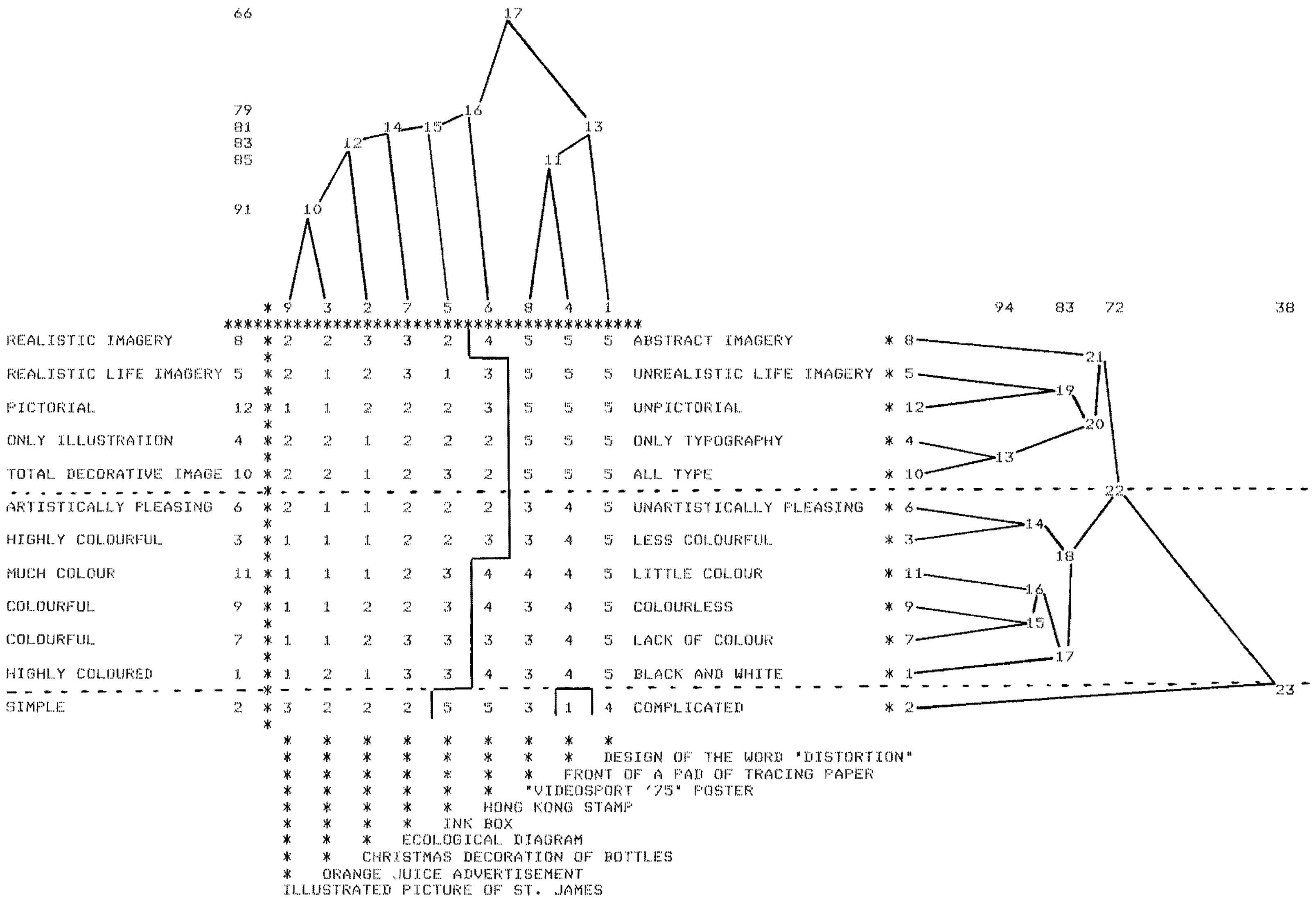


Fig. 7.3. The mode grid from the graphic art group using a five-point scale.

PAIRS algorithm, focusing each pair of mode and individual grids for each person in the group. Then the extent of shared construing of the individual with the mode can be seen from the clusters which are formed and the similarity values which are computed.

B. Socionets

A sequence of sociometric diagrams designated "socionets" is produced from the matrix of similarity measures between pairs of individual grids. The highest related pair is picked out initially as a subgroup where commonality of construing occurs, followed by the subgroups defined by the rank ordering of all the similarity measures. A good example of this is seen in Fig. 7.4 where a group of naval personnel were negotiating common experiences. On each net a new link is shown, sometimes introducing a new member of the group as in link 5, sometimes introducing a new group as in 2 and 3, sometimes linking two existing groups as in 4 and 6, and sometimes binding existing groups more strongly as in 9 and 10. The subgroups exhibiting commonality of construing are thereby seen. As the pattern of nets develops the links are drawn one by one until finally every possible link is made. During the development "stars" and "isolates" may become apparent (Moreno, 1953), although in this context these terms have been found inappropriate to the meaning given by the group. It sometimes happens that the "isolate" turns out to be the creative thinker, and the "star" the muddled compromiser in the group.

C. SOCIOGRIDS Algorithm

The flowchart for the SOCIOGRIDS package is shown in Fig. 7.5.

1. The raw grids are input.
2. The similarity measures for all pairs are computed and printed.
3. If required the focused combined grid for each pair is printed.
4. The socionets are computed and printed.
5. The table of average match values for all constructs and the list of highest matched constructs are printed.
6. The mode constructs are selected and the full focus analysis of the mode grid is computed and printed.
7. The PAIRS algorithm is applied to each grid with the mode, and similarity measures are printed.

III. Applications

The example previously given of the use of this program was with a group of art students, their art tutor and their general studies tutor. Each person in the group contributed examples of graphic art to a pool from which nine elements where chosen by the group, and each person labelled in his own terms. A grid was elicited from each individual, and the SOCIOGRIDS program used to analyse the results. Figure 7.6 shows the socionets and Fig. 7.3 the mode grid for the group. It can be seen from the socionets that person 6

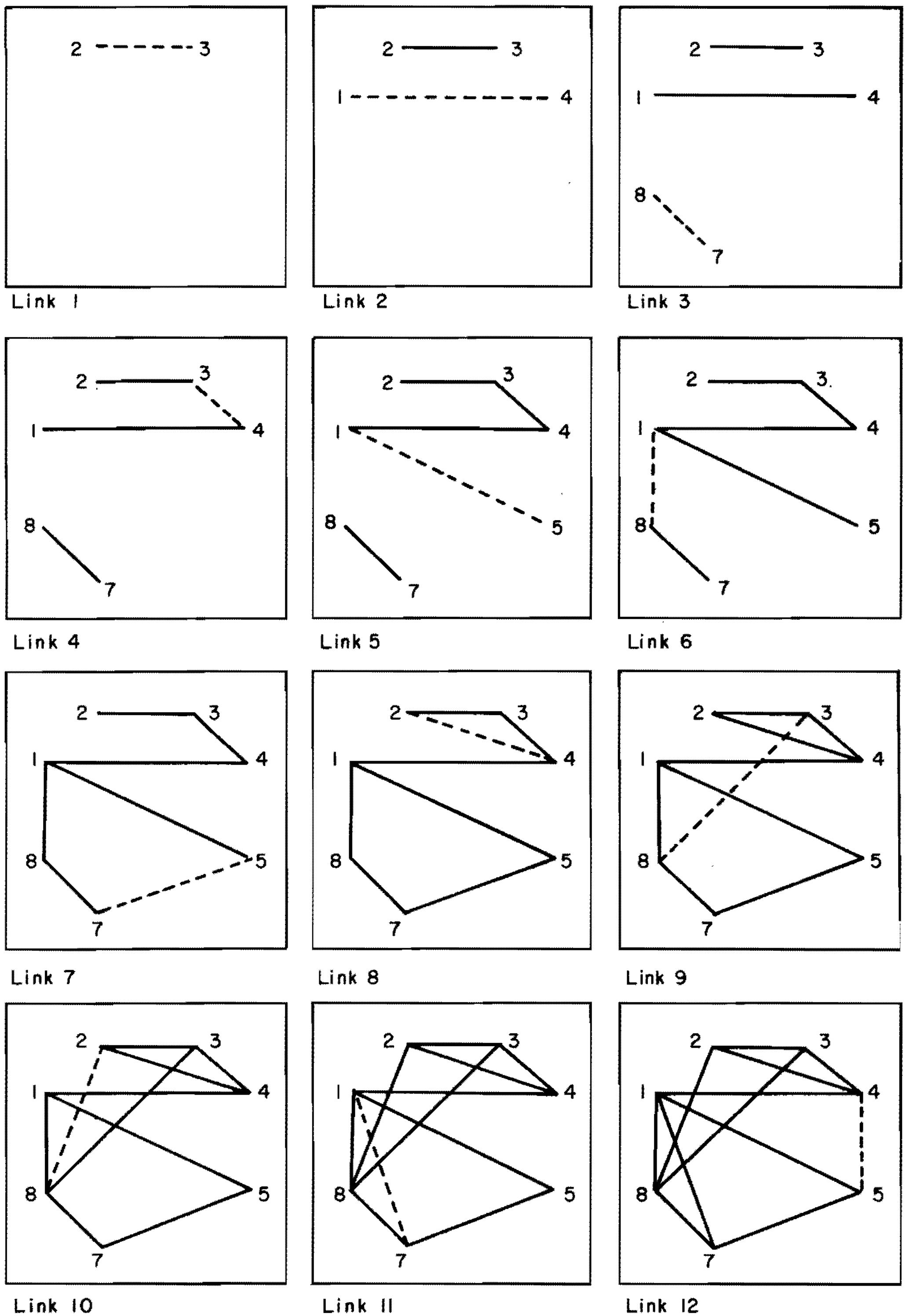


Fig. 7.4. Socionets from a group of naval personnel.

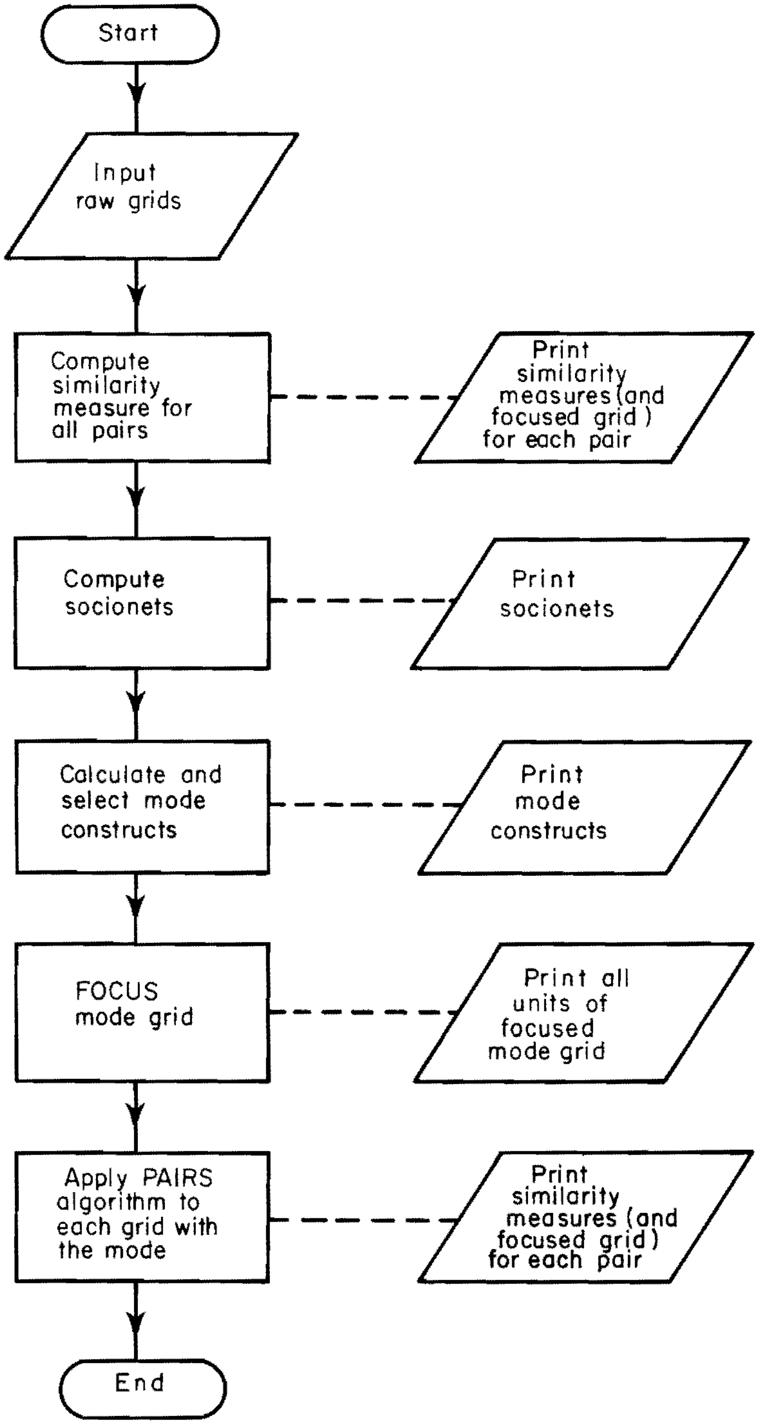


Fig. 7.5. Flowchart for the SOCIOGRIDS package.

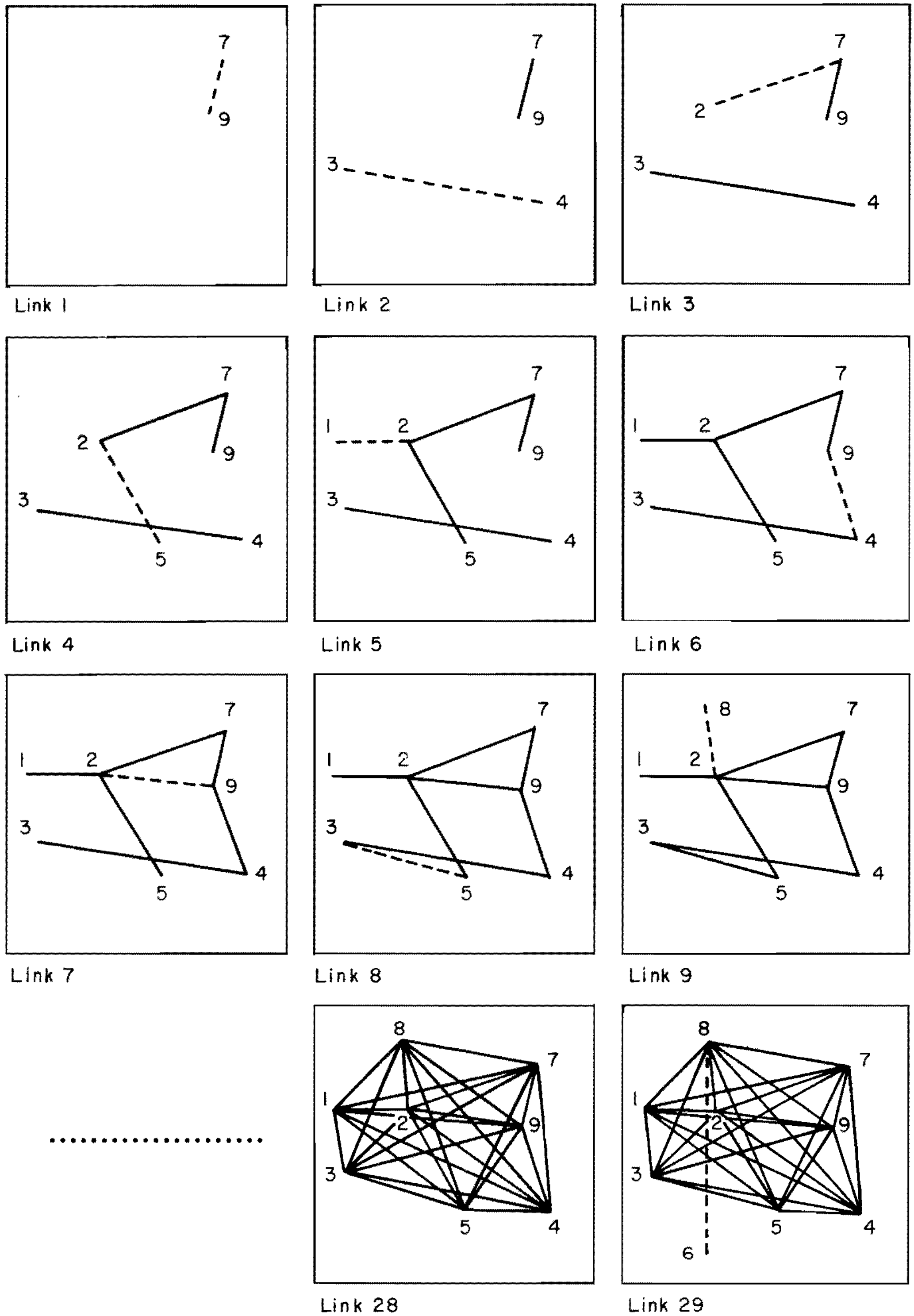


Fig. 7.6. Socionets from the graphic art group.

does not join the group until all other links are made, that is at link 29. Further, none of the mode constructs were contributed by person 6. These results were not given to the group concerned, which in the meantime had finished the course and left the college. However, it was discovered that part-way through the course person 6 had left as he had only been there gaining experience to enable him to study in a different area. He was thus less committed to graphics than the other members of the group. A more detailed account is given in Thomas, McKnight and Shaw (1976).

The SOCIOGRIDS technique is beoming a useful tool for exploring group communication and understanding in many areas. If used in conjunction with PEGASUS, the best form has been found to be MIN–PEGASUS which identifies the situation as it is rather than the version which encourages ongoing changes in the construing. If the version is used which encourages change through feedback, the tendency on forming the similarity measures between pairs of grids is to over-weight the influence of the more adaptable and flexible of the pair, and to edit out the high levels of construct match values which might otherwise occur.

IV. Developments

One variation in the SOCIOGRIDS algorithm is to use a new type of matching score in the processing of the pairs and hence in the formation of the similarity measures. This score ignores differences of one unit between ratings, on the basis that an accumulation of differences may have over-influenced the matching score when it was in fact only signifying a slight difference of degree in agreement. For example, on a five-point scale, if person *A* has used a rating of four and person *B* a rating of five, they are by intent in agreement; and similarly if *A* has used a rating of two to *B*'s three, very little significance can be attributed to the difference. This has not yet been fully explored.

A. The Delphi Technique

A powerful addition to the SOCIOGRIDS procedure is the Delphi technique. This technique is usually used to predict future events by giving a questionnaire to a group of people, feeding back to them the average responses of the group and repeating the process until the variance of responses is reduced. In the current context the mode grid is used as a basis for the group average, being chosen with substantially less constructs than the usual repertoire of the group members. Each participant in the group is given the mode constructs and asked to adjust the rating values for all those constructs he feels able to use. Any others he may delete. In addition to the mode constructs he may include any other constructs where he feels an important dimension of thinking is missing from the mode. The SOCIOGRIDS procedure is then repeated on the new set of grids. By iterating in this manner any individual in the group can highlight his position, either conforming to the group view or insisting on his individual but unrepresented opinion. If this is done openly and with respect and support from the group to all its members, the pressures which could form can be averted (Asch, 1955). Depending on the purpose of the exercise, the extent to which the group wishes to reach a consensus will vary. If, for example, the participants are all performing separate acts of subjective judgement in different situations where it is hoped to achieve the same results, they may wish to come to a complete agreement, and conformity is to be encouraged—for example in industrial inspection or marking examination scripts. If, however, the group is acting together in a brainstorming situation, the most creative variety which can be uncovered and recognised may be the goal. If a group is acting as a selection board, it is useful to each member to know in which subgroups certain attributes are to be found. In this way maximum use can be made of individual abilities.

Glanville (1977) has used an alternative method for exploring group commonality. With a group of architecture students, after each had completed a PEGASUS grid on the architecture of public houses using photographs as the elements, the student would place the elements of other members of the group on his construct scale for each construct in turn. In this way a conversation could be initiated between the students on the personal meanings of the constructs. An example of such a grid is given in Fig. 4.7.

The applications found for the SOCIOGRIDS system to date have been mainly in industrial areas, where management groups wish to identify criteria used for selection and development of staff, and in areas of quality control where the feeling is that different standards are being applied, but no other method has been found to articulate the dimensions of judgement employed. In education and psychotherapy the technique has been used less rigorously due to the problem of confidentiality of the information, with the results often being withheld from the group of participants to avoid the precipitation of personal crises where one or more members of the group are shown to be construing differently from the main body of opinion. If action were to be taken on this information, individual support must be available either from the group, from a tutor or from a counsellor. Other techniques are suggested by Reid (1977). Hopefully the present technique will have a worthwhile application in group therapy. It has been used in individual psychotherapy to process the results of a conversation between P-Individuals in one person's head, as described in the next chapter.

A sequence of mode grids can be used to chart changes in group construing over a period of time, which has special application in evaluating educational, industrial training or psychotherapeutic courses. Using the socionets, an individual's position in the group can be monitored over time by noting the links which are made and the subgroups the individual joins on different occasions. Together, the socionets and the mode grid can be used to investigate how misunderstanding has grown in a group, and how group performance is influenced by the levels of agreement and understanding which exist, and which can be achieved.

Chapter Eight

ARGUS

I. Introduction

ARGUS is a program which articulates a conversation among alternative P-Individuals in one head. It is the direct result of filling a gap in the technology by articulating a conversation within one brain. Ouspensky (1957) recognised the variety of personalities in the head, as have many novelists (e.g. Hesse, 1965). Ouspensky says:

> "I" is elusive and very small; it exists only as a potentiality; if it does not grow, false personality will continue to control everything. Many people make the mistake of thinking that they know which is which. They say "this is I", when in reality it is false personality. This is generally connected with our capacity to play roles. It is a very limited capacity; we generally have about five or six roles, whether we observe it or not. We may notice a certain, quite misleading, similarity between these roles and then, consciously or unconsciously, come to the conclusion that behind them there stands a permanent individuality. We call it "I" and think that it is behind all manifestations, when in reality it is an imaginary picture of ourselves. This picture has to be studied.
>
> (*Ouspensky, 1957, pp. 165–6*)

Many schools of psychotherapy recognise the existence of different influences within one person, acted out in sometimes apparently inconsistent behaviours. Each of us knows from experience that we act as different people in different environments. The parent of the quiet, withdrawn child is amazed to hear what a noisy, aggressive child he is at school; that charming man who is always pleasant and attentive makes the life of his family miserable at home.

A. Communicating P-Individuals

It seems reasonable to hypothesise that a well-adjusted individual has recognised the existence of the personalities in his head, and allowed each a place to operate where it can be valued and made use of in the context of the whole person. People who seek psychotherapy may hold an inadequately communicating group of P-Individuals, the therapy consisting of the creation of a conversation between these P-Individuals in which each may be recognised and valued. Such P-Individuals may be roles, purposes or centres of attention, but all are significant points from which to view the world. In extreme cases these P-Individuals may not share any constructs in certain areas. This may be due to variations in the ranges of convenience of the constructs used, or perhaps distinct and disjoint P-Individuals are brought into operation in different universes of discourse. Lewin (1936) uses the phrase "plurality of separate spaces" to express this same idea.

If P-Individuals are sharing some of the constructs, the similarity measure used in the PAIRS program may be used to identify those constructs which are operating in the same way. The question occurs again as to whether the two participants are contributing an equal variety of construing. If one has more constructs available than another what meaning can be given by the individual concerned? Wilson (1967) talks about "robots" which take over skilled activities such as typing which are so familiar and rigidly structured that they have become non-conscious. Perhaps these robots are also P-Individuals. Perhaps a robot is the P-Individual which is subsumed by another as computed by the PAIRS algorithm, having less workable constructs. Another example might be to consider the lack of structure and the low test–retest reliability scores found in the grid performance of thought-disordered schizophrenics (Bannister, 1960, 1962b; Bannister and Fransella, 1966) as due to the lack of enduring P-Individuals even over a short span of time.

B. Differences in Behaviour and Perspective

This theory offers a possible explanation as to why we act differently on different occasions in apparently identical situations, which seems to concur with Kelly's general position. Psychotherapy offers the chance to set up a negotiation among one's own system of P-Individuals, and the P-Individuals introduced by the therapist. It enables the person to recognise that he can take different points of view and offers a metalanguage in which to talk about the points of view. Different schools of psychotherapy tackle this in different ways. It would be interesting to explore the conversational ploys and techniques implicit in the psychotherapy of Rogers (1951), Perls (1969b) or Freud (1937) for example, in the terms of the development of both P-Individuals and the conversation between P-Individuals.

How can one identify such a system of P-Individuals in one brain? Ruesch refers to this type of system as "intrapersonal communication".

> The consideration of intrapersonal events becomes a special case of interpersonal communication. An imaginary entity made up of condensed traces of past experiences represents within an individual the missing outside person.
>
> (*Ruesch and Bateson, 1951, p. 15*)

One version of the ARGUS program is based on the assumption that if the concept of "ego ideal" or "superego" in the widest sense of interpretation has any validity, some of those P-Individuals are likely to be significant others in the past life of the person. A cathartic conversation can be initiated between "you as you are now" and the P-Individuals which are the results of the influence of the significant others. By eliciting grids about the different P-Individuals more coherence may be achieved. These may be used as elements, the constructs describing the relationships of the P-Individuals, one to another. However, a more powerful tool involves the assignment of each construct to a perspective of one or more of these P-Individuals representing the influence of the significant others. So the P-Individuals are used both as elements in each grid and as points of view from which each grid is elicited. Consequently, a grid is developed for each of the P-Individuals in the system, and the SOCIOGRIDS package maps out the commonality of construing between them. In this way the potential for conversation between the P-Individuals is made explicit, and areas of concern uncovered. The movement towards a more coherent or actualised self is the aim of successful psychotherapy.

The grid elicitation is based on the MIN–PEGASUS version where no feedback is given on high matches during the process. Each construct is viewed from each point of view in turn and the elements are rated as the elicitee thinks that person/role would have responded. Simultaneously, constructs are added which are felt to be important to each viewpoint. The final grids have the same element and construct names, but responses in the grid represent different perspectives and hence are not necessarily the same.

II. Algorithm and Flowchart

The flowchart for the ARGUS procedure is shown in Fig. 8.1.

1. The six elements are entered.
2. Three constructs are elicited using fixed triads.
3. From the point of view of the next element in the list, the existing constructs are rerated.
4. A construct important to that point of view is added.
5. Steps 3 and 4 are repeated until the list is exhausted.
6. The ratings for all newly elicited constructs in early grids are then filled in.

The resulting six grids are then focused, and processed on SOCIOGRIDS. This program maps out the relationships in the group, identifying the point of view which is central to the construing, and any subgroups which develop in the socionets sequence. The possible situations which have commonly been found to occur are the identification of an "isolate" and the development of two disjoint groups of P-Individuals. An example of the first is in a run by a colleague who used as elements himself, his wife, his sister, his brother-in-law, and his mother and father. The socionets shown in Fig. 8.2 produced the early groupings of him(1) and his wife(2), and separately his sister(3) and brother-in-law(4). These two groups then joined together, and incorporated his mother(5). Before his father(6) joined the group, all the internal links had been made, identifying his father as being least like any of the other P-Individuals in construing.

The subject was interested to see the results, commenting that he knew he saw things differently from his father and that it had always been like that. The situation of two subgroups developing may be more serious. If a person splits his P-Individuals into two disjoint sets he may be increasing a tendency to schizoid thinking. This will inevitably add

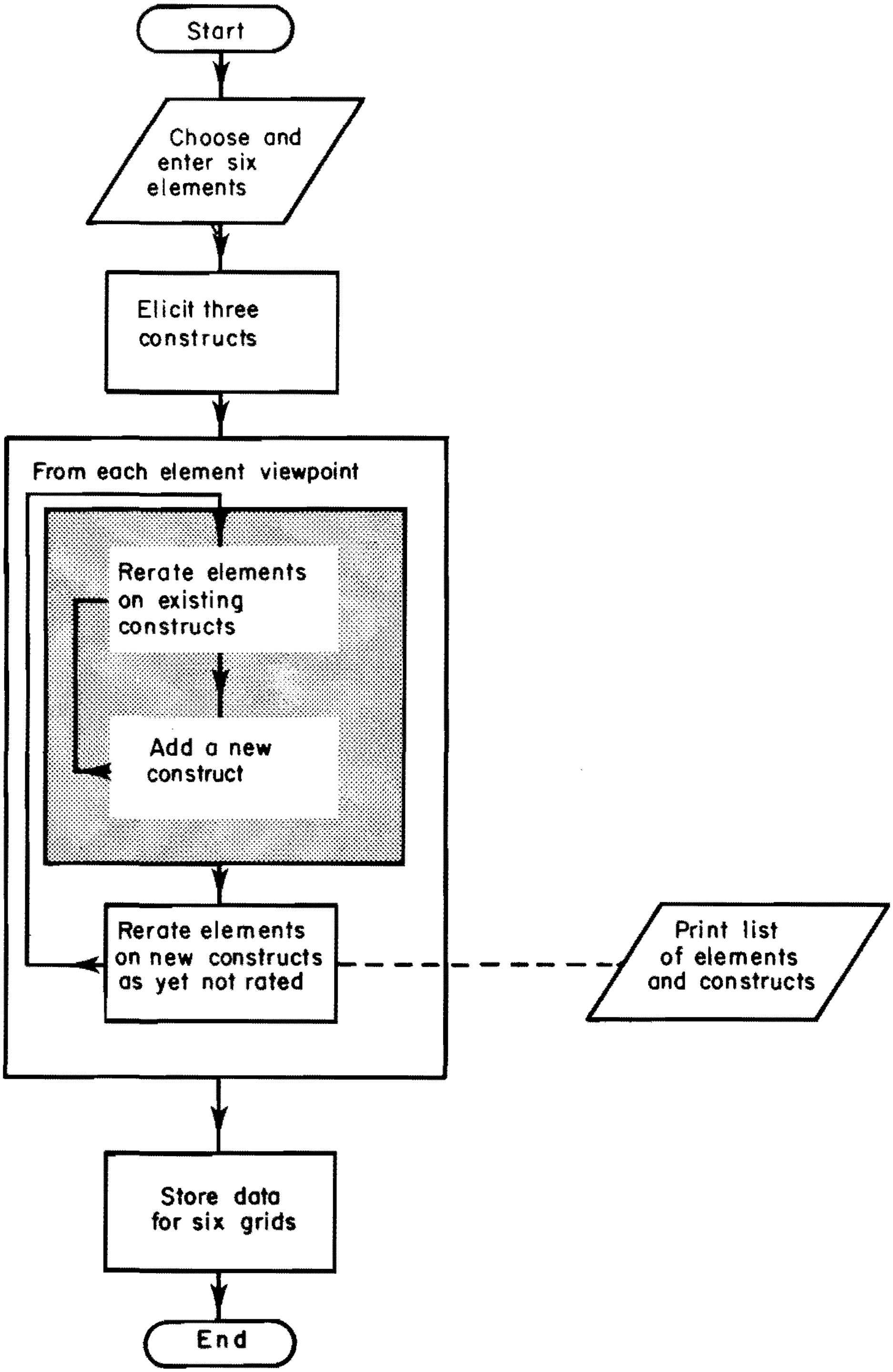


Fig. 8.1. Flowchart for the ARGUS procedure.

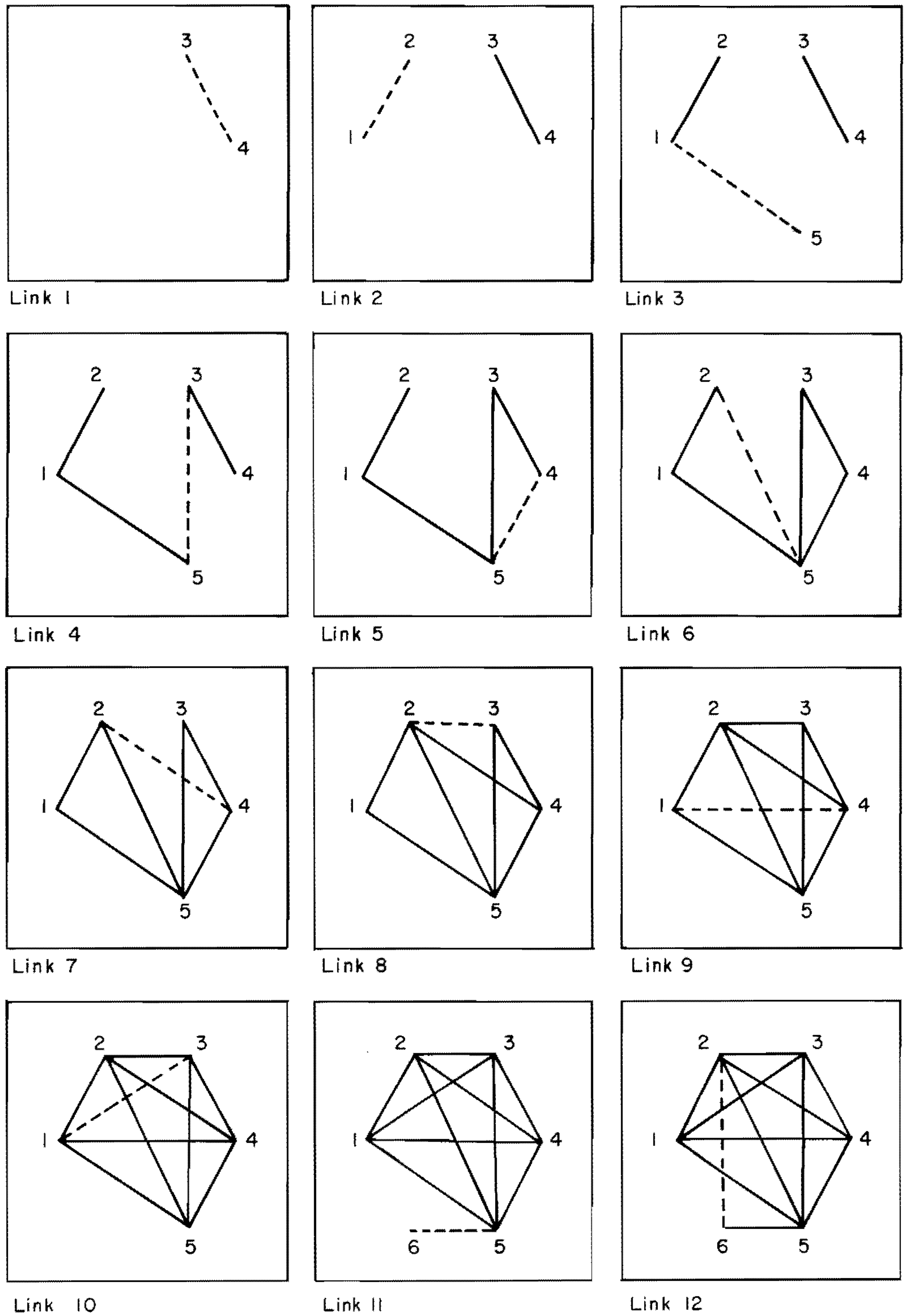


Fig. 8.2. Socionets from an ARGUS interaction.

stress and discomfort to his ability to build adequate models and operate effectively in all aspects of his life.

An alternative version of the program concerns roles. The elements of the grids are the roles assumed by the elicitee in his everyday life. The constructs he uses whilst operating these roles are elicited with respect to the roles themselves. An alternative view of roles as weighted constructs is expressed by McKnight (1977b). Since they use the same structure, each of these two versions of ARGUS involves only the contents of one brain, and the P-Individuals or personalities co-existing within that person. These two versions are merely examples of the many sets of P-Individuals which might be important to a person. The negotiation of a particular set for a particular occasion may be significant. An example of the use of ARGUS is described in Chapter 9, and the run from this example is shown in Appendix I.

III. Applications

So far this technique has only been used for self-counselling with healthy, "normal", interested people, not with the seriously disturbed. It seems to be identifying areas of concern and possible past or future difficulties. If it were to be widely used in psychotherapy to assess the problems a client was experiencing, and to identify a possible starting point for conversation between the client and therapist, much more development might ensue. It may have applications in social work such as investigations into reasons for juvenile crime or misconduct. The roles could take the form of the youngster in different situations such as: "me when I'm with my friends"; "me at school"; "me at home with my parents"; "me at a football match".

Another application could be in areas of self-concept and self-esteem, or to investigate how a young person thinks the world expects him to be; or to help in the personal adjustment of discharged prisoners, long-stay hospital patients, or others moving into a new type of living. In industry, aspects of staff promotion and staff development may be made easier by using this technique to make explicit how a worker sees his future career.

IV. Developments

An alternative way of processing the ARGUS grids is to use a SOCIOGRIDS type of analysis based on the MINUS or CORE algorithm rather than PAIRS. This produces a measure of similarity between every pair of grids by identifying those parts which are similar and those which have differences of some degree. Socionets are then produced as before by selecting in descending order the most similar grids to form a sociometric pattern.

Each of the six grids captures an important personal perspective for the elicitee. The patterning of the socionets offers him a frame of reference in which he can see himself and the relationship of the viewpoints which are significant in his life. It may then be possible to adjust slightly those relationships with which he has previously been unable to come to terms, and by using the Delphi technique of iterating on the set of elicitations a more comfortable position may be attained from where he is better able to operate. Often a feeling of temporary maladjustment causes a person to become "out of sorts" or have "one of those days", when a review of his "self" and its constituent P-Individuals may be all that is needed. This technique offers that facility.

Bakan has identified two aspects of living in the world both of which need to be satisfied:

> I have adopted the terms "agency" and "communion" to characterise two fundamental modalities in the existence of living forms, agency for the existence of an organism as an individual, and communion for the participation of the individual in some larger organism of which the individual is part. ... Agency manifests itself in the formation of separations; communion in the lack of separations.
>
> (*Bakan, 1966, pp. 14–15*)

Salmon extends this distinction to child development:

> Agency involves purpose, separateness, control, activity, responsibility; communion involves sharing, widening personal boundaries, acceptance of things, love. ... To me they offer interesting terms of comparison between the social realities in which children grow up.... When it comes to communion, it is important to know how far those close to a child share their inner experience with him, and expect him to share his with them.
>
> (*Salmon, 1977, p. 6*)

In the Western society of business and commerce where time-keeping rules our lives, we crave for the communion of the Eastern religions. Relationships are struck and heavily invested in to provide the communion from which we feel deprived. However, they so often fail to satisfy the need, because the need is for a whole self, the self-actualised individual.

Luft describes "trust" and "tolerance" in terms of his Johari Window model, a feeling of trust being in quadrant 1 but an attitude of tolerance being in quadrant 2.

> If it is true that you can become more of what you potentially can become only in relationship with others, then we can understand how universal is the trust-relationship hunger. Trust means to be in a state of mutual and reciprocal interest and to be free to become. It is the *sine qua non* for self-actualization.
>
> (*Luft, 1969, p. 138*)

Maslow describes at length the characteristics of the self-actualising person:

> Self-actualizing people do not for any length of time feel anxiety-ridden, insecure, unsafe; do not feel alone, ostracized, rootless, or isolated; do not feel unlovable, rejected, or unwanted; do not feel despised and looked down upon; and do not feel unworthy nor do they have crippling feelings of inferiority or worthlessness.
>
> (*Maslow, 1967, p. 67*)

It would be interesting to see one of Maslow's self-actualising persons run on the ARGUS program. One might expect a coherent map of relationships between the constituent P-Individuals in the conversation. Adequate communion is dependent on the recognition and acceptance of difference both within and between people. "Togetherness" is not a feasible proposition. Perls (1969a) exhorts people to be aware that one person can never be part of someone else nor can someone else become a part of him. This seems to be the same as saying that communion takes place between accepted, distinct P-Individuals. The ARGUS program, together with the SOCIOGRIDS processing of the results, deepens the insight of a self by raising the awareness of the value of the "you's", enabling them to be recognised and accepted, and allowing the individual to overcome any feelings of resentment from past interactions. Another way of looking at exchange grids (Chapter 6), is to see them as representing conversation between P-Individuals. If the dichotomy corollary has any validity, then the fact that an individual uses a dichotomous set of constructs implies that some P-Individuals are "exchanging" or incorporating constructs from other P-Individuals within the same person. Thus exchange grids may be seen as a means of communication between the P-Individuals of one person.

It has already been suggested (Chapter 1) that self-actualisation may be the endpoint of the solution to a space/time allocation problem of the P-Individuals in one skin; perhaps psychotherapy is the problem-solving procedure needed to achieve this state. Pask says:

> The dual characteristics (M-Individual, P-Individual)... give rise to the notion that P-Individuals (cultural entities, minds) inhabit M-Individuals (processors able to interpret these procedures, and *a fortiori*, brains). It is legitimate, though at first sight bizarre, to remark that developmental psychology is a study of how a P-Individual comes to be correlated with a vehicle which is a developing M-Individual. Odd though it sounds, this concept turns out to be useful, though it has not yet been properly exploited.
>
> (*Pask, 1975, p. 303*)

Psychotherapy may be seen as the initiation of a process of entering into communication with the significant others from one's past. Education may be seen as being concerned with the introduction of new P-Individuals, or the process of making existing P-Individuals more explicit and coherent. Industrial training may be seen as the introduction of new roles into the system of P-Individuals which are specific to the purpose and organisation of the enterprise. ARGUS therefore has possible applications in other areas of human management in addition to psychotherapy. Rogers (1971) calls it learning to "become a person".

Chapter Nine

Applications

I. Introduction

The set of programs described in the previous chapters has been developed to enhance the technology of personal construct theory. As these techniques are applied to different areas of industry, education and psychotherapy, they appear to offer a new and different light in which to see problems and situations.

This is illustrated in the chapter through a number of application studies which have been very much of an exploratory nature in the areas of staff appraisal, quality control and psychotherapy. For each one only a brief report is given, together with an example of the sort of data and results which were found.

II. The Projects

A. A study with Marathon Knitwear on the identification and exchange of subjective standards in inspection (see Pope, Shaw and Thomas, 1977).
B. A study of P-Individuals within one person represented by role perspectives.
C. A study with a section of ICI Paints Division on personal judgement in staff appraisal (see Thomas, Shaw and Pope, 1977).
D. A study of the personal and family relationships of two teenagers in a psychiatric adolescent unit (see Ovretveit, 1978).

A. A Study with Marathon Knitwear on the Identification and Exchange of Subjective Standards in Inspection

1. *Introduction*

In the inspection of products such as clothing the quality achieved is highly dependent on the subjective standards of final inspectors; but it is very difficult to train inspectors in such a way as to produce a group who are using the same standards. The repertory grid techniques were therefore applied to identify the constructs used by a group of final inspectors, supervisors and managers in the company, together with a trainee production technologist, in order to identify which aspects of quality were selected or ignored by each. In this way different subgroups were able explicitly to identify different purposes in the inspection of the garments, and hence negotiate the differences in value and opinion both within and between the subgroups. The following diagram shows the hierarchy within the organisation of those involved.

Divisional manager

Production manager

Production manageress

Supervisor

Final inspectors

The trainee production technologist was not part of the company, but belonged to Marks and Spencer, the large international organisation which buys 70 % of the output from the company, and which also sponsored the project. The garments currently being made in the factory were men's briefs, men's woollen underwear and a variety of tops. All the people concerned in the project were familiar with the faults occurring in these products.

2. *Methods and design*

The programs used in this study were FOCUS and SOCIOGRIDS. Four, out of a total of eight, final inspectors from the production line took part, together with their supervisor, the manageress, the production manager, the divisional manager and the trainee production technologist. Each member of this group was shown a range of garments currently in production and asked to describe the process of inspection and the faults which would specifically be looked for during the inspection procedure. As this was done, the faults were each noted on a separate card; these were then used as the elements in a grid. The method of eliciting constructs was varied to suit the individual concerned, including triadic elicitation, the full context form and the identification of the two most dissimilar elements. This was primarily to keep the interest of the person, and hence elicit as many constructs as possible.

After each person had separately identified elements of quality and elicited a grid, the group, excluding the production manager and divisional manager, met together to examine the total list of elements produced and negotiate a common set of elements which could be shared by them all. (The reason for the exclusion of the two managers was partially practical, in terms of time commitment, and partially to avoid inhibiting the less senior members of the organisation.) Each person then elicited a new grid using the negotiated element set, and the constructs which had been personally produced on the previous occasion with the addition of one offered construct. The opportunity was given to add extra elements and constructs, only one person choosing to add constructs after suddenly realising that she had several ideas which had been forgotten during the first grid elicitation. The two grids from each person were then focused, and the second set analysed on SOCIOGRIDS, as described in Chapter 7. A number of other analyses were performed, including a clustering of the original element list from the verbal labels, and the extraction of a grid made up of the offered construct from each person.

A week after the initial grids were elicited, each person was presented with his/her personal results and the group results. This included the main points of the socionets, the mode grid, trees of elements from all the grids of the second set, the entire list of constructs in the order of "modeness" as shown by the table of average match values of constructs, the entire list of elements from the first set clustered under the headings of the second element set, the grid made from the offered construct which was "very important–not so important", in addition to the two personal grids in focused form. During the feedback of the results, each person was encouraged to identify his/her own position with respect to the other people in the group, both from the links made in the socionets and from the list of constructs ordered by common usage, and also from examination of similarities and differences shown by the clustering of elements and constructs in the personal individual grids.

Following the individual feedback sessions, the four inspectors met to discuss the variety in the group. To initiate this discussion the nine trees of elements from the second set of grids were used as a basis for negotiation. Clusters appearing on all four grids of the people present were noted, as were elements lying in very different positions from one grid to another. This led to the negotiation and exchange of meaning of the exact nature of the faults concerned.

3. *Results*

Figure 9.1 shows a grid from the first set elicited from one of the final inspectors using her own elements. The elements used by people in other positions in the company varied somewhat, but all agreed on a common set of elements for the second set of grids; the one elicited from the manageress is shown in Fig. 9.2. It can be seen from the constructs that these two people have different perspectives within the firm, and different criteria for classifying faults.

Figure 9.3 shows the mode grid made up of the eleven most shared constructs. Two of the inspectors and the divisional manager contributed nothing to this grid, whereas one of the inspectors contributed four constructs and the production manager contributed three. The element clusters show the three faults "shading fault", "fabric fault" and "print fault" to be construed similarly on the left of the tree, and the three faults "broken seams", "tabs"

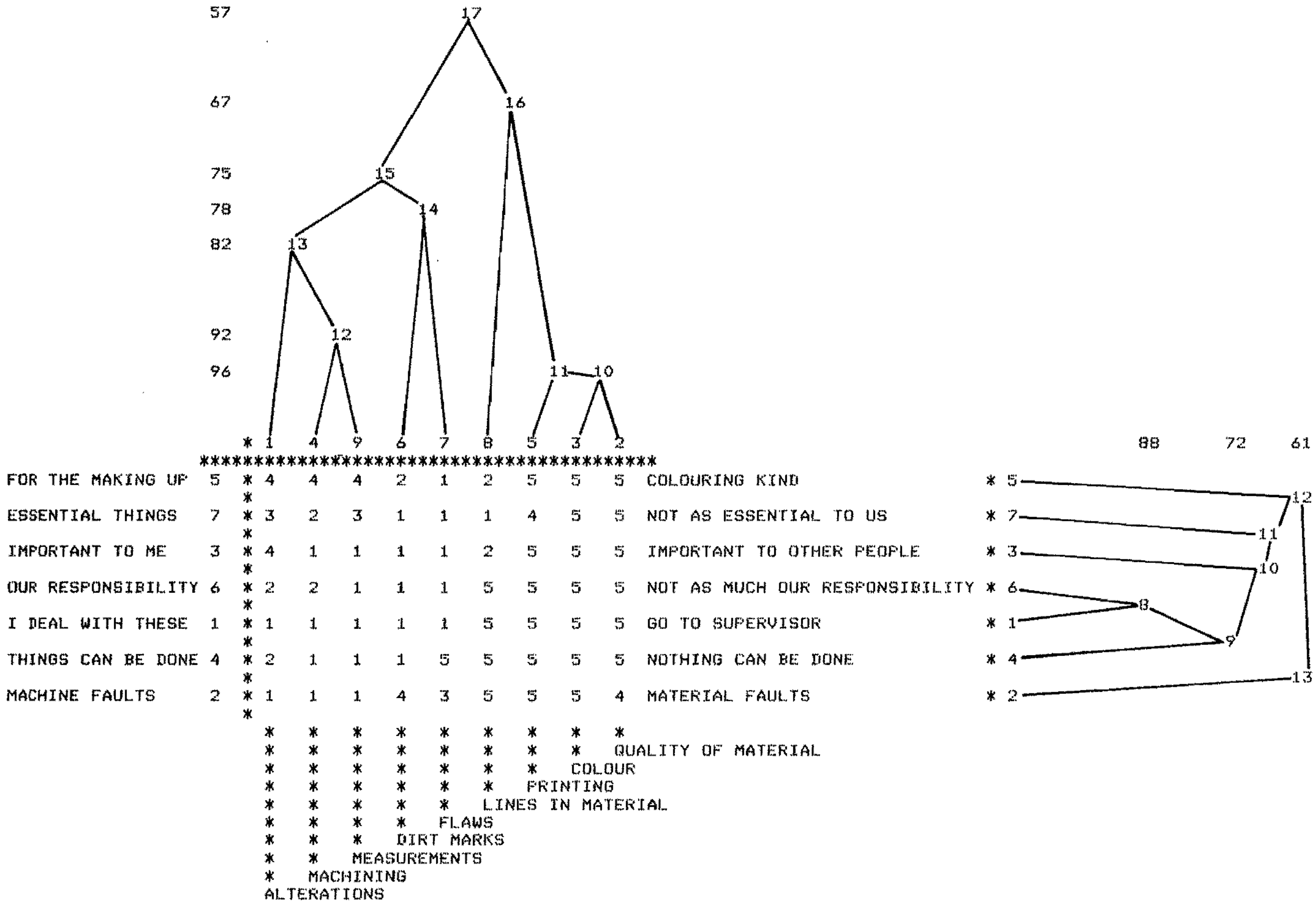
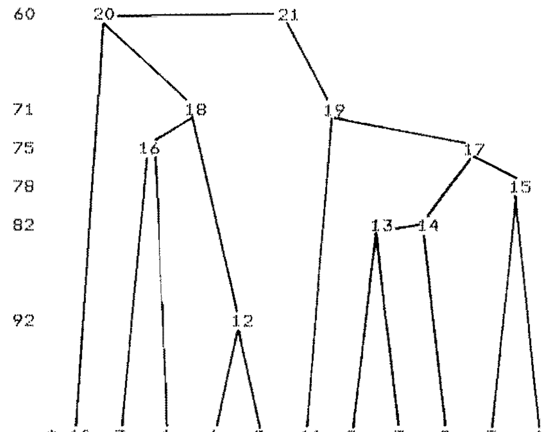


Fig. 9.1. A grid on faults in garments from the first set using a five-point scale.



			10	3	1	6	2	11	8	7	9	5	4		
BEYOND MY CONTROL	6	*	5	5	1	1	1	5	5	5	5	5	5	IN MY CONTROL	* 6
MORE RETURNS	3	*	2	1	1	2	4	5	5	5	4	5	5	FEW RETURNS	* 3
GET A LOT OF THESE	2	*	1	1	1	4	4	5	3	3	2	4	4	VERY FEW	* 2
SERIOUS THINGS	1	*	1	2	2	4	4	5	4	2	1	1	5	DON'T AFFECT WEARING	* 1
MORE ATN. QUAL. CONTR	4	*	1	5	3	4	4	5	1	2	1	1	2	NORMAL VISIT	* 4
VERY IMPORTANT	7	*	1	2	1	2	2	5	4	2	1	2	1	NOT SO IMPORTANT	* 7
OFFEND THE EYE	5	*	5	1	1	1	1	1	1	1	1	4	4	LOOK GOOD BUT DON'T FIT	* 5

TABS
MEASUREMENTS TO SPEC.
BROKEN SEAMS
GENERAL APPEARANCE
WELTS
TRIMMINGS
PRINT FAULT
SHADING FAULT
FABRIC FAULT
DIRT & OIL
STRETCH MEASUREMENTS

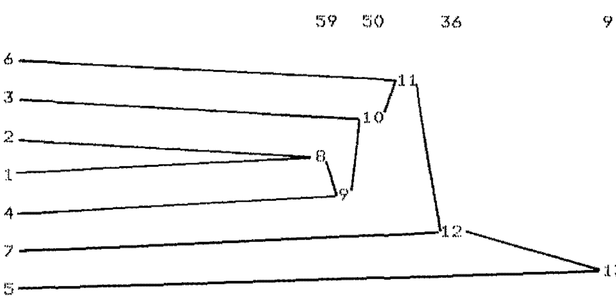


Fig. 9.2. A grid on faults in garments from the second set using a five-point scale.

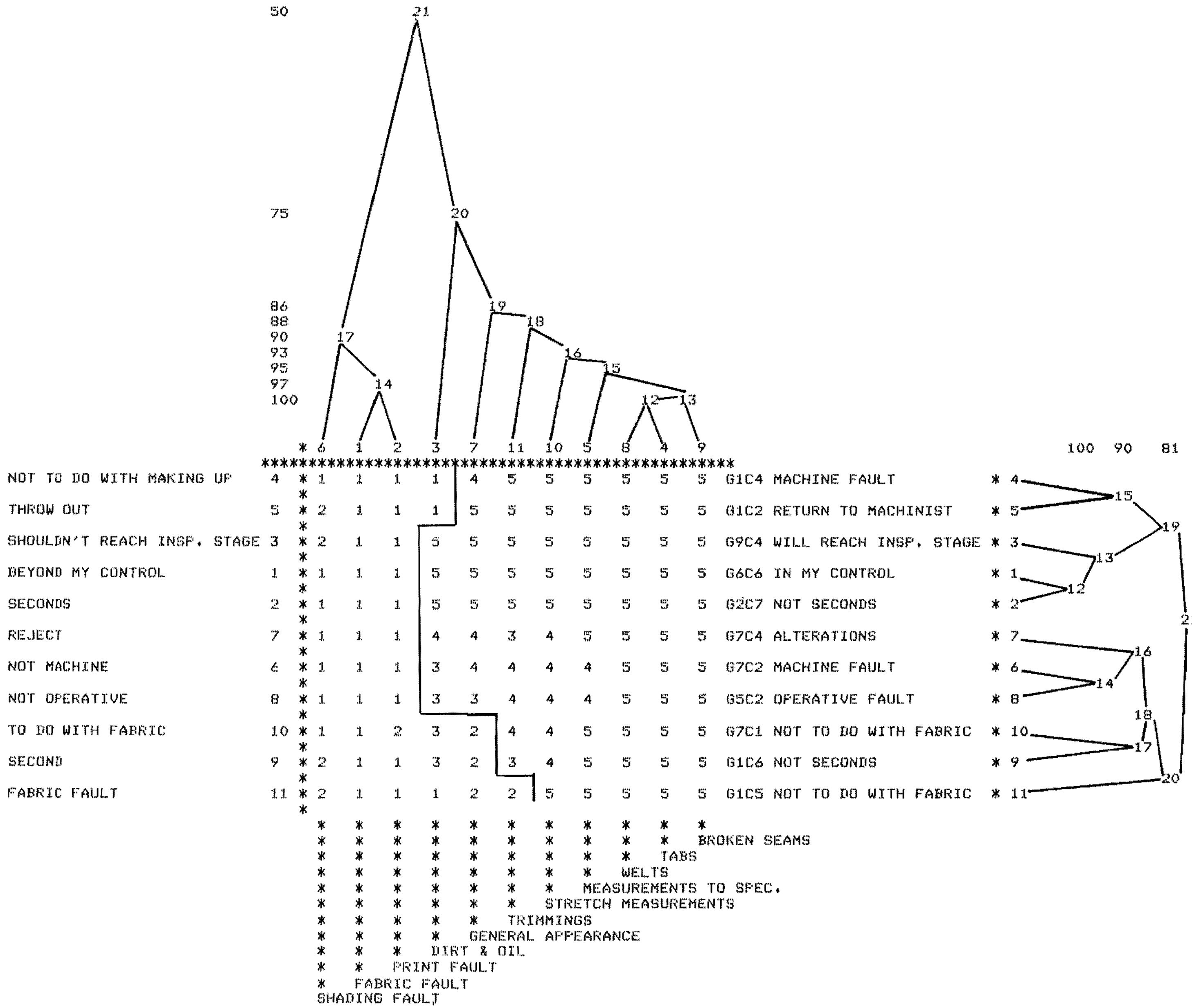


Fig. 9.3. The mode grid on faults in garments.

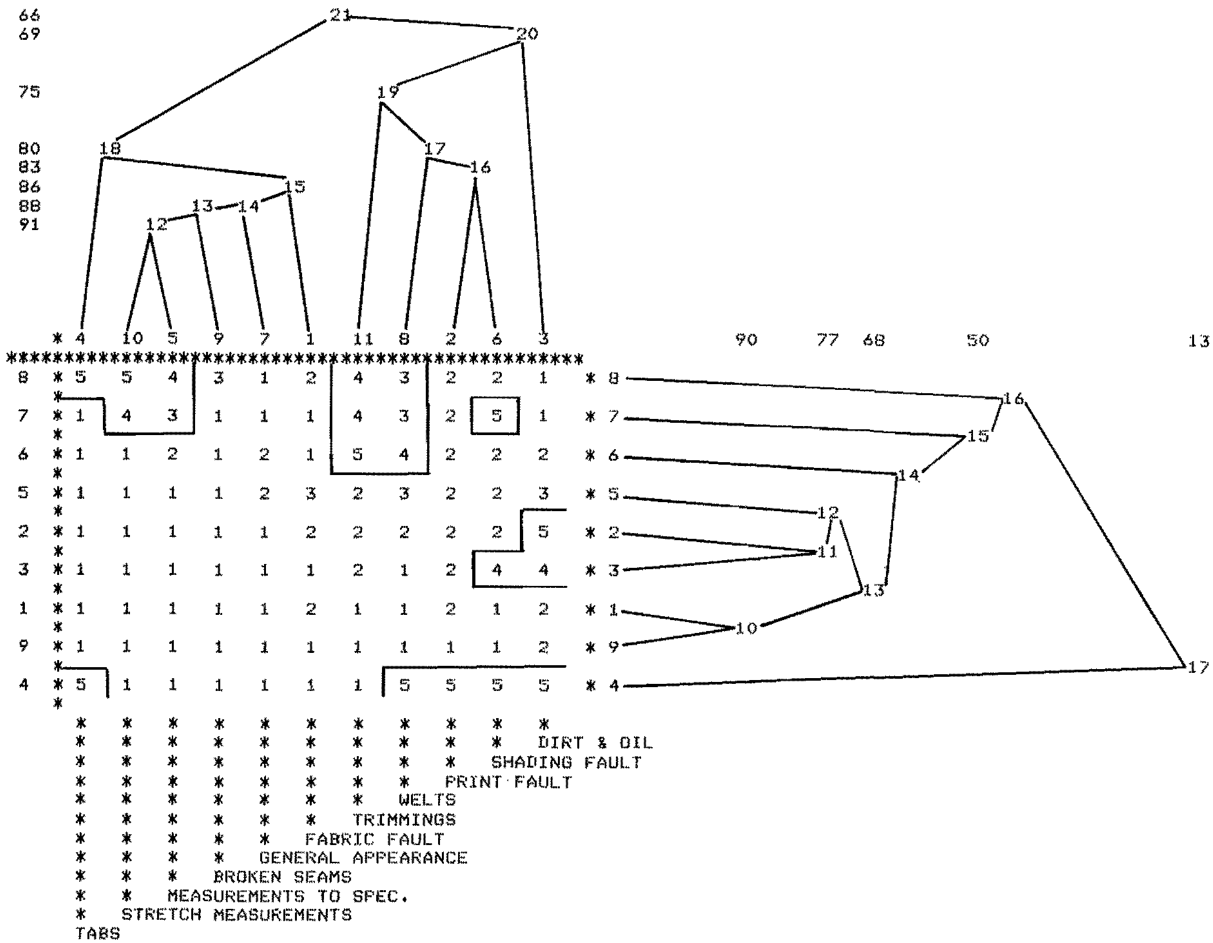


Fig. 9.4. The "offered construct" grid on faults in garments.

and "welts" to be construed similarly on the right of the tree. This right-hand cluster then gradually incorporates each of the remaining faults one at a time, until "dirt and oil" enables it to join with the other cluster. It can be seen that "dirt and oil", "general appearance" and to some extent "trimmings" are viewed variably, not belonging clearly to one or other pole of all the constructs as the other faults are.

Since everyone was using the same set of elements, it was possible to extract the one offered construct "very important–not so important" from each grid. This is shown in Fig. 9.4. The construct tree now shows the relationship of the people who took part in this study with respect to the importance they attach to different faults in the garments. It is interesting to note that reading down from the top of the construct tree one is reading down the hierarchy within the group; 8 is the divisional manager, 7 is the production manager, 6 is the manageress, 5 is the supervisor, 1 to 4 are the inspectors and 9 is the trainee. A possible explanation of the separateness of 4 is the difference in the use of the 1 to 5 scale. Whereas person 4 used the two poles 1 and 5, most other inspectors used 1 and 2 to differentiate importance.

As an experiment, the construct from person 4 was changed so that the elements rated 5 were given a rating of 2. This brought it into the same scaling system as a number of other inspectors: the focused result is shown in Fig. 9.5. Now person 4 can be seen to belong more definitely with the group of inspectors and the supervisor. The hierarchy is still clearly shown although the grid has been printed the other way up. This makes no difference, only the relative positions being of interest. The element clusters are also slightly different, but element 3, "dirt and oil", as in the mode grid, is in both cases seen to be differently construed by different people.

4. *Conclusion and evaluation*

The most encouraging aspect of this study was the involvement and interest displayed by all who took part despite the fact that they were "compulsory volunteers" and were initially unaware of the objectives or methods of the project. Each person responded very well, asking how the results could help them all in their jobs, and if any more such work was planned for the future.

The results show that different roles within the company incorporate different viewpoints of quality, and they provide a foundation for the exchange of meaning. It would have been beneficial if more time had been available to elicit exchange grids, as described in Chapter 6, and, in general, to explore more systematically the differences in perspective and how one person's perspective is related to that of another. One possible outcome is to repeat the procedures using, instead of a range of faults in the element set, a variety of instances of one fault. This might for instance be a hole of varying size and position on the garment. Another possibility is to investigate job expectation, job satisfaction, or working conditions of the final inspectors. The response has indicated once again the value of the repertory grid techniques and the programs in the field of subjective judgement and control of quality.

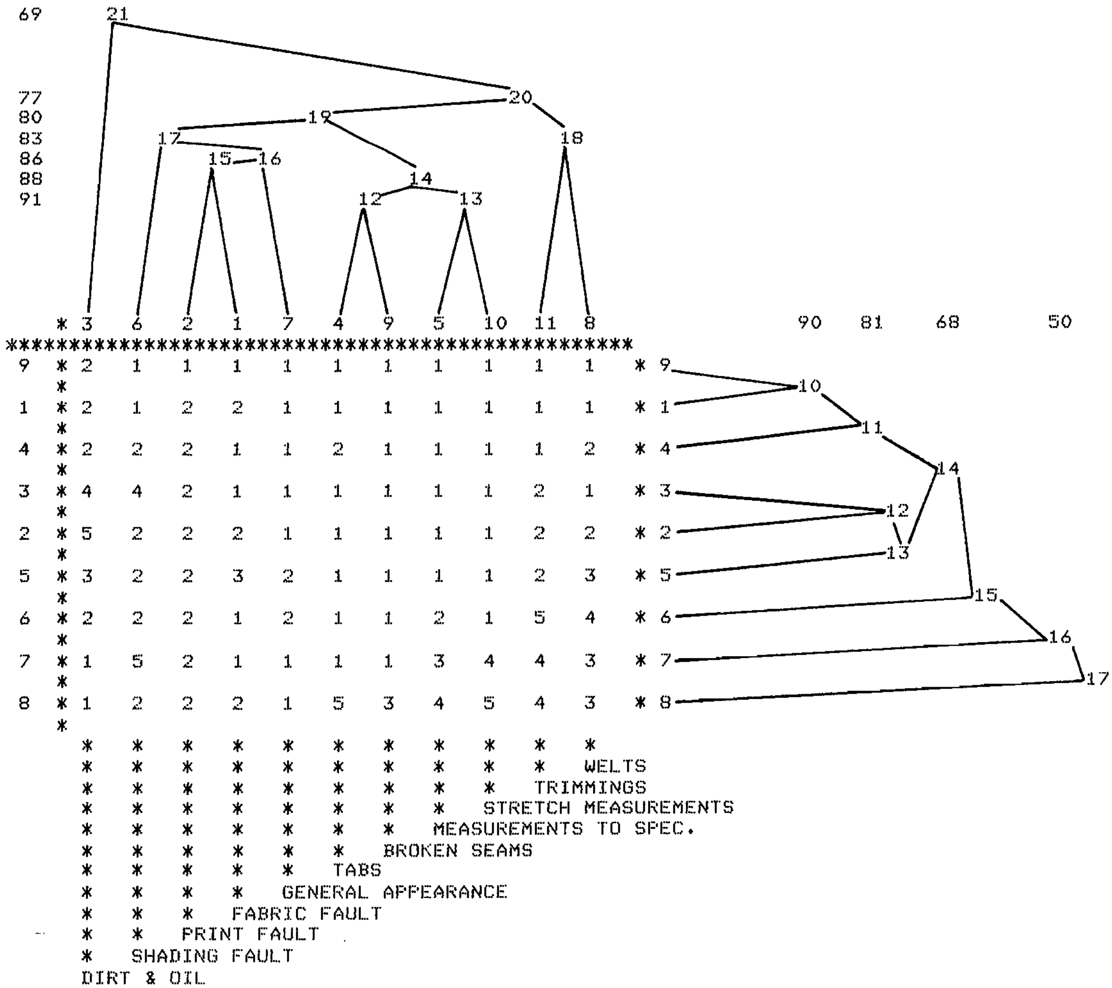


Fig. 9.5. The "offered construct" grid with a change of scale on construct 4.

B. A Study of P-Individuals Within One Person Represented by Role Perspectives

1. *Introduction*

This project was designed to investigate the ability of the ARGUS program to offer new awarenesses of self to an individual. The individual concerned was a friend and colleague who was "normal" and well-adjusted, and not known to be suffering from any mental disorder. The roles he chose were not totally distinct, in that in some cases one may overlap or subsume another, and more than one may operate in the same environment.

2. *Methods and design*

The "roles" version of ARGUS as described in Chapter 8 was used to elicit six grids simultaneously from six points of view respectively. These six roles were also used as the elements in each of the grids. The entire run is shown in Appendix I. In the first attempt, the offered element "the real me" was used, but the subject found this very confusing and asked for it to be suppressed. Consequently, the six positions were freely chosen to represent as fully as possible the "self". On completion, the six grids were focused and then processed on SOCIOGRIDS to determine subgroupings of the P-Individuals and the content of the most commonly used constructs as shown by the mode grid. Every possible pairing from the grids, fifteen in total, was run on CORE to 100 % level of similarity, in order to determine the unchanged part shared by the pair in each case. Then the six grids were processed as one, keeping the elements constant, to determine how well-matched were constructs from different grids. If in operation there was only one point of view, all the constructs labelled in the same way would be clustered at 100 %.

All the above information was personally fed back to the subject who commented on and discussed the patterns exhibited by the analysis, agreeing in the main with, and offering explanations and meanings for, those patterns.

3. *Results*

Before the discussion of individual grids, the subject commented on the roles, which were: (i) student, (ii) teacher, (iii) scientist, (iv) therapist, (v) father, (vi) son. One interesting comment concerned the role of "son", that in thinking himself into this position, the two roles of "adolescent son" and "son at the present time" kept alternating, making the role of "son" difficult to construe as a constant perspective. Another comment was that the task was made easier by the overlapping of the roles, and the most difficult, "son", was the most distinct and separate from the others.

(a) *The six focused grids.* These are shown in Figs. 9.6 to 9.11. Looking first at the patterning of the elements, a frequent clustering was of 2, 4 and 5 which were "teacher", "therapist" and "father" respectively. The only grid where this was less tightly related was that of "son" where 2 was more closely linked to 3, "scientist". Four of the grids had very similar element tree patterns with the tight cluster of 2, 4 and 5 being joined singly by 1, 3 and 6 in various orders; the grid of "scientist" was mainly similar; and again "son" was the exception with 1, 3 and 2 forming one cluster, 5 and 4 another, then 6 joining the total group.

Looking then at the constructs, without exception one cluster is formed by 3 and 6 with a reversal, that is: "academic–real" with "pure–usable". Similarly in all grids, constructs 1 and 2 are adjacently placed, that is: "receiver–giver" with "follower–leader". Otherwise, some patterns occur in subsets of the set of grids such as the contiguity of 5 and 4, "developing–stationary" with "receptive–closed", in grids 1, 2, 5 and 6. In grid 3, "scientist", construct 5 is matched with 8 "personally rich–personally poor"; and in grid 4 it is closer to "giver–receiver". Each of the grids is shown in Figs. 9.6 to 9.11 for comparison.

(b) *The constructs.* When the six grids were focused as one, keeping the elements constant, it was possible to see how constructs with the same names were being used differently in different grids. This is shown in Fig. 9.12. The top cluster consists entirely of the 3 with 6 reversed set commented on previously. The largest cluster above the 80 % level contains a group of 5's, 4's, 1's, 2's and 8's interspersed with two 7's and a 5. This latter 5 is apart from the early 5's group, being from grid 3, "scientist", and within a cluster of 8's,

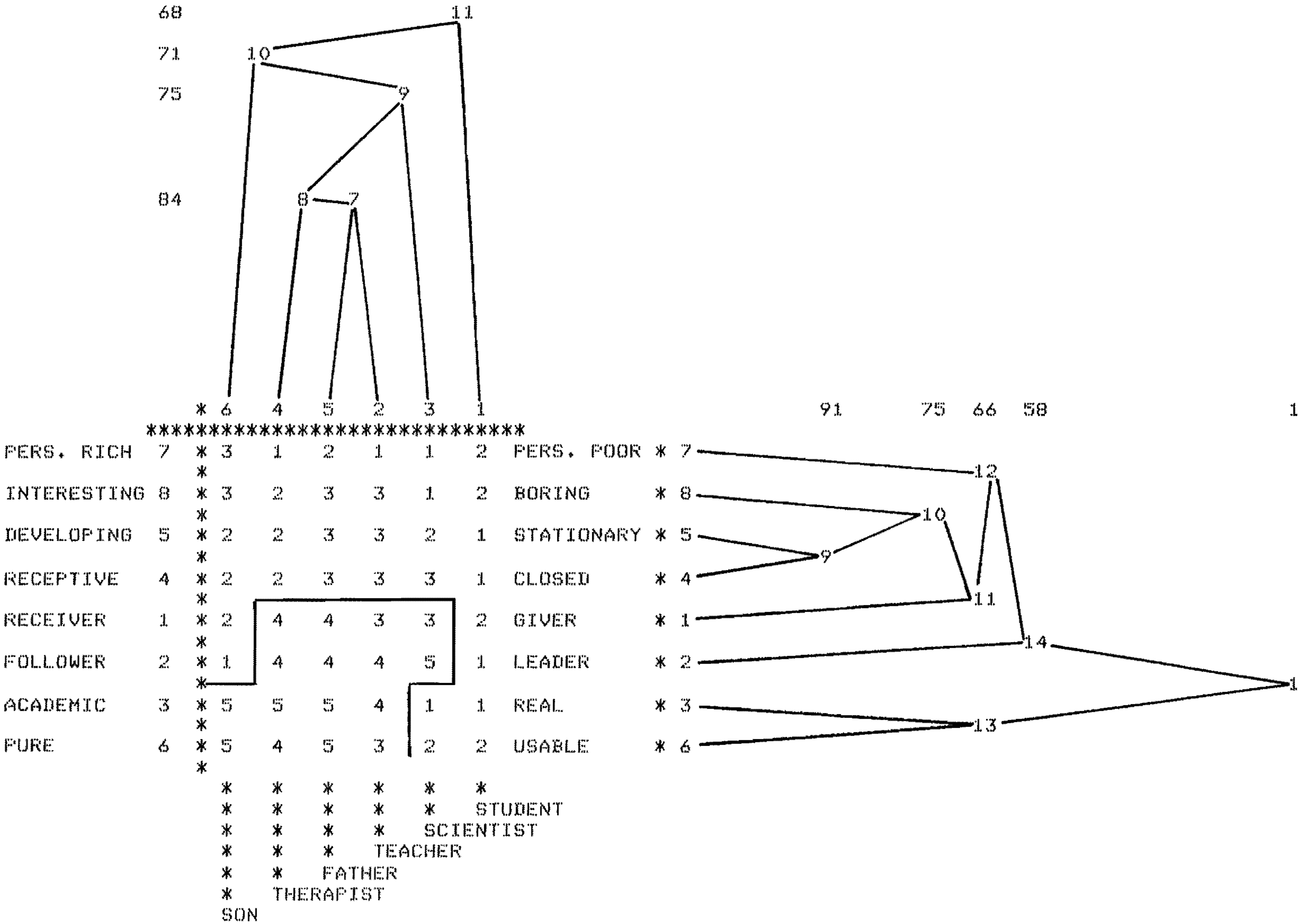


Fig. 9.6. The grid from the role of "student" using a five-point scale.

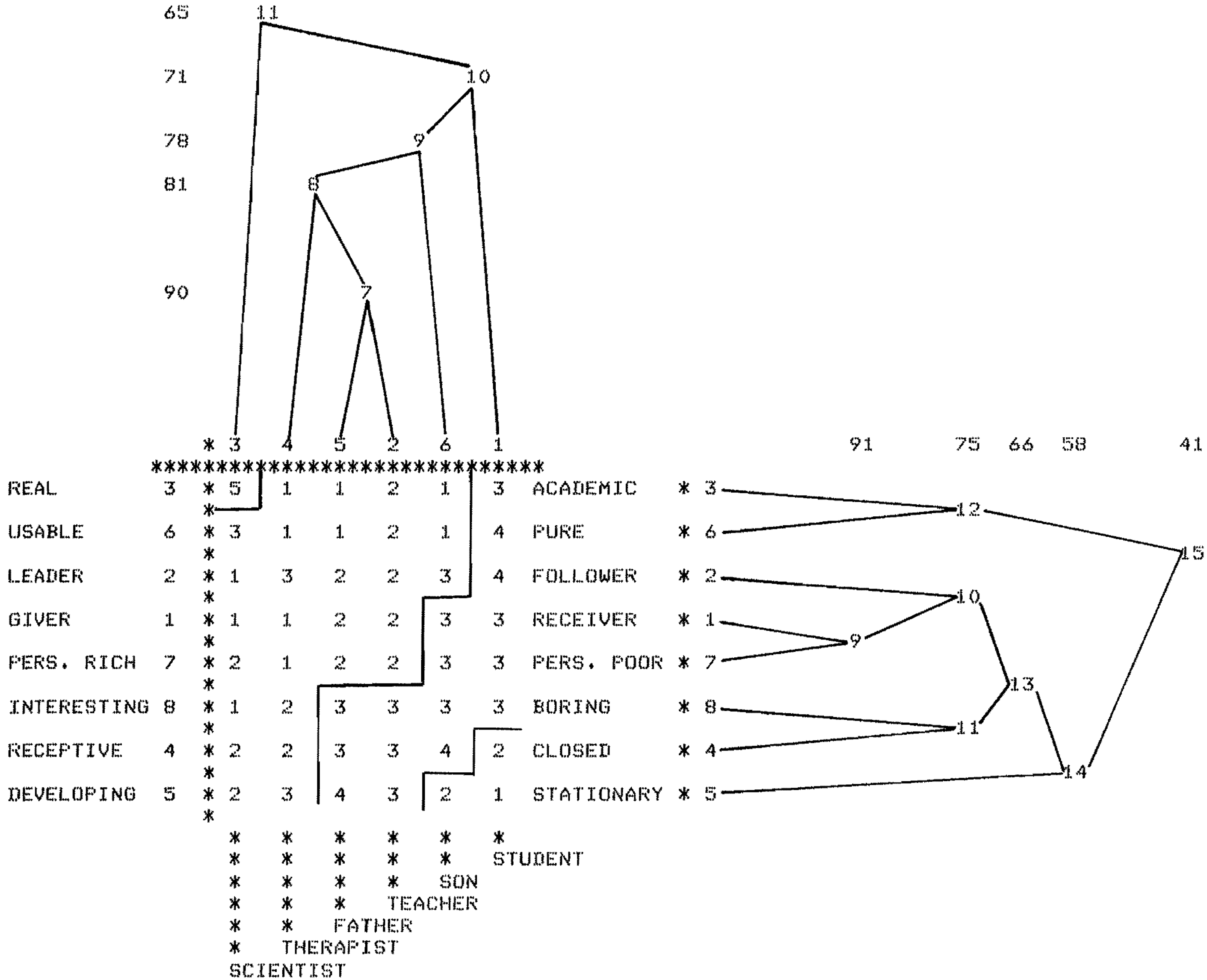


Fig. 9.7. The grid from the role of "teacher" using a five-point scale.

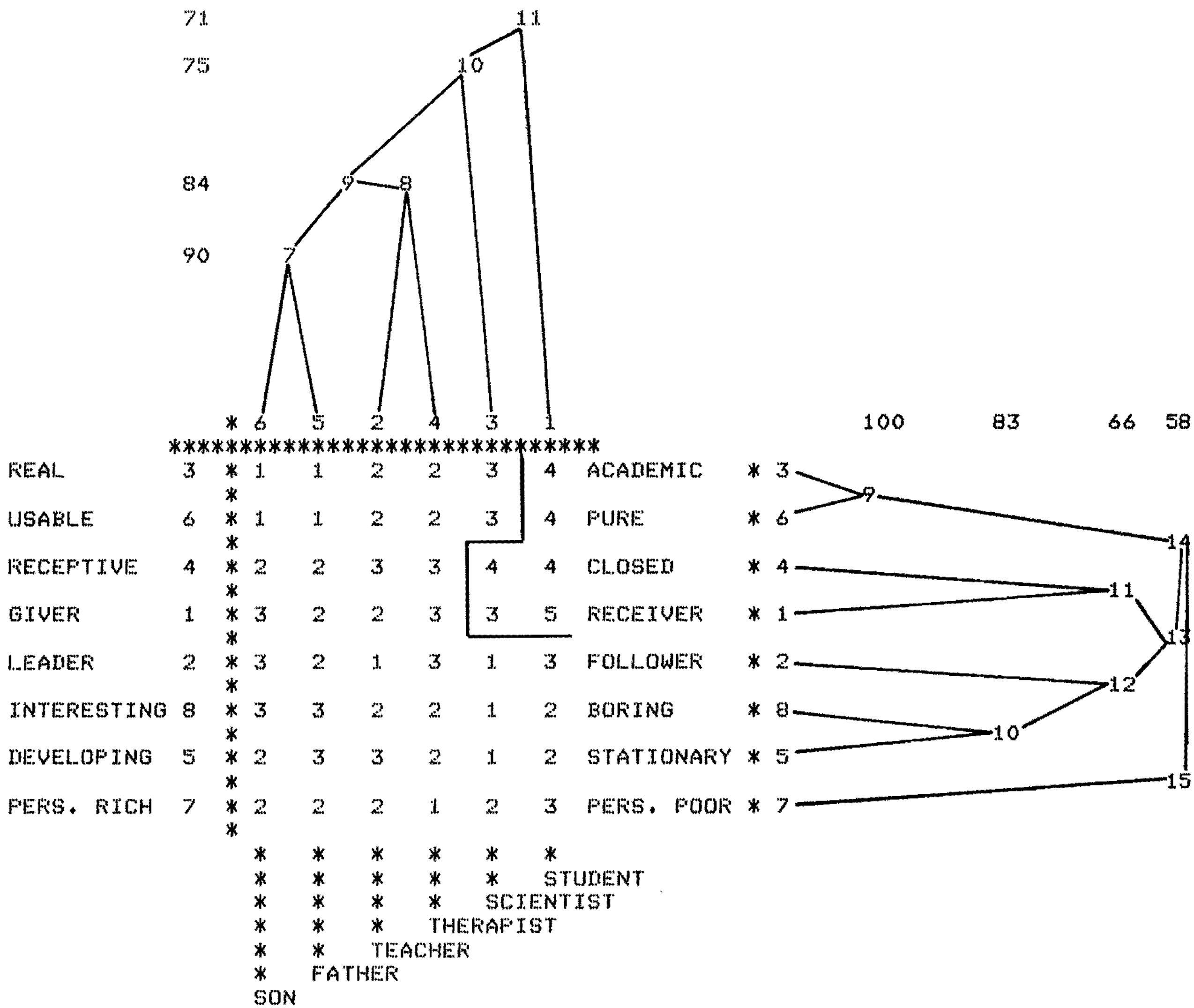


Fig. 9.8. The grid from the role of "scientist" using a five-point scale.

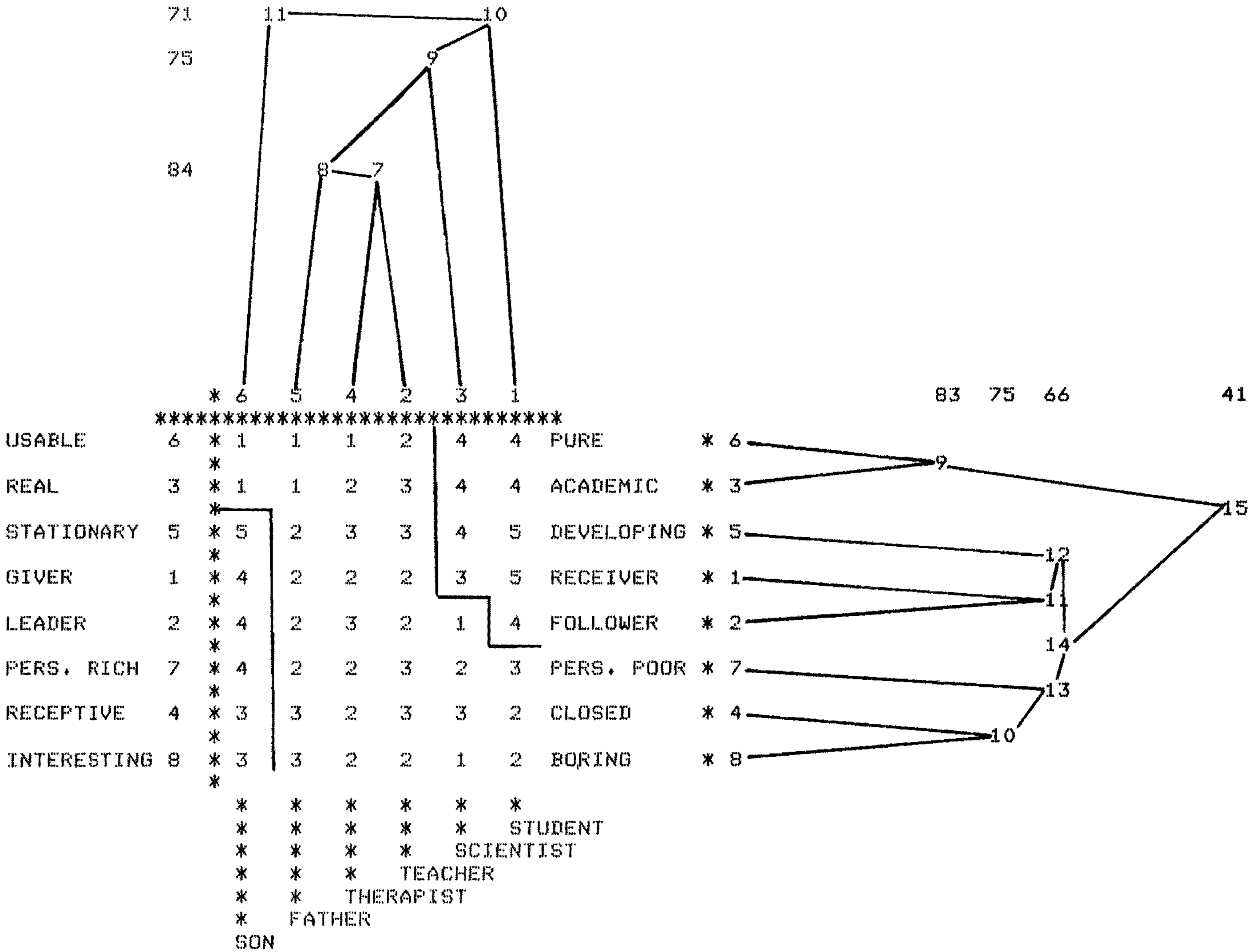


Fig. 9.9. The grid from the role of "therapist" using a five-point scale.

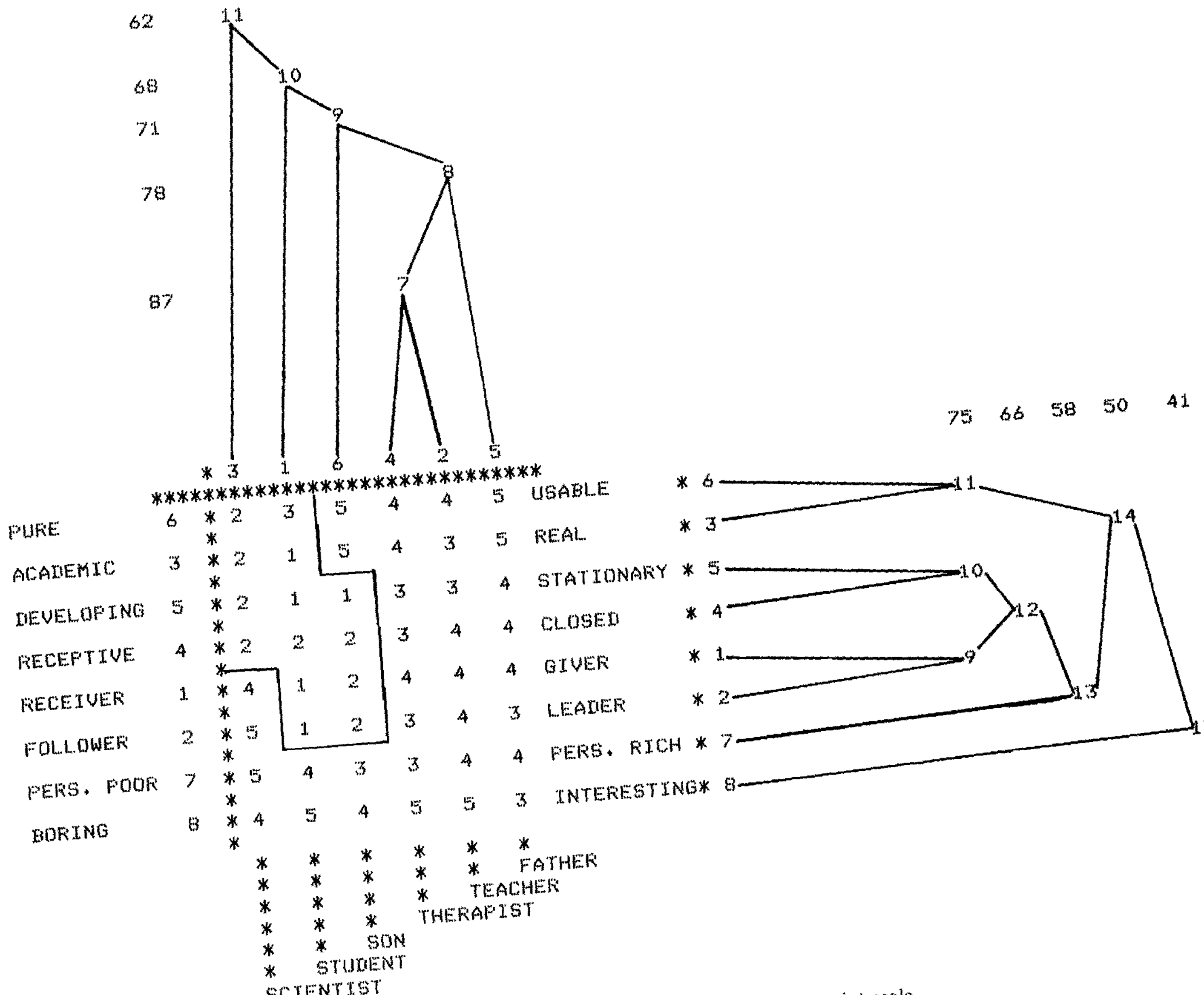


Fig. 9.10. The grid from the role of "father" using a five-point scale.

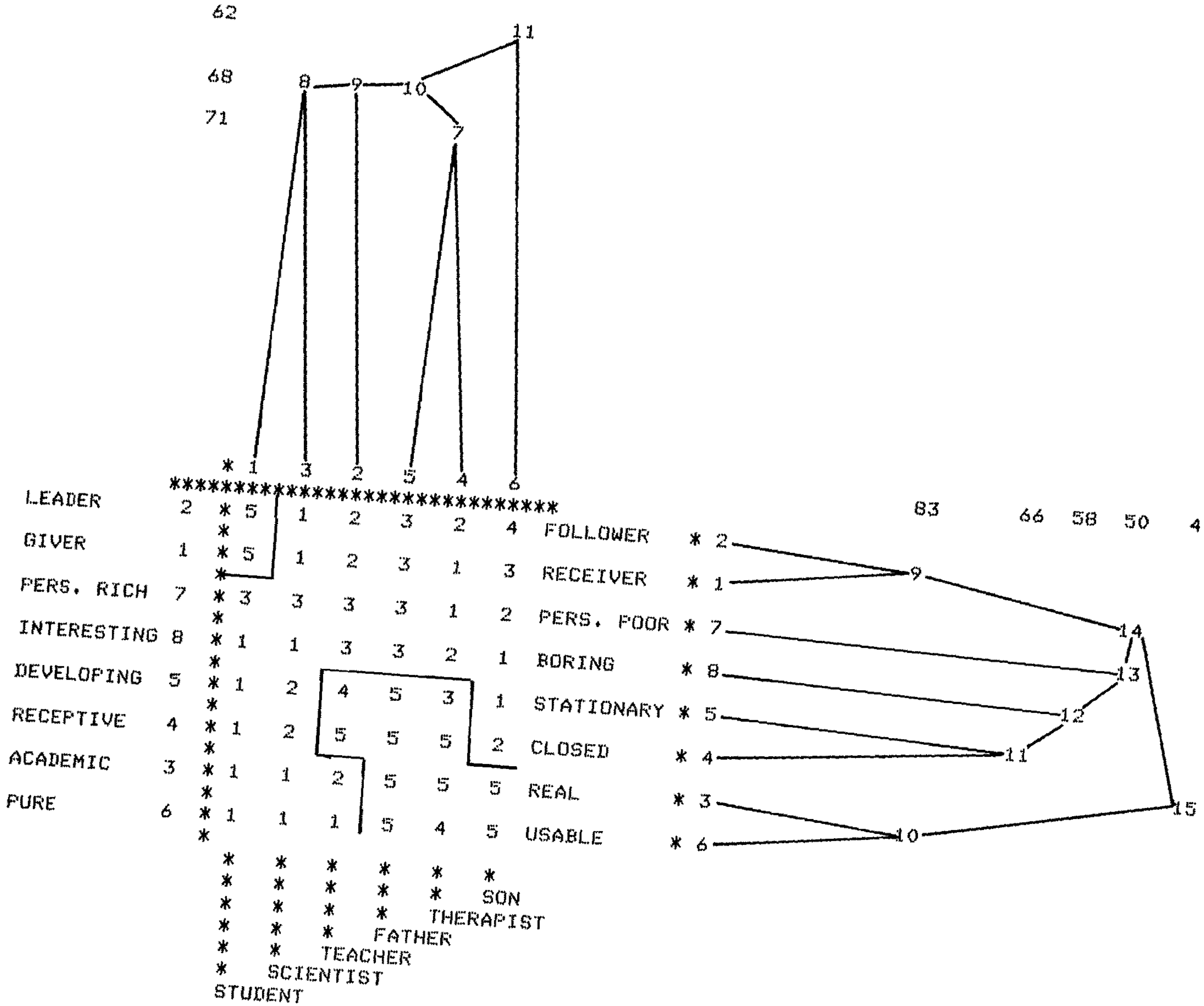


Fig. 9.11. The grid from the role of "son" using a five-point scale.

▶46	* 4	1	5	5	1	1	G 6	C 6	*	46
43	* 5	2	5	5	1	1	G 6	C 3	*	43
3	* 5	4	5	5	1	1	G 1	C 3	*	3
11	* 5	4	5	5	3	1	G 2	C 3	*	11
▶38	* 4	4	5	5	3	2	G 5	C 6	*	38
19	* 4	4	5	5	2	3	G 3	C 3	*	19
▶22	* 4	4	5	5	2	3	G 3	C 6	*	22
▶14	* 5	4	5	5	2	3	G 2	C 6	*	14
▶30	* 5	4	5	5	2	2	G 4	C 6	*	30
▶6	* 4	3	5	5	2	2	G 1	C 6	*	6
27	* 4	3	5	5	2	2	G 4	C 3	*	27
35	* 4	3	5	5	1	2	G 5	C 3	*	35
▶20	* 3	3	4	4	2	2	G 3	C 4	*	20
17	* 3	4	4	3	1	3	G 3	C 1	*	17
36	* 3	4	4	2	2	2	G 5	C 4	*	36
45	* 3	4	5	1	1	2	G 6	C 5	*	45
37	* 3	3	4	1	1	2	G 5	C 5	*	37
29	* 3	3	4	1	1	2	G 4	C 5	*	29
13	* 3	3	4	2	1	2	G 2	C 5	*	13
5	* 2	3	3	2	1	2	G 1	C 5	*	5
4	* 2	3	3	2	1	3	G 1	C 4	*	4
28	* 2	3	3	3	2	3	G 4	C 4	*	28
12	* 2	3	3	4	2	2	G 2	C 4	*	12
31	* 2	3	2	4	3	2	G 4	C 7	*	31
▶1	* 2	3	2	4	4	3	G 1	C 1	*	1
▶25	* 2	2	2	4	5	3	G 4	C 1	*	25
▶33	* 2	2	2	4	5	2	G 5	C 1	*	33
▶2	* 2	2	2	5	5	1	G 1	C 2	*	2
▶42	* 2	2	3	4	5	1	G 6	C 2	*	42
▶34	* 3	2	3	4	5	1	G 5	C 2	*	34
▶26	* 3	2	2	4	4	1	G 4	C 2	*	26
▶10	* 3	2	2	3	4	1	G 2	C 2	*	10
▶18	* 3	1	2	3	3	1	G 3	C 2	*	18
39	* 3	2	2	3	2	1	G 5	C 7	*	39
32	* 2	2	3	3	2	1	G 4	C 8	*	32
24	* 2	2	3	3	2	1	G 3	C 8	*	24
16	* 2	3	3	3	3	1	G 2	C 8	*	16
8	* 2	3	3	3	2	1	G 1	C 8	*	8
21	* 2	3	3	2	2	1	G 3	C 5	*	21
48	* 2	3	3	1	1	1	G 6	C 8	*	48
40	* 1	1	3	2	1	2	G 5	C 8	*	40
7	* 1	1	2	3	2	1	G 1	C 7	*	7
▶9	* 1	2	2	3	3	1	G 2	C 1	*	9
15	* 1	2	2	3	3	2	G 2	C 7	*	15
23	* 1	2	2	2	3	2	G 3	C 7	*	23
47	* 1	3	3	2	3	3	G 6	C 7	*	47
▶41	* 1	2	3	3	5	1	G 6	C 1	*	41
▶44	* 1	1	1	4	5	4	G 6	C 4	*	44

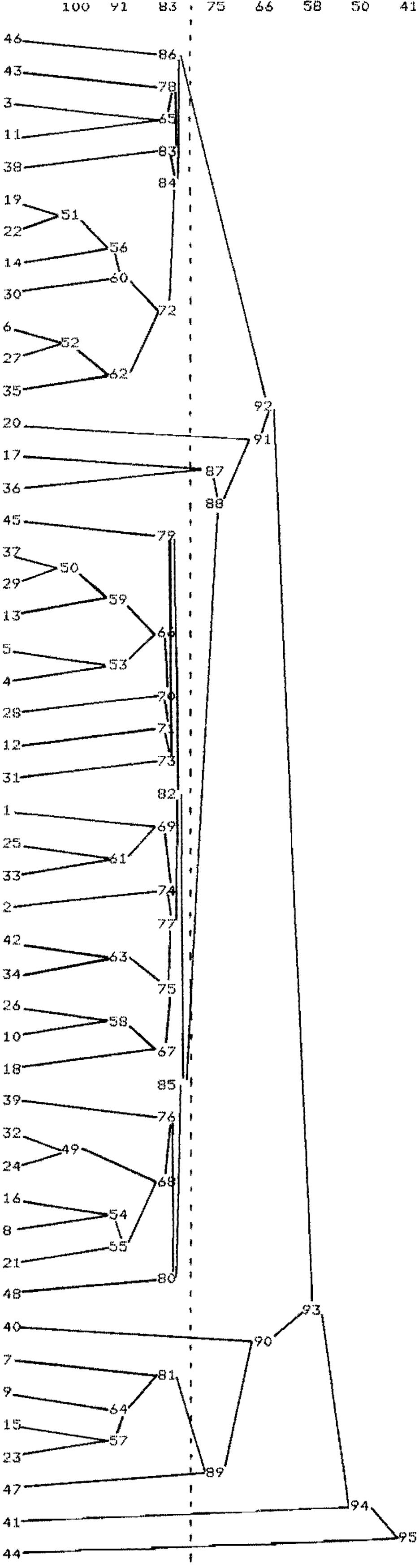


Fig. 9.12. The focused grid of all the constructs from the roles grids. The marked constructs have been reversed. (These may be checked against the original in Appendix I.)

"interesting–boring", perhaps implying that as a scientist there is more of a link between "developing–stationary" and "interesting–boring" than when other roles are in operation. The remaining cluster contains mainly 7's with a 1 contained in the group. The single constructs remaining at the 80 % level are G3C4, G3C1, G5C4, G5C8, G6C7, G6C1 and G6C4. This may indicate the variable nature of these particular constructs elicited in these particular situations.

(c) *The SOCIOGRIDS analysis.* The first twelve socionets shown in Fig. 9.13 demonstrate the difference of "son". All other internal links are drawn in the group excluding "son" before any link brings in this role. This may have some connection with the comment made by the subject on the difficulty of holding a steady view of this role, or it may indicate a distinct position from which to see the world. The table of average match values for each construct, Fig. 9.14, shows the relatively high levels of match between constructs with the same name, that is along each row. The lowest is 58 % shown in G6C4 which was "receptive–closed" from the point of view of "son". The SOCIOGRIDS run is shown in Appendix H.

(d) *The CORE grids.* Having run every combination of pairs of grids on the CORE program, Fig. 9.15 shows those elements and constructs unchanged in each case. Immediately striking is the large core common to "father" and "therapist" of three elements and four constructs. Overall, the core grids are large showing an integration of each role with all the other roles. One commonly occurring element is 5, "father", indicating a constant view of this role from each of the others. Although "therapist" has the most in common with other roles, the element "therapist" is not one of the core elements; and this is in turn true also for "student", "teacher" and "scientist". This may lead one to think that there could be a lack of security in these positions since the view of the position itself is changing. "Father" and "son" do not exhibit this property.

4. *Conclusion and evaluation*

From the various methods used to process these six grids, much data was produced which has yielded a wealth of information. One may assume from the great similarity of the grids, from the large core part existing between all pairs, and from the match values of all the constructs, that this is a well-adjusted, colloquially "together" person. Perhaps, of all the data presented the most useful is shown in the grid of all the constructs together (Fig. 9.12) showing how they cluster not only within grids but also between grids. Although the SOCIOGRIDS analysis is helpful, in this case its full capacity is not used because of the high similarity between all the grids. It does, however, bring to light the variable nature of the role of "son", which was mentioned by the subject not as an explanation of the socionets, but before he saw the SOCIOGRIDS results.

Clearly, in this case, it would have been better to allow the element "son" to be split into two elements "son at the present time" and "adolescent son". Also, perhaps the original idea of incorporating an element to represent "the real me" could have been reintroduced at a later stage in the procedure, to investigate whether it might be more successful there. The underlying nature of the whole person seems very much towards the paternal/therapeutic view indicating a generally benevolent helpfulness, although this is a purely subjective assessment. One of the clearest reactions during the feedback session was the forming of the construct "emic–etic" by the subject.

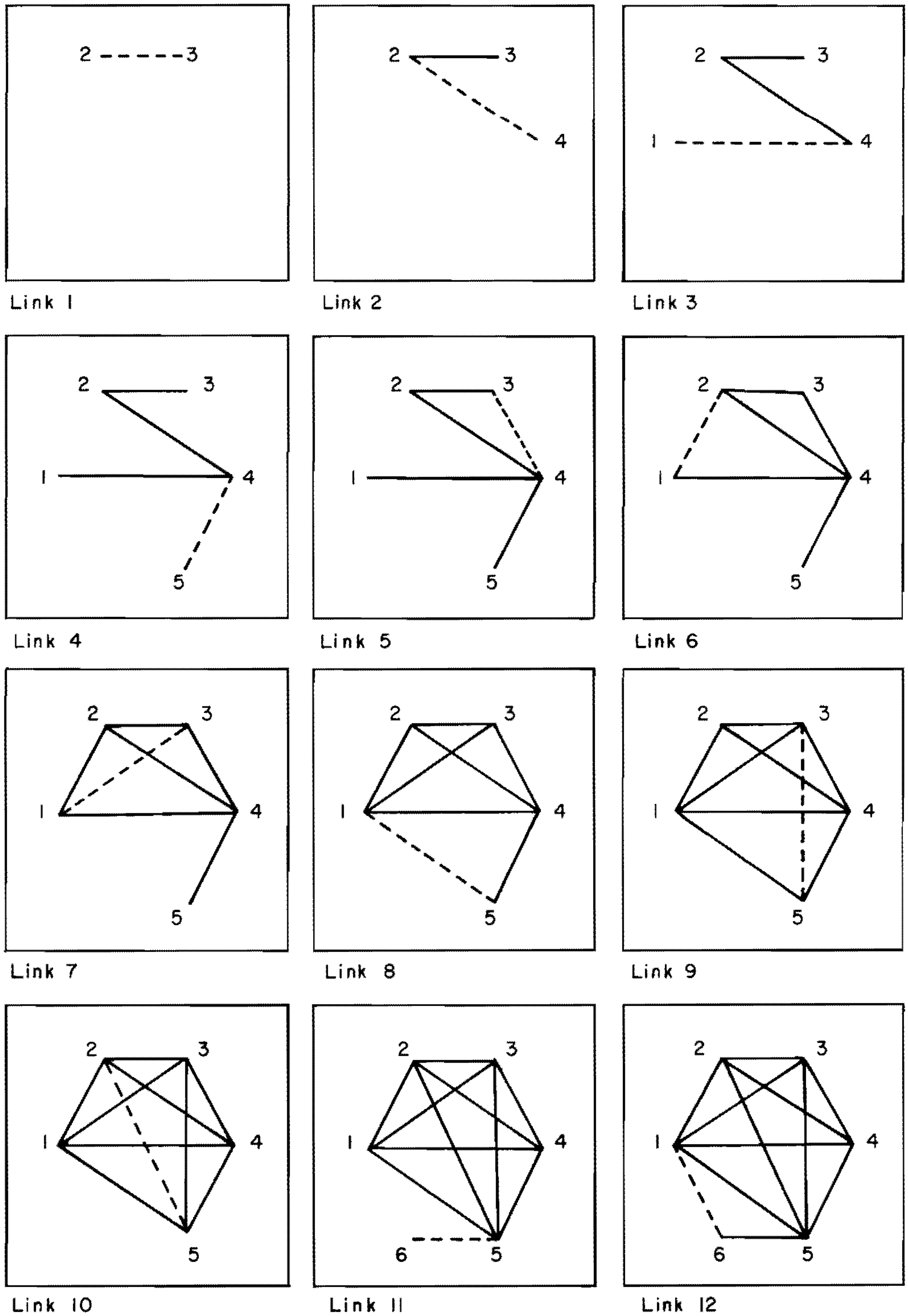


Fig. 9.13. Socionets for the set of roles.

```
TABLE OF AVERAGE MATCH VALUES FOR EACH CONSTRUCT
************************************************

GRIDS ARE NUMBERED ALONG THE TOP, CONSTRUCTS DOWN THE SIDE


    * 1   2   3   4   5   6
******************************
1   * 71  78  73  81  79  69

2   * 73  78  73  79  78  76

3   * 78  76  78  83  79  68

4   * 74  73  73  74  76  58

5   * 79  83  81  83  83  73

6   * 83  78  78  81  76  61

7   * 73  74  73  73  74  69

8   * 84  78  84  84  63  76
```

Fig. 9.14. The table of average match values for the roles grids.

		Student	Teacher	Scientist	Therapist	Father	Son
Student	E		5, 6	4, 5	3, 5	3	3, 4
	C		3, 6, 7, 8	5, 6, 7, 8	1, 4, 6, 8	5, 6, 7	2, 3, 8
Teacher	E			5, 6	3, 5	5, 6	3, 4
	C			2, 6, 8	2, 5, 7, 8	3, 6, 7	1, 3, 5, 8
Scientist	E				1, 5	2, 5	4
	C				1, 3, 7, 8	1, 6, 7	6, 7, 8
Therapist	E					2, 5, 6	6
	C					1, 3, 5, 6	3, 5, 6
Father	E						1, 6
	C						2, 3, 5
Son	E						
	C						

Fig. 9.15. Results of fifteen CORE runs on the roles grids.

> It proved convenient—though partially arbitrary—to describe behavior from two different standpoints, which lead to results which shade into one another. The etic viewpoint studies behavior as from outside of a particular system, and as an essential initial approach to an alien system. The emic viewpoint results from studying behavior as from inside the system.
>
> *(Pike, 1967, p. 37)*

Current work on this type of data involves the construction of a coherent network from the links found from each position, to build a view of the person as he potentially is. This would then enable him to see in particular instances what link would move him from where he finds himself to where he could operate more effectively in the world, thereby forming a coherent view of reality from a set of personally significant realities. With more use and experience of ARGUS it may be possible to identify alternative purposes more succinctly, and hence relate different forms of analysis more appropriately to different purposes.

C. A Study with a Section of ICI Paints Division on Personal Judgement in Staff Appraisal

1. *Introduction*

The Management Services Division of the above company felt that although standard assessment forms were used for staff appraisal, different people were perhaps using them in different ways. The agreed categories and rating scales presented on the appraisal form are designed to standardise the personal judgements of each manager in order to provide a fair and equitable basis on which to assess each person's performance, so to enable both the company to make the best use of its resources and each individual to make the best use of the opportunities offered by the company for self-development. However, there was a prevalent belief that the subjective judgements made within this objective framework reflect the personal value system of the manager concerned in the appraisal.

The purposes of this study were to explore the dimensions used by each manager in the appraisal of his subordinates in such a way as to help him to become more aware of the implicit criteria he uses; and to reflect to the group the patterns of judgement formed within the group, hence providing material for discussion on how to exploit the similarities and differences in the group for the benefit of all concerned.

2. *Methods and design*

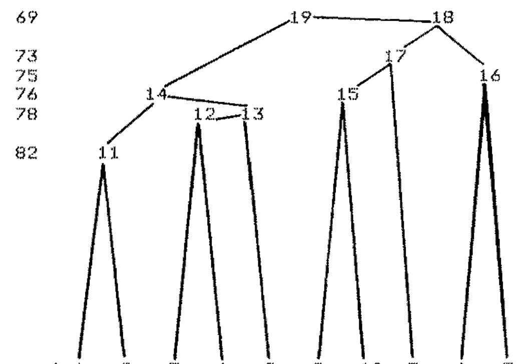
The programs used in this study were PEGASUS, SOCIOGRIDS and CORE. Initially each manager chose a set of elements which was made up of his immediate subordinates. Each manager then used the PEGASUS program described in Chapter 5 to examine the basic dimensions of his own personal assessment of his subordinates, and the way in which they contribute to the work of the department. As the procedure progressed, real-time feedback was given on the relationships implicitly held by the manager and extracted by his conversation with himself via PEGASUS. The complete run for one manager is shown in Appendix D. After the PEGASUS experience the manager was talked through the focused grid to help him to achieve a greater awareness of the underlying processes of evaluation and judgement being used. This is a similar process to that demonstrated in Chapter 3 on the grid about the programs.

After each of the seven managers had completed this stage, each took part in another PEGASUS procedure using as elements a negotiated group of twelve subordinates known to all the managers and representing as fully as possible the variety of employees in the department. Again the focused grid was explored and explained by each manager respectively. Since on the second occasion the set of elements was shared by all the participants, a SOCIOGRIDS analysis as described in Chapter 7 was appropriate to reveal the patterning in the group and the content of the shared construing. The socionets, mode grid, trees of elements from all the grids of the second set, the entire list of constructs, and the individual grid focused with the mode, were used as the basis of an individual session with each manager. This was carried out by reviewing the analysis of the second PEGASUS grid in order to remind the manager of the constructs he had used, of the clusters of elements and constructs which had been found, and to examine, and where possible name, the clusters which constituted superordinate constructs. He was then shown the mode grid and his own grid focused with the mode, noting which, if any, of his own constructs were frequently used by the group. From the list of socionets he was able to see the interlinkages within the group, noting particularly the most highly matched pair, the order in which individual members were drawn into the socionets, where he himself was placed within this overall pattern, which subgroups were apparent within the group, and which individual member had the most central or mediating position in the group. The seven trees of element clusters from each person were presented so that each manager could see the groupings of subordinates made by the others, thereby isolating areas of agreement and disagreement. The total list of constructs used by all the managers enabled each to see the range and variety produced by his colleagues who were ostensibly using the same dimensions for appraisal. During this session, the manager was encouraged to reflect on his dimensions of judgement used in appraisal, to relate these to the pattern of the group, and to assess his position in the group as shown by these results.

Following these individual sessions, the group met to discuss the results and assess how the best use could be made of the information obtained. Two or three weeks after this group meeting, each manager rerated his constructs from his first grid on his original elements, adding extra constructs and/or elements where it was felt to be desirable. These were then individually processed on the CORE program as described in Chapter 6, each being compared with the first elicited grid to assess the change which had taken place over the duration of the study.

3. *Results*

Figure 9.16 shows one of the first set of PEGASUS grids in its focused form. This indicates the types of constructs used by one manager. Figure 9.17 shows the list of socionets constructed from the matrix of similarity measures which is used to produce the patterning shown in Fig. 9.18. It can be seen that 5 and 4 form the most related pair, although by link 6 all members have been included, indicating a highly cohesive group of people. Person 4 seems to be most central, having the most connections by link 9. If two subgroups could be distinguished they might contain 3, 4 and 7, and 1, 4 and 5, but since 4 belongs to both of these it may be inappropriate to separate them.



		1	2	5	6	8	9	10	3	4	7		
NEWBOY	3	1	2	4	4	1	4	3	3	5	4	OLDSWEATS	3
PROFESSIONAL	12	1	2	2	1	2	4	4	3	3	5	LESS PROFESSIONAL	12
OVERALL RATING HIGH	13	2	1	1	2	2	3	4	3	4	5	OVERALL RATING LOW	13
LITTLE SUPVSN REQ	4	3	1	2	1	2	2	3	4	5	5	NEED SUPVSN	4
RELIABLE	6	3	2	1	1	1	2	3	2	5	5	NOT SO RELIABLE	6
WILLING	2	1	2	1	1	3	1	2	4	5	4	UNWILLING	2
MOTIVATED	5	1	1	2	2	3	3	2	4	5	5	LESS MOTIVATED	5
INTELLIGENT	1	1	1	3	3	2	3	5	4	5	5	DIM	1
CREATIVE	10	1	1	2	3	3	4	5	5	5	4	NON CREATIVE	10
SELF STARTERS	9	2	1	1	3	3	4	5	5	5	5	NEED A PUSH	9
IDEAS MEN	8	1	1	2	3	3	4	4	5	4	1	STAID	8
MILD	7	3	4	2	3	5	4	5	5	2	1	ABRASIVE	7
HELPFUL	11	4	3	3	5	4	5	5	4	2	1	UNHELPFUL	11
MESSERS	14	2	2	3	5	5	3	1	5	4	1	TIDY	14
		S1	S2	S5	S6	S8	S9	S10	S3	S4	S7		

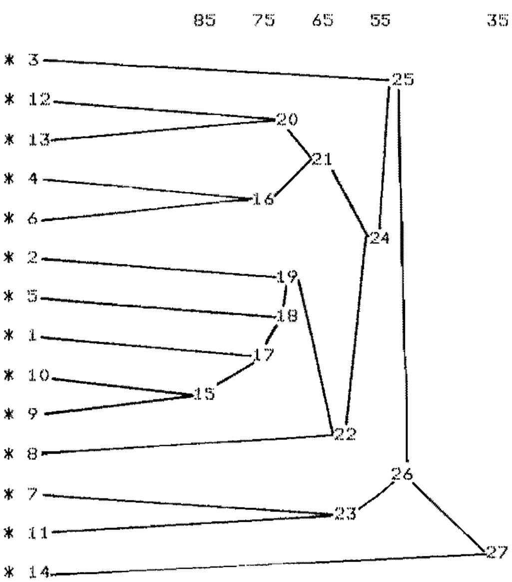


Fig. 9.16. A PEGASUS grid on staff appraisal using a five-point scale.

1	2	3	4	5	6	7	LINK COUNT	NEW LINK	MAX VALUE	MAX/MIN
			4	5			1	5 > 4	69.72	1.94
		3	4	5			2	5 > 3	69.64	8.8
		3	4	5	6		3	4 > 6	69.55	4.55
1		3	4	5	6		4	5 > 1	68.45	2.06
1		3	4	5	6	7	5	7 > 3	67.85	10.28
1	2	3	4	5	6	7	6	2 > 4	67.77	1.43
1	2	3	4	5	6	7	7	4 > 1	67.55	2.55
1	2	3	4	5	6	7	8	4 > 3	66.66	1.38
1	2	3	4	5	6	7	9	7 > 4	66.11	3.23
1	2	3	4	5	6	7	10	1 > 3	66.07	8.33
1	2	3	4	5	6	7	11	5 > 6	66.02	0.74
1	2	3	4	5	6	7	12	2 > 6	65.7	6.73
1	2	3	4	5	6	7	13	2 > 3	65.47	15.79
1	2	3	4	5	6	7	14	1 > 6	65.38	1.69
1	2	3	4	5	6	7	15	2 > 5	64.72	2.22
1	2	3	4	5	6	7	16	2 > 1	63.39	1.85
1	2	3	4	5	6	7	17	5 > 7	62.12	1.28
1	2	3	4	5	6	7	18	7 > 1	61.01	0.02
1	2	3	4	5	6	7	19	7 > 6	59.61	2.03
1	2	3	4	5	6	7	20	6 > 3	59.52	0.22
1	2	3	4	5	6	7	21	7 > 2	58.33	2.65

Fig. 9.17. The list of socionets from the group of managers.

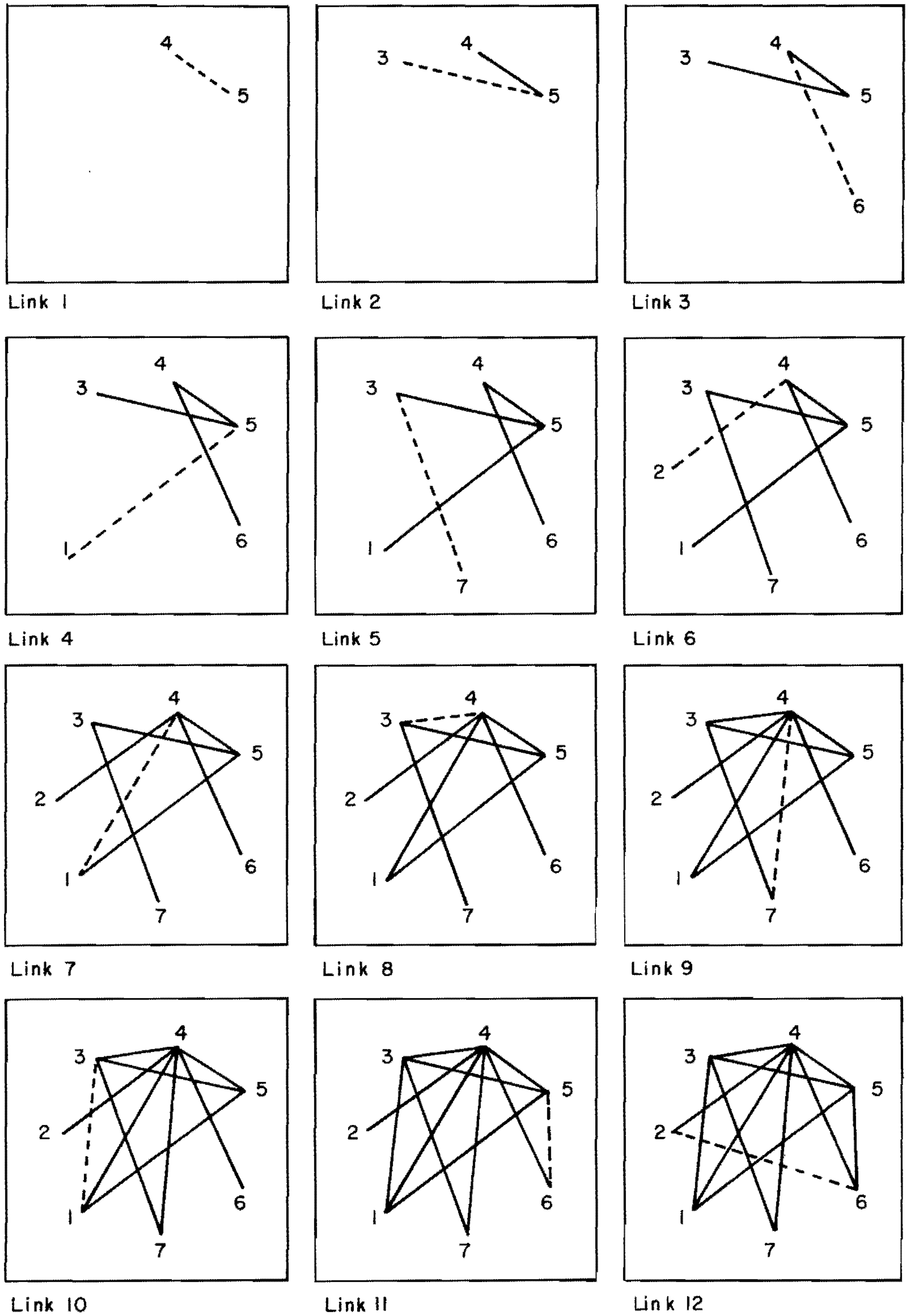
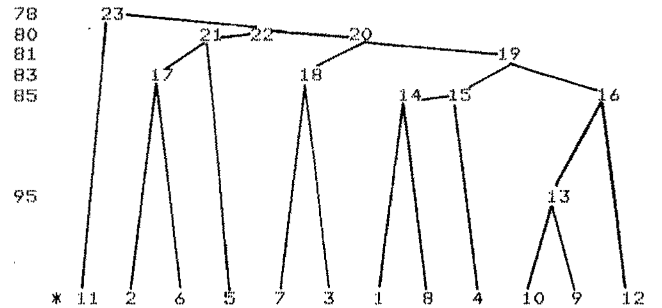


Fig. 9.18. Socionets from the group of managers.

THE 30 HIGHEST MATCHED CONSTRUCTS ARE :

MODE		CONSTRUCTS	AVERAGE MATCH
***			
1	--	G 3 C 4	74.99
2	--	G 3 C 5	74.99
3	--	G 2 C 7	74.99
4	--	G 1 C 11	74.99
5	--	G 6 C 12	74.99
6	--	G 5 C 15	74.3
7	--	G 3 C 2	72.91
8	--	G 4 C 2	72.22
9	--	G 4 C 3	72.22
10	--	G 5 C 4	72.22
11	--	G 6 C 4	72.22
12	--	G 7 C 5	72.22
13	--	G 4 C 6	72.22
14	--	G 6 C 11	72.22
15	--	G 4 C 13	72.22
16	--	G 6 C 1	71.52
17	--	G 7 C 1	71.52
18	--	G 4 C 7	70.83
19	--	G 5 C 7	70.83
20	--	G 4 C 9	70.83
21	--	G 4 C 4	70.13
22	--	G 2 C 11	70.13
23	--	G 5 C 8	69.44
24	--	G 5 C 9	69.44
25	--	G 2 C 2	68.74
26	--	G 3 C 1	68.05
27	--	G 4 C 1	68.05
28	--	G 5 C 2	68.05
29	--	G 5 C 13	68.05
30	--	G 1 C 4	67.36

Fig. 9.19. The most frequently used constructs from the managers.



		11	2	6	5	7	3	1	8	4	10	9	12		
JUNIORS	14	1	1	2	2	3	2	4	3	5	4	4	4	SENIORS	14
NEEDS SUPERVISION	3	3	1	2	3	3	2	3	3	5	4	4	5	WORKS INDEPENDENTLY	3
LESS PROFFESIONAL	11	1	1	3	3	2	2	3	4	5	4	4	5	PROFESSIONAL	11
UNINTELLIGENT	5	2	1	2	3	2	2	3	4	4	5	4	4	INTELLIGENT	5
DISLIKE PRESSURE	15	1	1	1	3	2	2	3	4	4	5	5	5	ACCEPT PRESSURE	15
NEEDS SUPERVISION	8	1	1	2	4	3	4	4	4	4	5	5	5	UNSUPERVISED	8
LACKS JUDGEMENT	6	2	2	2	3	3	3	3	4	4	4	5	4	HAS GOOD JUDGEMENT	6
POOR COMMUNICATION	7	3	2	2	1	3	3	3	4	4	3	4	4	GOOD COMMUNICATION	7
FOLLOW	12	3	2	1	1	1	3	3	4	4	4	4	5	LEAD	12
ORAL COMM. POOR	9	4	2	1	1	2	3	3	3	4	4	4	3	ORAL COMM. GOOD	9
DUMB	4	2	2	1	2	2	3	4	3	4	4	4	4	COMMUNICATOR	4
LACK OF DETERMINATION	2	3	2	1	2	3	2	4	4	4	4	4	5	PERSISTENCE	2
POOR PLAN./PROB. ANAL.	1	3	1	1	2	3	2	3	4	3	4	4	5	PLAN./CREATIVE ABILITY	1
NARROW VIEW	13	3	1	1	1	2	2	3	3	2	4	4	5	WIDER VIEW	13
NO STAFF RESP.	10	2	1	1	2	1	2	3	3	3	4	4	3	HAS/HAD STAFF RESP.	10

M12
M9
M10
M4
M8
M1
M3
M7
M5
M6
M2
M11

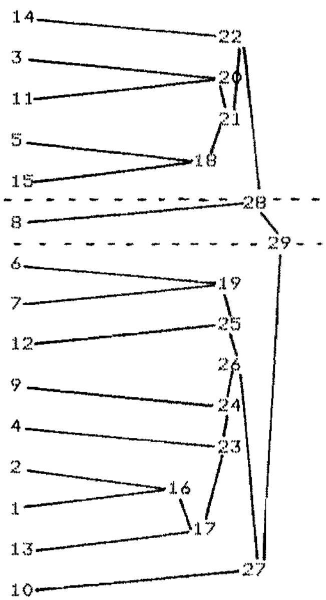


Fig. 9.20. The mode grid for the managers using a five-point scale.

The most frequently used constructs are shown in Fig. 9.19, from which the top fifteen were chosen to make the mode grid. The focused form of the mode is shown in Fig. 9.20. It can be seen that there are three major clusters of constructs: 14, 3, 11, 5 and 15; 8; and 6, 7, 12, 9, 4, 2, 1, 13 and 10. These divide the elements into two main clusters: 11, 2, 6, 5, 7 and 3, which is subdivided into several smaller clusters; and 1, 8, 4, 10, 9 and 12. If the construct names used in the mode grid are compared with the total list of construct names shown in Fig. 9.21 it can be seen that much of the elaboration is verbal rather than operational.

Each first PEGASUS grid was compared with the rerated grid using the CORE program. There was a wide range of "coreness" of constructs and of the final size of the core grid for each person. All the managers had all the elements matched over 70% from the first time to the second, although one or two of the construct match values were very low, even negative, indicating that either the pole names were accidentally reversed, or the construct is actually being used in a reverse way on the second occasion. Two examples of the grids are given, the core part being common to both. Figure 9.22 shows the largest core grid whereas Fig. 9.23 shows the smallest.

4. *Conclusion and evaluation*

All the managers involved in the study reported that they had enjoyed the PEGASUS elicitation sessions on the computer. During the feedback session it was felt that they had been deeply involved in the interaction and had been encouraged to explore more exactly what they had thought and felt; the fact that the whole elicitation was conducted in the terms of the participant maintained the reality of the conversation throughout.

The study has clearly demonstrated the feasibility of using these techniques for the exploration and improvement of staff appraisal schemes. The PEGASUS elicitations were very successful in this context, and together with the individual feedback sessions were enlightening and interesting to both parties. The group session, however, was rather hurried with too much information presented in too short a time. Much of the material from the SOCIOGRIDS analysis was interesting and useful, although it was felt that a clearer picture could have been presented by using the MIN–PEGASUS version on the second occasion. This would have allowed high element and construct matches to have been retained for consideration by the group, and perhaps would have revealed further relationships in the SOCIOGRIDS analysis which in the event were hidden. It would have been useful to have had more time devoted to exchange grids between pairs of managers, when each might have been encouraged to greater empathy and understanding of others. Also, the Delphi iterative technique could have been employed with benefit, encouraging each person to identify, clarify and stabilise his own position, not only in the group as a whole but also as part of a significant separate value system in a subgroup.

The CORE analysis clearly showed a substantial area of commonality between the two occasions for most of the managers. This is probably due to the fact that the group is very cohesive and has thought about and discussed the problems of staff appraisal quite extensively.

The company has also valued the results of the study, and is considering extending this type of work into other areas of interest such as subjective standards in inspection and quality control, evaluation of training courses and development programmes, selection

G3	C4	POOR PLANNING/PROBLEM ANALYSIS V	PLANNING/CREATIVE ABILITY
G3	C5	LACK OF DETERMINATION	PERSISTENCE
G2	C7	WORKS INDEPENDENTLY	NEEDS SUPERVISION
G1	C11	COMMUNICATOR	DUMB
G6	C12	INTELLIGENT	UNINTELLIGENT
G5	C15	LACKS JUDGMENT	HAS GOOD JUDGMENT
G3	C2	POOR COMMUNICATION	GOOD COMMUNICATION
G4	C2	NEED SUPERVISION	UNSUPERVISED
G4	C3	ORGAL COMM POOR	ORAL COMM GOOD
G5	C4	NO STAFF RESPONSIBILITIES	HAS/HAD STAFF RESPONSIBILITIES
G6	C4	PROFESSIONAL	LESS PROFESSIONAL
G7	C5	LEAD	FOLLOW
G4	C6	NARROW VIEW	WIDER VIEW
G6	C11	SENIORS	JUNIORS
G4	C13	DISLIKE PRESSURE	ACCEPT PRESSURE
G6	C1	EFFICIENT	LESS EFFICIENT
G7	C1	SPECIFIERS	IMPLEMENTERS
G4	C7	ECONOMICALLY AWARE	ECONOMICALLY UNAWARE
G5	C7	DOES NOT COMMUNICATE WELL	COMMUNICATES WELL
G4	C9	MISS OBJ	MEET OBJ
G4	C4	LESS TECH EXP	WIDER TECH EXP
G2	C11	DESIGNS SYSTEMS	ACCEPTS SYSTEMS
G5	C8	LIMITED MSD EXPERIENCE	WIDE MSD EXPERIENCE
G5	C9	DOES NOT PLAN WORK SO WELL	PLANS WORK WELL
G2	C2	STRONG USER RELATIONSHIP	WEAK USER COMMUNICATION
G3	C1	WANT/NEED GUIDANCE	INDEPENDENCE/INITIATIVE
G4	C1	REQ TRIGGER	SELF STARTER
G5	C2	LACKS SELF-CONFIDENCE	SELF-CONFIDENT
G5	C13	MODERATE OVERALL PERFORMANCE	GOOD OVERALL PERFORMANCE
G1	C4	JOB INTEREST	JOB APATHY
G1	C6	SELF CONFIDENT	UNSURE
G1	C7	PRODUCES GOODS	INEFFECTIVE
G1	C14	OUTGOING	SHY
G4	C8	DISLIKE CHANGE	WILLING CHANGE
G4	C10	RETAIN IDEAS	COMM IDEAS
G4	C14	INCONSISTENT	CONSISTENCY
G5	C10	LACKS DRIVE	HAS ENTHUSIASM
G6	C2	RELIABLE	NOT SO RELIABLE
G1	C5	SALESMAN	BACKROOM BOY
G1	C8	WORK PLANNED	WORK DISORGANISED
G2	C4	TECHNICAL EXPERTISE	WEAK TECHNICALLY
G5	C1	UNWILLING FOR CHANGES	WILLING TO CHANGES
G7	C6	RESPONSIVE	NON-RESPONSIVE

G6	C3	SELF STARTED	NEED A PUSH
G6	C10	RATING HIGH	RATING LOW
G6	C13	CREATIVE	NON CREATIVE
G7	C4	PROG. ABILITY	LESS PROG. ABILITY
G5	C5	LITTLE OPERATING EXPERIENCE	HAD OPERATING EXPERIENCE
G5	C11	LESS DEPENDABLE	DEPENDABLE
G1	C2	LEADER	LONER
G3	C7	ERRATIC/INEFFICIENT	ORGANISED/EFFICIENT/CONSISTENT
G6	C9	TIDY	MESSERS
G7	C8	SPEAKING ABILITY	NO SPEAKING ABILITY
G2	C8	ACCEPTS NEW IDEAS	UNWILLING TO ACCEPT NEW IDEAS
G2	C12	RESPONDS UNDER PRESSURE	DISLIKES PRESSURE
G1	C3	VETERAN	NEW BOY
G1	C10	BUSINESS APPRECIATION	BUSINESS IGNORANCE
G1	C13	WILLING TO HELP OTHERS	SELF CENTRED
G6	C5	EXTROVERT	INTROVERT
G6	C6	SUPERVISOR	SUPERVISED
G1	C1	INITIATOR	FOLLOWER
G4	C5	LACK EMPATHY	HAS EMPATHY
G4	C11	IGNORE DETAIL	ATTENTION TO DETAIL
G7	C11	MANAGE	NON-MANAGE
G1	C12	SYSTEMS	PROGRAMMING
G4	C12	INTERNAL	USER LIASON EXP.
G5	C6	MORE EMOTIONAL UNDER PRESSURE	UNFLAPPABLE
G7	C2	EXTROVERT	INTROVERT
G1	C9	WILLING TO CHANGE	CLOSED MIND
G2	C6	STRONG MINDED	EASILY INFLUENCED
G2	C10	TEAM WORKER	LONER
G2	C1	SPECIFIES PROGRAMS	PROGRAMS TO SPECIFICATION
G2	C9	ATTENTION TO DETAIL	SLAPDASH
G2	C3	GOOD APPLICATION	EASILY DISTRACTED
G3	C6	POOR INTERPERSONAL SKILLS	GOOD INTERPERSONAL SKILLS
G5	C12	HERMIT-LIKE TENDENCES	GREGARIOUS
G5	C14	WORKS STANDARD HOURS	DISTURBED OUT OF HOURS
G7	C9	NON-FLEXIBLE	FLEXIBLE
G7	C7	NEAT	UNTIDY
G3	C3	TECHNIQUE/DETAIL MINDED	USER ORIENTED
G4	C15	DESTRUCTIVE ATTITUDE	CONSTRUCTIVE ATTITUDE
G6	C7	ABRASIVE	MILD
G2	C5	INVOLVED IN PERSONNEL	NOT CONCERNED WITH PERSONNEL
G6	C8	UNWILLING	WILLING
G7	C10	ARGUER	AGREER
G7	C3	MOANER	EASY-GOING
G5	C3	NOT MARRIED	MARRIED
G2	C13	NO DATA COMM.	DATA COMMUNICATIONS

Fig. 9.21. The total list of constructs from the managers.

```
     * 1   6   4   2   3   5
*****************************
5    * 2   3   1   5   1   1  *
     *                        *
7    * 2   4   1   5   3   3  *
     *                        *
3    * 2   5   2   3   1   3  *
     *                        *
8    * 3   4   1   4   5   3  *4   6   1
     *          .- - - - - - .*************
1    * 3   4   2 : 4   1   3 : 2   4   3  *
     *           :           :            *
2    * 3   2   1 : 4   5   5 : 1   2   3  *
     *           :           :            *
4    * 5   4   1 : 3   2   2 : 1   4   5  *
     *           :           :            *
6    * 3   5   2 : 4   1   3 : 2   5   3  *
     *           :           :            *
9    * 3   5   1 : 5   1   2 : 2   4   3  *
     *           :           :            *
10   * 2   1   5 : 2   4   3 : 5   1   2  *
     *           :           :            *
11   * 2   5   1 : 5   2   3 : 1   5   3  *
     *           '- - - - - -'            *
************ 8 * 4   5   4   1   3   3  *
               *                        *
             3 * 4   1   3   2   5   2  *
               *                        *
             7 * 5   2   3   2   4   3  *
               *                        *
             5 * 4   1   2   1   3   3  *
               *                        *
             ****************************
```

Fig. 9.22. The two grids from a manager showing the largest core.

procedures, vocational guidance for people on early retirement, management decision-making in committee, consumer judgement in choosing products, and perceptual training in the acquisition of skill. This combination of techniques has been successful in helping to isolate and display the many interdependent variables used in the area of human judgement, and in particular for staff appraisal.

D. A Study of the Personal and Family Relationships of Two Teenagers in a Psychiatric Adolescent Unit

1. *Introduction*

This study was undertaken as part of a third-year work-placement by a Brunel undergraduate who chose to use the repertory grid and the associated computer programs as the main vehicle of the work. The aim of the study was to satisfy the needs of the psychiatric staff and the adolescents at the unit in terms of the problems which beset the adolescent, and simultaneously to carry out a piece of research acceptable to the University in the situation presented. This led to the important consideration of balancing the exercise so that it was pertinent to a theory of psychiatry and also offered the adolescent a possibility to clarify his view of himself and others. These requirements were mainly fulfilled by the repertory grid.

2. *Methods and design*

It was decided that the grids used with this group should all be of the same format to allow some comparison to be made between individual grids and hence allow the experimenter to build up his experience in this type of procedure. The problems of the adolescents in

```
      * 1    3    5    7    8    2    9    4    6
*****************************************************
11    * 5    3    2    4    5    3    1    1    3    *
      *                                              *
2     * 3    4    1    4    1    1    3    5    5    *
      *                                              *
3     * 5    5    1    5    1    2    3    4    5    *
      *                                              *
4     * 2    5    2    2    1    1    3    5    5    *
      *                                              *
14    * 2    1    4    5    3    2    5    3    1    *
      *                                              *
1     * 5    1    1    3    1    1    1    2    3    *
      *                                              *
5     * 3    4    1    4    1    1    3    5    3    *
      *                                              *
8     * 5    3    2    5    1    2    2    3    5    *4    9    2    8    7    5    3    1
      *                                              ****************************************
6     * 3    3    1    5    1    1    4    3    5    3    4    1    2    4    2    2    2    *
      *                                                                                      *
7     * 4    4    2    3    3    2    3    3    3    3    2    1    3    3    2    3    5    *
      *                                                                                      *
9     * 3    4    3    2    3    1    3    3    4    3    2    1    3    2    3    4    5    *
      *                                                                                      *
10    * 4    4    3    2    2    2    2    3    4    4    2    1    2    3    1    4    5    *
      *                                                                                      *
12    * 4    3    2    4    1    2    2    4    5    4    2    1    1    4    1    4    4    *
      *                                                                                      *
13    * 1    5    2    4    1    2    5    3    1    3    5    2    3    3    3    5    2    *
      *                                                                                      *
15    * 4    3    1    5    2    1    2    3    4    3    2    1    2    4    2    3    5    *
      *                                                                                      *
****************************************: 8   * 4    3    2    2    1    4    3    3    5    *
                                              *                                              *
                                          5   * 3    5    2    1    2    5    2    3    4    *
                                              *                                              *
                                          1   * 2    3    1    1    2    3    1    1    5    *
                                              *                                              *
                                          14  * 2    3    4    3    4    5    4    3    1    *
                                              *                                              *
                                          4   * 3    5    2    1    2    2    2    3    2    *
                                              *                                              *
                                          3   * 4    4    2    1    2    5    2    3    5    *
                                              *                                              *
                                          2   * 3    4    1    1    1    4    2    3    5    *
                                              *                                              *
                                          11  * 3    5    5    4    1    2    5    3    1    *
                                              *                                              *
                                          ****************************************************
```

Fig. 9.23. The two grids from a manager showing the smallest core.

becoming aware of themselves in interpersonal relationships led to the choice of the universe of discourse as the nuclear family plus "significant others" in the life of the adolescent. The basic set of elements where applicable included mother, father, four grandparents, brothers and sisters. The remaining elements were in general friends both male and female, the family pet where appropriate, the class teacher, other close relatives, as well as important people that they did not much care for. It was felt that the balance of fifteen stipulated and elicited elements offered a sufficient range and variety of relationships without becoming onerous.

Constructs were elicited by asking the subject to select from the total set of elements the two people who were most alike and, keeping that idea in mind, the one most different from these two. In addition to the elicited constructs, three offered constructs were used: "like I used to be–least like I used to be"; "like I am–least like I am"; "like I'd like to be–least like I'd like to be". It was hoped that measures of similarity between such constructs would provide an indication as to self-definition and the attitude to personal change. A seven-point scale was chosen to give maximum reasonable opportunity for discrimination of the elements, and to help to increase the involvement and commitment of the adolescents.

As each grid was elicited, the experimenter was noting surprising or entirely lacking areas of discrimination. This applied both to elements which were either forgotten or highly resisted, and to dimensions of construing, thus enabling some immediate feedback to be offered during the elicitation procedure. On completion, each grid was processed on the FOCUS program thereby exhibiting more systematically implicit relationships which had been made. This focused version was then returned to the subject who was talked through the relationships shown by the trees and the matching scores matrices.

After ten weeks each subject repeated the grids using the same element and construct names, and again each completed grid was processed on the FOCUS program. Additionally, the CORE program was used for each person on the two grids from each occasion to identify the centrality of the elements and constructs, and the levels of change over this time interval. Although twenty adolescents elicited grids on the first occasion, for a variety of reasons only nine were able to complete the second grid. Of those, two are reported here.

3. *Results*

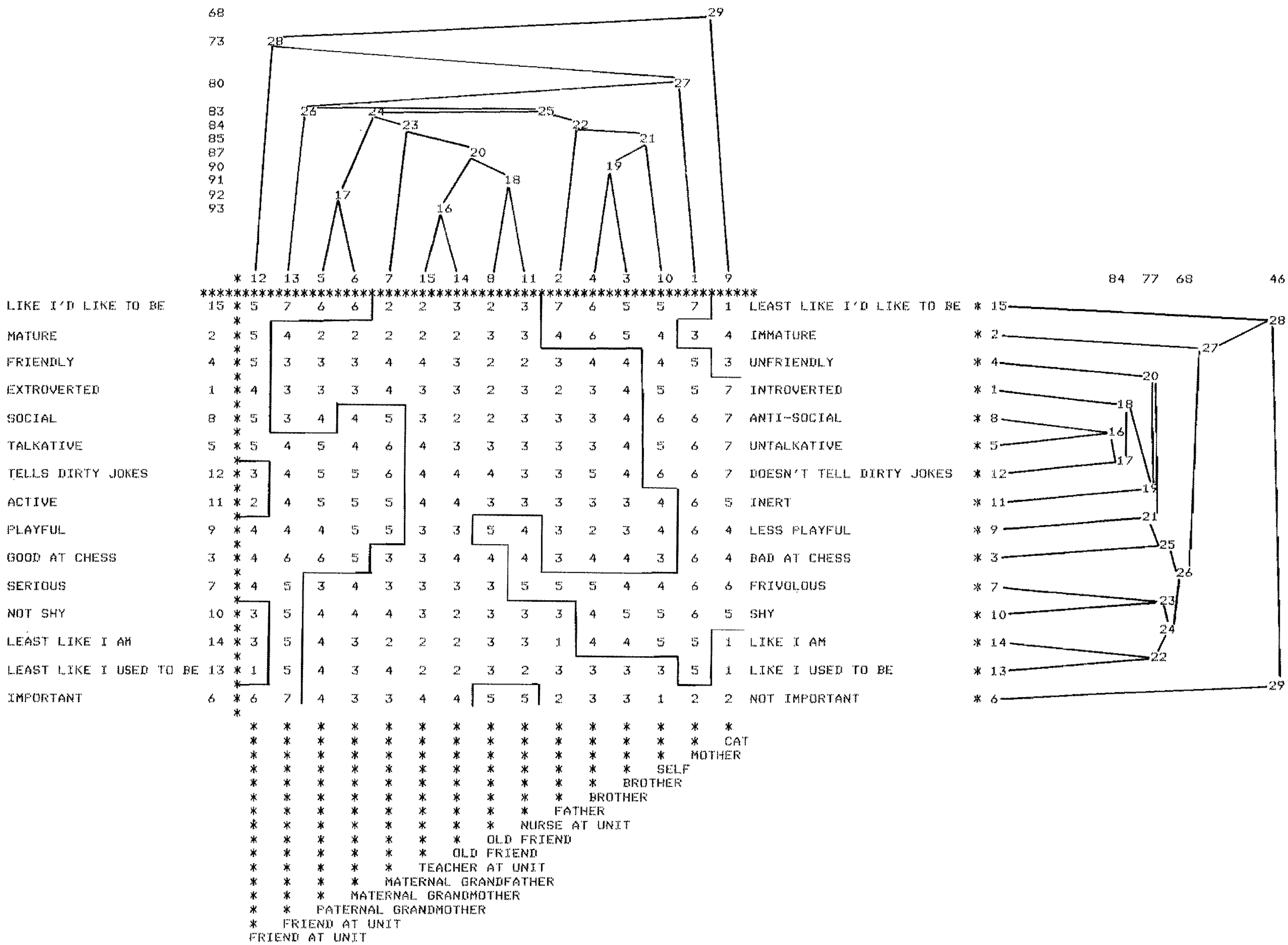
(a) *Peter*. Peter was fifteen years old. During the elicitation of his elements it was felt that he was deliberately excluding girls of his own age. A decision was made on the basis of the situation at the time and previous staff discussions to press Peter into including one such element, despite his protestations as to the lack of importance of one particular girl. In focusing the grid it can be seen from the element matching scores matrix (Fig. 9.24) that

C.S.H.L.

ELEMENT MATCHING SCORES -- GRID 1

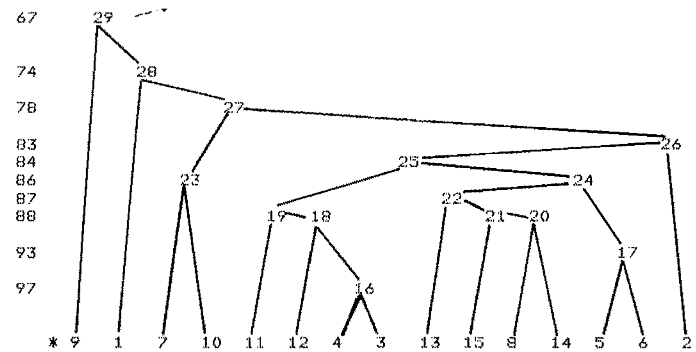
*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 *		62	70	66	75	74	73	56	68	80	58	63	74	55	57
2 *	62		81	84	73	78	68	78	64	73	83	74	76	80	80
3 *	70	81		90	81	84	76	77	67	85	80	84	80	78	81
4 *	66	84	90		80	83	71	76	62	77	81	76	78	77	77
5 *	75	73	81	80		92	82	76	64	77	76	74	83	80	80
6 *	74	78	84	83	92		83	80	67	78	80	75	80	81	81
7 *	73	68	76	71	82	83		76	75	80	72	72	65	77	84
8 *	56	78	77	76	76	80	76		61	67	91	75	73	87	85
9 *	68	64	67	62	64	67	75	61		75	65	65	58	64	66
10 *	80	73	85	77	77	78	80	67	75		70	76	74	68	73
11 *	58	83	80	81	76	80	72	91	65	70		82	77	87	85
12 *	63	74	84	76	74	75	72	75	65	76	82		73	74	76
13 *	74	76	80	78	83	80	65	73	58	74	77	73		72	72
14 *	55	80	78	77	80	81	77	87	64	68	87	74	72		93
15 *	57	80	81	77	80	81	84	85	66	73	85	76	72	93	

Fig. 9.24. Element matching scores for Peter's first grid.



Construct	No.	12 FRIEND AT UNIT	13 FRIEND AT UNIT	5 PATERNAL GRANDMOTHER	6 MATERNAL GRANDMOTHER	7 MATERNAL GRANDFATHER	15 TEACHER AT UNIT	14 OLD FRIEND	8 OLD FRIEND	11 NURSE AT UNIT	2 FATHER	4 BROTHER	3 BROTHER	10 SELF	1 MOTHER	9 CAT	Opposite pole	No.
LIKE I'D LIKE TO BE	15	5	7	6	6	2	2	3	2	3	7	6	5	5	7	1	LEAST LIKE I'D LIKE TO BE	15
MATURE	2	5	4	2	2	2	2	2	3	3	4	6	5	4	3	4	IMMATURE	2
FRIENDLY	4	5	3	3	3	4	4	3	2	2	3	4	4	4	5	3	UNFRIENDLY	4
EXTROVERTED	1	4	3	3	3	4	3	3	2	3	2	3	4	5	5	7	INTROVERTED	1
SOCIAL	8	5	3	4	4	5	3	2	2	3	3	3	4	6	6	7	ANTI-SOCIAL	8
TALKATIVE	5	5	4	5	4	6	4	3	3	3	3	3	4	5	6	7	UNTALKATIVE	5
TELLS DIRTY JOKES	12	3	4	5	5	6	4	4	4	3	3	5	4	6	6	7	DOESN'T TELL DIRTY JOKES	12
ACTIVE	11	2	4	5	5	5	4	4	3	3	3	3	3	4	6	5	INERT	11
PLAYFUL	9	4	4	4	5	5	3	3	5	4	3	2	3	4	6	4	LESS PLAYFUL	9
GOOD AT CHESS	3	4	6	6	5	3	3	4	4	4	3	4	4	3	6	4	BAD AT CHESS	3
SERIOUS	7	4	5	3	4	3	3	3	3	5	5	5	4	4	6	6	FRIVOLOUS	7
NOT SHY	10	3	5	4	4	4	3	2	3	3	3	4	5	5	6	5	SHY	10
LEAST LIKE I AM	14	3	5	4	3	2	2	2	3	3	1	4	4	5	5	1	LIKE I AM	14
LEAST LIKE I USED TO BE	13	1	5	4	3	4	2	2	3	2	3	3	3	3	5	1	LIKE I USED TO BE	13
IMPORTANT	6	6	7	4	3	3	4	4	5	5	2	3	3	1	2	2	NOT IMPORTANT	6

Fig. 9.25. Peter's first grid using a seven-point scale.



		9 CAT	1 MOTHER	7 MATERNAL GRANDFATHER	10 SELF	11 NURSE AT UNIT	12 FRIEND AT UNIT	4 BROTHER	3 BROTHER	13 FRIEND AT UNIT	15 TEACHER AT UNIT	8 OLD FRIEND	14 OLD FRIEND	5 PATERNAL GRANDMOTHER	6 MATERNAL GRANDMOTHER	2 FATHER	
LEAST LIKE I USED TO BE	13	1	2	3	3	2	4	3	3	4	4	4	5	4	4	1	LIKE I USED TO BE
ANTI-SOCIAL	8	1	3	3	3	3	3	4	4	4	4	5	4	4	4	5	SOCIAL
INTROVERTED	1	1	2	3	3	4	4	4	4	4	5	5	5	5	5	5	EXTROVERTED
UNTALKATIVE	5	4	2	5	3	3	3	4	4	4	4	5	5	5	5	5	TALKATIVE
FRIVOLOUS	7	3	2	6	5	3	3	3	4	4	4	6	5	5	4	3	SERIOUS
TELLS DIRTY JOKES	12	5	5	6	6	3	3	2	2	4	4	4	4	5	5	3	DOESN'T TELL DIRTY JOKES
UNFRIENDLY	4	6	5	6	4	4	3	3	3	4	4	4	4	5	6	4	FRIENDLY
IMMATURE	2	7	5	5	3	6	3	3	3	4	5	4	6	5	5	5	MATURE
GOOD AT CHESS	3	7	6	4	4	4	5	4	4	6	4	4	5	5	5	5	BAD AT CHESS
SHY	10	4	2	3	3	5	5	4	4	3	4	4	5	4	5	5	NOT SHY
INERT	11	6	2	3	3	5	6	5	5	4	4	4	4	3	4	5	ACTIVE
LESS PLAYFUL	9	6	2	4	3	4	4	5	5	3	3	4	4	3	4	5	PLAYFUL
IMPORTANT	6	4	2	3	1	5	5	6	6	7	6	3	4	4	3	2	NOT IMPORTANT
LIKE I AM	14	3	2	3	4	4	5	5	6	7	5	5	5	4	4	7	LEAST LIKE I AM
LIKE I'D LIKE TO BE	15	2	7	3	4	4	5	6	6	7	4	5	3	7	7	7	LEAST LIKE I'D LIKE TO BE

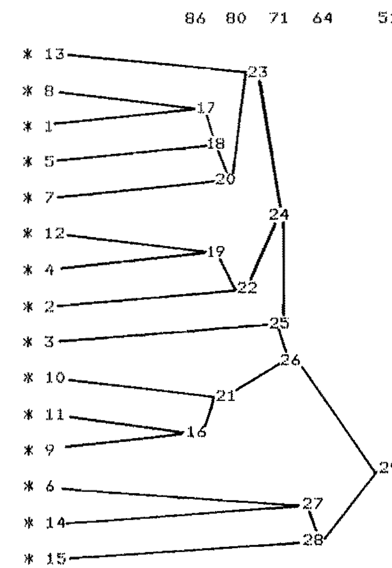


Fig. 9.26. Peter's second grid using a seven-point scale.

this girl, element 13, is highly matched with most of the other elements, and in fact has the second highest sum of matching scores in the grid. Here, the girl is only extremely placed on the poles of constructs 15 ("least like I'd like to be") and 6 ("not important"); the latter being inconsistent with the result from the sum of element matching scores. She is centrally placed but towards the "social" end of cluster 21, but towards the other end of the "self-definition" and "seriousness" cluster 24 (see Fig. 9.25).

Peter sees himself, element 10, as more towards "least like I'd like to be", wishing to be more like the family cat, a friend from outside the unit, his teacher at the unit and his maternal grandfather. Those extremely rated on the pole "least like I'd like to be" are his mother, father and the girl of his own age at the unit. "Like I used to be" and "like I am" were matched at 75%, showing that he feels himself not to be greatly changed compared with "like I'd like to be" matched at 35% and 51% respectively, but nevertheless showing that he is nearer now to his ideal self than he was previously. He ssees himself in terms of the highest match of "like I am" with "shy" at 73%. In the second grid (Fig. 9.26) "like I am" has become much closer to "like I'd like to be", matched at 64%. "Like I used to be" is now 51% similar to "like I am" and 46% similar to "like I'd like to be", indicating a change in a positively-valued direction. The elements cluster somewhat differently in the second grid, although some small clusters are still similar such as 5 and 6, 4 and 3, and 15, 8 and 14. The girl has become more neutrally rated on most constructs, although polarised on "unimportant", "least like I am" and "least like I'd like to be", and much more closely related to other people than previously. The focused CORE grid from the two occasions shown in Fig. 9.27 shows the unchanged elements to be father, paternal grandmother, a nurse at the unit, and the girl at the unit; whilst the unchanged constructs were "tells dirty jokes" identically matched on the core elements with "active", "not shy" and "important".

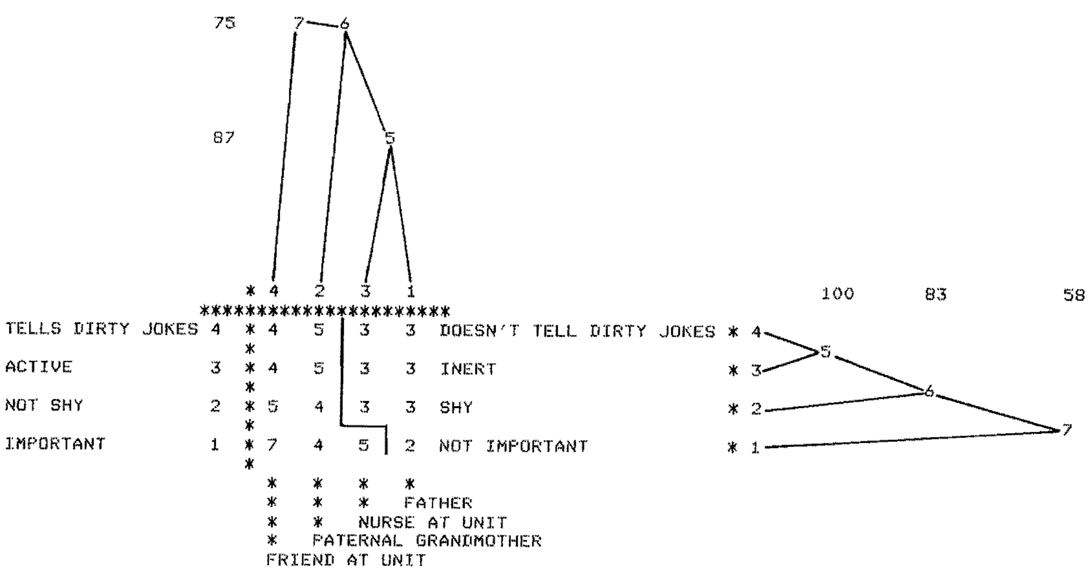
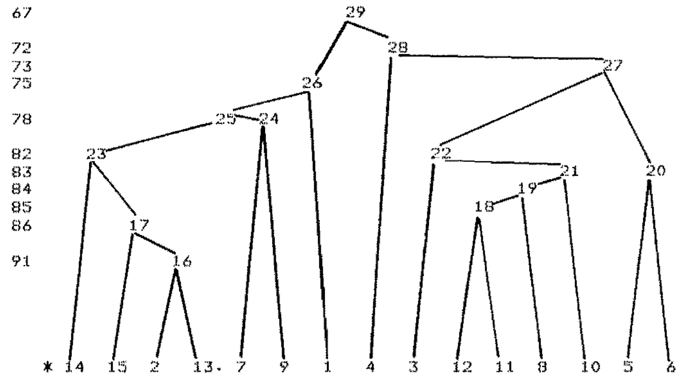
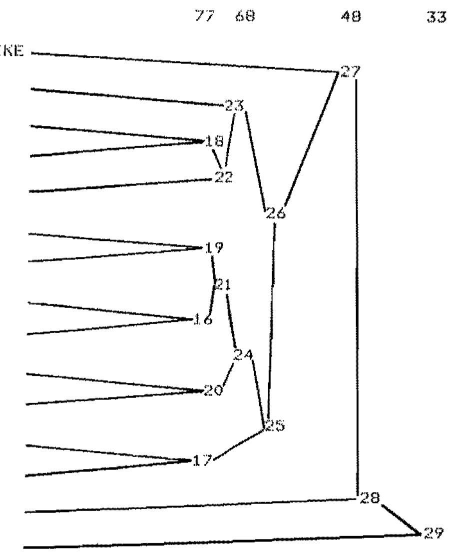


Fig. 9.27. Peter's CORE grid in focused form.



Construct		14	15	2	13	7	9	1	4	3	12	11	8	10	5	6	Contrast
CARE WHAT THEY LOOK LIKE	4	1	2	6	6	5	2	2	1	6	5	6	5	7	5	6	DON'T CARE WHAT THEY LOOK LIKE
SELFISH	12	3	5	5	4	5	5	2	1	3	3	5	4	3	4	6	UNSELFISH
VERY OUTSPOKEN	6	4	5	5	4	3	3	1	2	4	3	3	4	4	5	5	QUIET
GETTING THEIR OWN WAY	7	2	5	6	4	3	4	2	3	1	2	3	4	4	5	6	SUBMISSIVE
STRONG WILLED	1	4	4	4	5	3	4	2	3	3	2	2	2	4	6	6	WEAK WILLED
AMBITIOUS	8	2	4	1	1	3	2	2	3	2	2	3	3	3	5	5	NOT AMBITIOUS
DOESN'T GIVE UP EASILY	2	1	1	1	1	3	3	2	6	4	2	3	2	3	5	5	GIVES UP EASILY
CAN'T LEAVE THINGS UNFINISHED	9	3	2	1	1	2	4	2	6	6	5	4	2	3	5	4	LAZY
PERFECTIONIST	3	2	1	1	1	1	5	4	6	6	6	3	3	3	4	4	SLAPDASH
LEAST LIKE I USED TO BE	13	2	1	1	1	1	3	3	5	6	5	5	4	7	3	5	LIKE I USED TO BE
LIKE I AM	14	2	1	1	1	3	3	3	6	5	4	5	5	4	4	6	LEAST LIKE I AM
SHOW THEY CARE	10	2	2	1	2	3	2	5	4	3	4	4	5	5	3	1	CAN'T SHOW THEY CARE
EASILY UPSET	11	4	2	1	2	2	2	2	6	2	4	5	5	5	3	1	NOT EASILY UPSET
LIKE I'D LIKE TO BE	15	1	1	1	1	3	3	6	3	2	5	4	7	6	5	5	LEAST LIKE I'D LIKE TO BE
PHYSICALLY TOUGH	5	4	3	4	3	6	2	5	5	2	3	3	1	4	5	7	PHYSICALLY WEAK



Elements (columns from right to left):
PATERNAL GRANDMOTHER
MATERNAL GRANDMOTHER
OLD FRIEND
MATERNAL GRANDFATHER
FRIEND
COUSIN
BROTHER
AUNT
MOTHER
FRIEND
PATERNAL GRANDFATHER
SELF
FATHER
FRIEND AT UNIT
FRIEND AT UNIT

Fig. 9.28. Cathy's first grid using a seven-point scale.

(b) *Cathy*. Cathy was fifteen years old. Her first grid (Fig. 9.28) shows the highest element cluster of herself with her father, and most of the ratings for this cluster seem to lie on the positively-valued end of the constructs. Her elements fall into two clusters which seem to be oppositely construed in the main, as can be seen from the contour lines. The main construct clusters are 12, 6, 7 and 1, to do with dominance; 8, 2, 9 and 3, to do with persistence; 13 and 14, showing a recent change in perception of self; and 10 and 11; outliers 5, 15 and 4 are less related than the other constructs. Looking, then, at the second grid shown in Fig. 9.29, constructs 4, 5 and 15 are again unrelated to other constructs, and the previously formed clusters remain relatively unchanged. The notable exception is the high match of 8 and 13 showing "ambitious" to be 84 % similar to "least like I used to be". The element clusters, however, show some differences. This is commented on by Cathy, but all names have been replaced to preserve anonymity.

Cathy: Here is the second grid that you did three weeks ago as well as the first one you did fourteen weeks ago.

Would you like to colour in the numbers as you did before, and perhaps you could write down the changes that have taken place which you agree with, as well as any other comments.

Thanks,

John

Dear John,

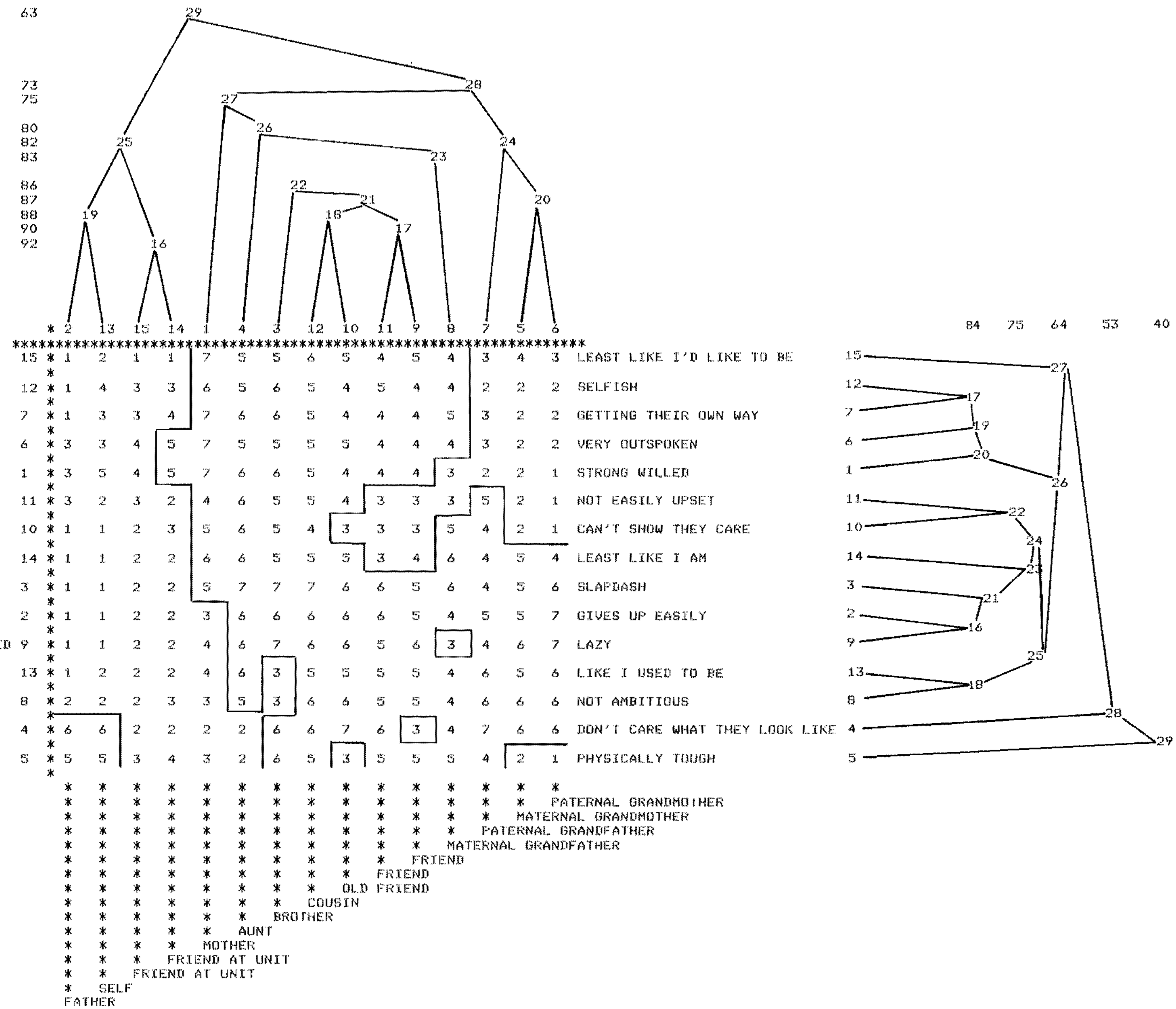
I have as you suggested coloured in the numbers on the second grid. I find it interesting to note that the similarity percentage between myself and Dad in the second chart has decreased from 91 % to 88 % and that it is no longer the highest percentage of similarity. It strikes me as quite a contrast from the first survey that element 15 and element 14's similarity ratio has increased from 82 % to 92 %. Indeed I quite agree with this relationship because to my way of thinking they are two of the most similar character-type people I've ever met. As for element 11–element 9 relationship–to be honest I find the results quite incredible because I've never thought of these people being particularly similar in any way! It seems that it is only on the last chart that the latter relationship similarity has increased because from the previous graph these two people were about as unlike each other as was shown. I really find that amazing and I wonder whether I didn't prefer the original set-up on the graph! The Gran–Nanny idea seems to have remained pretty well the same as of course I would have expected. With the Mum–Aunt construct I'm happier with the second graph since it shows them more alike each other than the first which to me is nearer reality. I think that's all I have to say on observation of the two grids together. Thank you very much for sparing your time—I appreciate it greatly and the information was very helpful.

Cathy.

When the two grids were processed on CORE, the unchanged elements were found to be mother, paternal grandmother and a cousin. The core constructs were "physically tough", "show they care" and "selfish". The focused CORE grid is shown in Fig. 9.30.

4. *Conclusion and evaluation*

From the data for the nine adolescents involved in this study, a number of statistical measures were calculated. The FOCUS program was adapted to print values to help compute some of these such as Bannister's (1960, 1962a) intensity measure for constructs. Others include the sum of element matching scores for all columns from which the highest, lowest, mean and variance were calculated; the average match between columns; and the identification score and degree of identification which were based on the sum of element



Construct (1)	No.	FATHER (2)	SELF (13)	FRIEND AT UNIT (15)	FRIEND AT UNIT (14)	MOTHER (1)	AUNT (4)	BROTHER (3)	COUSIN (12)	OLD FRIEND (10)	FRIEND (11)	FRIEND (9)	MATERNAL GRANDFATHER (8)	PATERNAL GRANDFATHER (7)	MATERNAL GRANDMOTHER (5)	PATERNAL GRANDMOTHER (6)	Construct (7)
LIKE I'D LIKE TO BE	15	1	2	1	1	7	5	5	6	5	4	5	4	3	4	3	LEAST LIKE I'D LIKE TO BE
UNSELFISH	12	1	4	3	3	6	5	6	5	4	5	4	4	2	2	2	SELFISH
SUBMISSIVE	7	1	3	3	4	7	6	6	5	4	4	4	5	3	2	2	GETTING THEIR OWN WAY
QUIET	6	3	3	4	5	7	5	5	5	5	4	4	4	3	2	2	VERY OUTSPOKEN
WEAK WILLED	1	3	5	4	5	7	6	6	5	4	4	4	3	2	2	1	STRONG WILLED
EASILY UPSET	11	3	2	3	2	4	6	5	5	4	3	3	3	5	2	1	NOT EASILY UPSET
SHOW THEY CARE	10	1	1	2	3	5	6	5	4	3	3	3	5	4	2	1	CAN'T SHOW THEY CARE
LIKE I AM	14	1	1	2	2	6	6	5	5	5	3	4	6	4	5	4	LEAST LIKE I AM
PERFECTIONIST	3	1	1	2	2	5	7	7	7	6	6	5	6	4	5	6	SLAPDASH
DOESN'T GIVE UP EASILY	2	1	1	2	2	3	6	6	6	6	6	5	4	5	5	7	GIVES UP EASILY
CAN'T LEAVE THINGS UNFINISHED	9	1	1	2	2	4	6	7	6	6	5	6	3	4	6	7	LAZY
LEAST LIKE I USED TO BE	13	1	2	2	2	4	6	3	5	5	5	5	4	6	5	6	LIKE I USED TO BE
AMBITIOUS	8	2	2	2	3	3	5	3	6	6	5	5	4	6	6	6	NOT AMBITIOUS
CARE WHAT THEY LOOK LIKE	4	6	6	2	2	2	2	6	6	7	6	3	4	7	6	6	DON'T CARE WHAT THEY LOOK LIKE
PHYSICALLY WEAK	5	5	5	3	4	3	2	6	5	3	5	5	5	4	2	1	PHYSICALLY TOUGH

Fig. 9.29. Cathy's second grid using a seven-point scale.

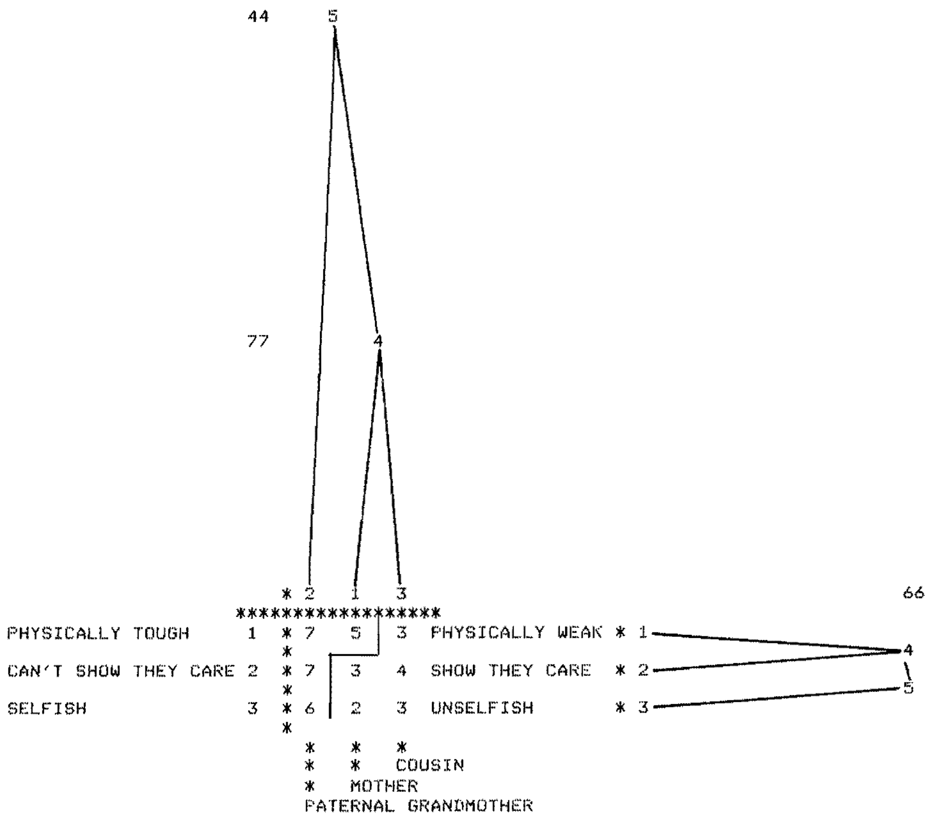


Fig. 9.30. Cathy's CORE grid in focused form.

matching scores for the "self" column. These were all attempts to identify different perceptions of self as shown by the grid, and aspects of stereotyping, based on grid indices reported in the literature (e.g. Adams-Webber, 1970). However, it is felt that the most valuable results come from the comments made during the feedback sessions, where the subject can identify expected and unexpected patterns displayed in the focused grid. The information obtained from the grids was found to relate to psychoanalytic theory, although some difficulty was encountered with this. Another problem was in drawing conclusions from the grid data in that the subject must necessarily guide any interpretation which is made.

The two adolescents chosen were in no way special, but merely act as examples of the data which was obtained. The data presented contains many interesting speculative patterns from which much information could be gleaned and put to use both by the subjects concerned and by those whose job is to help them with their problems. The nature of the conversational heuristic employed will determine the nature of the model of construction which is elicited, the mental processes used, and the modelling facility which is amplified and brought to bear. The repertory grid which is the basic structure of each algorithm is being used in a more flexible and learning-centred way than the traditional grid. The personal scientist is collecting evidence to support his theories, and revising those theories in the light of his reality testing. He now has available a more powerful set of tools to help him to deepen his understanding and heighten his awareness of the world.

Chapter Ten

Conclusion

I. Phenomenology

This book has been concerned with an operational form of Kelly's personal construct psychology. This has provided a philosophy for the individual and the way he learns experientially by building models, applying them to his reality and adapting them continually to maintain his world. Kelly's repertory grid offered a basic technology whereby this could be achieved by an individual; this technology has now been expanded into a set of tools for developing personal models of the world through interaction with the computer.

The computer used in an interactive mode can be seen as a superb device for developing conversational heuristics for exploring an individual's phenomenological world. Heaton defines phenomenology as "the science of lived experience". He also says:

> Husserl developed phenomenology so that it became the descriptive analysis of experience. He went beneath the abstract and derived constructions of science to seek their foundations in common sense and experience.
>
> (*Heaton, 1968, p. 297*)

The techniques described allow the individual to explore his own phenomenological world, or "self-concept" as described by Bugental (1952). They are also used to encourage self-organisation in learning. Bruner's aims apply not only to the child but to the individual throughout the whole of his life:

> One seeks to equip the child with deeper, more gripping, and subtler ways of knowing the world and himself.
>
> (*Bruner, 1962, p. 117*)

These content-free conversational algorithms which are embodied in computer programs have the capacity to encourage and control conversation as systematically and rigorously as any scientific experimental method. They are psychological tools which can be used to encourage a greater awareness of the self in the world. The computer is used not as a machine which takes away from any task the essential human element, but in a humanistic and supportive way, reflecting back to the user himself and his models of reality.

II. The Programs and the Corollaries

It is the FOCUS algorithm which provides the basis for the feedback of the grid, enabling a deeper understanding and a reconstruction of a person's system to be a real possibility. The clustering of constructs produced may lead to the identification of superordinate constructs, and a consideration of the range of convenience related to the organisation and range corollaries (Chapter 2).

PEGASUS was developed from a simple grid elicitation together with the need for continual feedback of the "replications" as Kelly says in the construction corollary. Here the computer provides a facility of real-time data processing which otherwise would be impossible, to give feedback commentary on highly matched elements and constructs immediately they are entered in the grid, and analysis of the results at the end of the elicitation.

The commonality corollary indicates how one can explore the similarity of processing in two people, leading to the PAIRS program; and the further exploration of groups by examining all possible pairs which could interact in the group using the sociometric measures developed in SOCIOGRIDS. While SOCIOGRIDS is a method of exploring construing in the group, PEGASUS–BANK is a method of articulating a group view in such a way as to make it available to another person who can then match it against his own construing of the situation.

Together, the individuality corollary and the sociality corollary indicate that similarities and differences exist between all individuals. CORE allows two people to uncover areas of shared understanding and agreement in a structured manner. If one explains carefully to the other how he has used the elements and constructs without revealing the actual ratings given, then invites the other to complete the grid to demonstrate how he has understood the explanation, the differences found will be a good guide to the lack of adequate verbal exchange which has taken place. The individuality corollary might even be extended to include the case of a person differing from his own construction of events on a separate occasion, which has been found using CORE to process two grids elicited at different times from the same person. This is also supported by the modulation corollary. The levels of match at which the constructs remain the same will be related to the permeability of the constructs used in the grids.

ARGUS is based on the fragmentation corollary, which describes the inconsistencies seen in behaviour at different times. This may also be related to the choice corollary where perhaps the choice is between the P-Individuals which might be dominant at any given time. Mead discussed the alternatives of "me" and "I" operating under varying circumstances. He also says:

> We divide ourselves up in all sorts of different selves with reference to our acquaintances.
> (*Mead, 1934, p. 142*)

The experience corollary indicates how both CORE and ARGUS can be used to enable a person to test out interactions with different aspects of reality, and learn from the results in a way which enables the experience to be incorporated into his current model. Creativity may be viewed as the flexibility to move between different aspects of self rather than being tied to a switch from one to another which is habitual and non-conscious.

Mendelsohn (1977) gives an example of a construct used by one of his patients "Ransom Swick–Joe Gorilla". "Ransom Swick" is a generalised name for the sort of man who is a pillar of society, does everything right, eats in the best restaurants and accomplishes everything with ease and assurance; whereas "Joe Gorilla" is a down-and-out, not fit for human company, who always looks down at heel and accomplishes nothing, but fails at anything he tries to do. He further says that freedom is the ability to move the full length of such a dimension and be in any position at a given time by choice. If ARGUS can be used to help a person to become more aware of the aspects of himself which are available, his creative ability could be recognised and expanded.

Each of the grids produced in the ARGUS process offers an important personal perspective for the elicitee. If he is interested in the commonality between any two particular points of view, the CORE program can be used to identify that part of commonality between the two grids. This could be repeated for all pairs of grids, but becomes rather like applying the *t*-test to columns of data which would be better processed using analysis of variance. The SOCIOGRIDS program, therefore, is being used in a new context with ARGUS. Just as CORE seems to become two separate and different programs when applied to grids done by two people, as opposed to grids done by one person at different times, although retaining the identical structure, now SOCIOGRIDS seems to be two different programs when applied to a group of people as opposed to a group of P-Individuals in one head. SOCIOGRIDS was developed from the PAIRS algorithm for comparing two grids, but could equally well be applied to the CORE or the MINUS algorithm when the construct names are common to all the grids as in the ARGUS grids. The choice then as to which measure of comparison to use would depend entirely on the purpose for which the grids were elicited and the specific application.

III. Three Types of Conversation

If the three types of conversation described in Chapter 1—with oneself, in pairs and in groups—are applied in the three main areas of application—clinical psychology and psychiatry, education, and industry—Table 10.1 results. In this table some examples of possible entries are given, but the reader is invited to consider his own entries.

The current technology may beneficially be used in each of these circumstances. In clinical psychology and psychiatry an alternative to a five-year course of psychoanalysis may be found. Psychotherapy involves a one-to-one relationship where much of the therapist's task is repetitive. Already work has been done to assist a consultant in his questioning and diagnosis of patients in the field of gastroenterology (Card *et al.*, 1974). Much self-help and self-therapy may be offered by a similar facility. Some forward-thinking group practices of general practitioners employ a psychologist to help with an increasing number of people who need someone who will listen to their problems, often without

Table 10.1
Applications of types of conversation

	Type I Conversation with self	Type II Conversation in pairs	Type III Conversation in groups
Clinical	Reflection, meditation, wrestling with conscience, prayer.	Psychotherapy: Rogerian, psychoanalysis, marriage guidance.	Group therapy, T-groups, family crises.
Education	Revision, analysis of argument, self-learning, essay writing.	Tutorial, interviewing, "quiet words", counselling, programmed learning.	Seminar, lecture, board meetings, course planning.
Industry	Design, report writing, policy making, systems analysis.	Consultancy, progress reporting, interviewing, staff appraisal.	Board meetings, "brain-storming", union meetings.

wishing for any advice or treatment. People are less likely today to confide in their local priest or vicar, and conversation with oneself via the computer terminal is becoming a viable alternative.

IV. Computer-aided Learning

In the field of education, CAL or computer-aided learning has been partially developed. This is based on the desirability of individual tuition, which for many centuries has been demonstrated by the aristocracy who were educated by tutors and who, at the Universities of Oxford and Cambridge, benefited from the tutorial system. Criticisms of this method are made for purely economic reasons, and are not directed at the method itself. The computer is programmed to adapt to an individual learner, record his successes and failures, and use these records as a basis for the selection of further material. However, much of what is called computer-aided learning is indistinguishable from CAI, computer-assisted instruction. If the philosophy of a personal scientist were to be incorporated into CAL, the learner could be offered tools which allow him to do what he can do in a more effective way, and allow him to attempt new ventures with a firm basis and support in the system. This would be immediately appropriate in the teaching of foreign languages to businessmen and others who are travelling more extensively since Britain joined the European Economic Community. Such systems as PEGASUS–BANK offer a new light in which the learning of a language such as French or PL/1 may be made less obscure.

A. "Sitting by Nellie"

The same techniques which could enliven CAL apply equally to training in industry and in the armed forces. "Sitting by Nellie" is a valuable learning experience if "Nellie" incorporates a conversational device which enables the learner to review his models and examine his knowledge structures. Simulators of expensive equipment such as radar do not necessarily act as trainers merely by allowing repetitive practice, but must allow the learner to become more aware of his own effectiveness. The techniques applied in areas of quality control and staff development have been discussed in Chapter 9. Much more is possible in terms of personal development and career structure, from the points of view of both the company and the individual. The tools may be used to open new lines of communication between members of a project team, allowing greater co-operation and the maximum exploitation of individual skill and expertise. Now that industrial organisations are discovering the value of such techniques to meet their own needs, it is fascinating to speculate on possible future developments and applications to everyday life situations by the individual. The personal scientist now has the ability to structure his own destiny.

B. Modern Technology

The technology which will allow the "average" person such facilities is developing at a remarkable rate. Recently engineers have said:

> It is likely that in *x* years' time the computer as we know it now will be merely one component of a much richer family of systems which will contain hardware versions of what now seem vague notions such as "understanding", "thought" and "awareness". This is as much science fiction as would have been the statement 30 years ago that a machine could have a hardware "memory".
>
> (*Aleksander and Hanna, 1976, p. 7*)

A special microelectronics edition of *Scientific American* contained many advertisements for computers which may be owned by the "average" person. One such advertisement for a personal computer included the following:

> Dramatic developments in computer technology have made it possible for you to completely reorganize and improve the ways you manage your personal and business life. Today, for as little as $600, you can buy a complete computer system about the size of a typewriter. These new computers are called personal computers. They are every bit as powerful as yesterday's room-sized computers that cost millions of dollars.
>
> (*Scientific American, Sept. 1977, p. 257*)

In this era of television games, it is not impossible for anyone to own a microprocessor which manages a PEGASUS-like interaction displayed onto a television screen. Within a few years the Viewdata systems offered by the Post Office and the broadcasting companies may offer a video library accessible to all. How much more meaningful this would be if it were extended to include a conversational procedure of learning, training and/or psychotherapy. Judging from the impact of Rogerian therapy on education in the United States, there is a vast universal need for such a facility.

This technology may be used to make human activities either more "human" or less related to people and more "automated". It is important to decide which of these people want, and make some effort towards a chosen goal rather than drifting towards the easiest end to achieve. In talking about the personal computer, Kay says:

> Children who have not yet lost much of their sense of wonder and fun have helped us to find an ethic about computing: Do not automate the work you are engaged in, only the materials. ... Although the personal computer can be guided in any direction we choose, the real sin would be to make it act like a machine!
>
> *(Kay, 1977, p. 244)*

Gaines goes further than distinguishing between the computer as a machine and a tool:

> Sympathy and understanding are traits that we might hope for in people, and in requiring them in computer systems we are clearly beginning to accept the computer as a "colleague" rather than a "tool".
>
> *(Gaines, 1977, p. 6)*

This attitude, which is quickly spreading among people interested in achieving a realistic partnership between people and computers, exemplifies the hope of Wiener (1950) when he spoke of "the human use of human beings".

V. What is Structure?

This book is the account of an initial attempt to provide a technology which will enable every individual to become a personal scientist. The repertory grid is the first structure used here to hold a personal model of the world, but many others will surely follow. Many of the techniques in other fields have potential here, especially data structures from computer science, graph theory and optimization from operational research, mathematical structures and forms, such as Q-Analysis (Atkin, 1977), the concept of cybernetic entities like P-Individuals, and developments in computer graphics. Lorenz expresses the problem of structure:

> The two effects of any structure, that of supporting and that of sacrificing degrees of freedom, confront all living systems, be they organisms, species or cultures, with the same problems, the same necessity of finding a compromise between the two. ... Knowledge cannot be stored in any other form than in structure, whether this be the chain molecules of the ganglion cells of the brain, or the letters in a textbook. Structure is adaptation in its finished form. But if further adaptation is to take place and fresh knowledge is to be acquired, a structure must be dismantled and rebuilt, at least in part.
>
> *(Lorenz, 1977, p. 198)*

Lorenz later goes on to say:

> The scientific investigation of the structure of human society and its intellectual processes is a task of mammoth proportions. ... Yet I believe that man stands at a turning point in history and has at this moment the potential capacity to scale new and unknown heights.
>
> *(Lorenz, 1977, p. 245)*

Perhaps the combination of the philosophy of the personal scientist and the technology of the personal computer will help one or two onto the lower slopes. "Interactive" computing takes on a new meaning when it is content free, holding only a conversational form for personal development—for becoming a personal scientist.

Appendices

A. The Psychophysics Of The Repertory Grid

This appendix attempts to explain some of the mathematics involved in the repertory grid, and general problems of psychological scaling. Some speculative ways of tackling these problems are described.

I. Scaling of Constructs

One of the most general problems which has yet to be dealt with is that of the scaling of the construct. Much work has been carried out in the psychophysical field on how people perceive and use scales (e.g. Pollack, 1953; Helson, 1964), but the question now is the extent of the relevance of these findings to the scaling used in forming constructs.

A. *Ranking versus rating*

In past studies using grids, two techniques have been commonly used for assigning each element a position on a construct. These are "ranking" and "rating". In the ranking method, the elements are rank-ordered from the emergent (left-hand) pole. Humphreys gives an example of a possible danger in the use of ranking.

> It is possible to obtain such rankings by the successive choice of elements in terms of their similarity with the emergent pole of a construct, without mentioning the implicit pole. However, the nature of this implicit pole can nevertheless affect the ranking obtained. Consider the case where two elements to be ranked are "girlfriend" and "girlfriend's mother", and the emergent pole of the relevant construct is "cool". It is easy to imagine a situation where "girlfriend" would be ranked more "cool" than her mother when the implicit pole is "uncool", but at the same time less "cool" than her mother when the implicit pole is "warm".
>
> *(Humphreys, 1973, pp. 3–4)*

Rating has in the past been used in about 70 % of grid studies compared with 30 % using ranking. All the grids in the present study have used ratings, commonly a two-, five-, or seven-point scale. Some study has been made as to which method is to be preferred but opinion is varied. Mair and Boyd (1967) say that either may be appropriate in any particular experimental context.

B. *Properties of scales*

Scales generally may have different attributes which are summarised by the following table:

Scale	Property of the scale			
	Labels	Order	Equal intervals	Absolute zero
Nominal	√			
Ordinal	√	√		
Interval	√	√	√	
Ratio	√	√	√	√

What can be assumed about a construct on which a five-point rating scale is used from 1 at the left pole to 5 at the right pole?

For example:

long 1 2 3 4 5 short
x - - - - - - - - - - - - - x

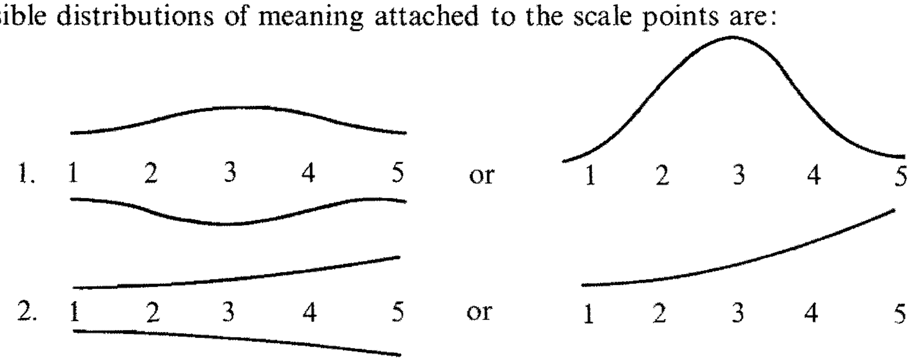
Some eliciters give verbal labels to the points such as:

1. very long
2. quite long
3. neither long nor short
4. quite short
5. very short

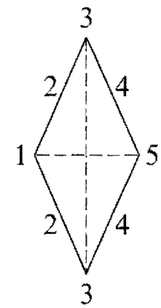
but is this imposing the eliciter's construct system on the subject? If possible, it is felt that the discrimination should be left to the subject. Some of the questions posed are:

is the construct a scale?
is it unidimensional/linear?
are the scale points equidistant?

Possible distributions of meaning attached to the scale points are:

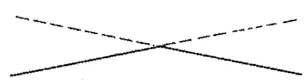


Case 2 may possibly occur where there is a clearly emergent pole at 1, pole 5 being implicit. Here, an element which is out of the range of convenience is as likely to be assigned the value 5 (away from the emergent pole) as the value 3 (equally between both poles). However, case 1 is more likely to occur where the two poles of the construct are equally meaningful, and split the set of elements into roughly equal groups. An element rated a 3 may be neither pole 1 nor pole 5, both pole 1 and pole 5, or out of the range of convenience of the construct. Could it happen in case 1 that two elements each assigned the value 3 are more different than two elements assigned values 1 and 5 respectively?



Might a construct operating like this describe a psychological corner? Should the eliciter allow such a construct to be left in the form in which it was produced or should the subject be encouraged to make two constructs out of the bent one?

For example:



1 2 3 4 5
long green

might become

1 2 3 4 5
long short

and

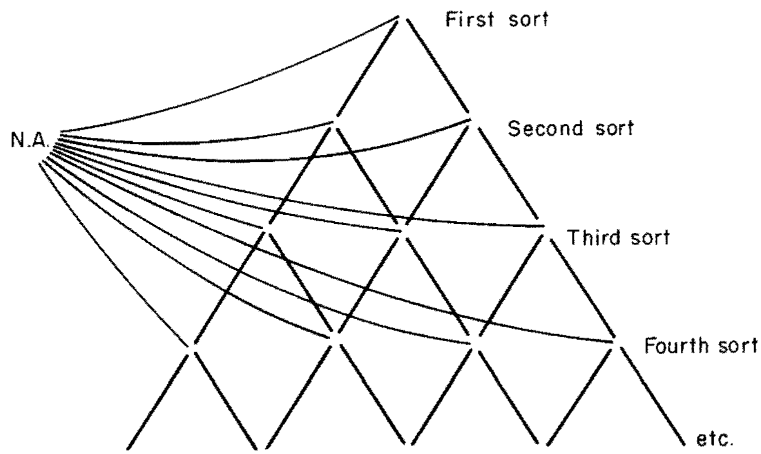
1 2 3 4 5
red green

C. *Adaptation level*

A suggestion which would lead to further investigations is to elicit the construct from a temporarily fixed zero or "adaptation level". The question might be put: "Think of an element which would be typical of this construct". The elicitee could then be asked how his other elements fitted with this one, how close to it and on which side. In this way new elements might be generated to form the typical examples, and the universe of discourse either widened or more adequately sampled by their inclusion. Alternatively the anchor might be the preferred point, and the question put: "Think of an element which would be at the ideal point of this construct". Each of these would lead to a different construct with a different range of focus and meaning. Another variation on this method to investigate the scaling of a construct is to fix one element and ask how far away each other element would be. If the results were inconsistent when the fixed element was changed, an indication would be given both as to the stability of the elements and of the construct itself. The Weber–Fechner law suggests a logarithmic scale from the zero point. Perhaps a human being who subjectively rates on an equal interval scale automatically uses a logarithmic scale, another possibility for investigation.

D. *The rangefinder technique*

The rangefinder technique (Daisley, 1971) indicates a possible approach to defining a construct and incidentally defines the coherence and certainty attached to each element on the construct. This technique involves splitting all the elements on to the left or right pole; each group is then split again, the two centre groups being joined into one so that any early bad judgement can be overcome at the next stage; the process is repeated. A modification of this procedure seems desirable to cope with elements which initially seem to be outside the range of convenience. The ensuing pattern is thus:



continuing until the appropriate number of points has been reached. At each stage an extra group is formed of those elements which seem to be unplaced and these elements are collected together into a group of "not-applicables" (N.A.). These may then be considered again on the more articulate scale, and some will be placed on the second or third iteration. Any that remain are truly "not-applicables" and help in determining the construct range. A dyadic grid (Rule and Lunghi, 1970) of relationships as elements, if elicited concurrently will shed some light on the implicit associations being made.

II. Correlation and Metrics

The problem becomes more acute when comparison is made between two constructs. One of the criteria in the mathematical definition of equal functions is that they have the same range, and this is a fair guide in dealing with constructs. In practice a compromise must be made. When eliciting constructs, the eliciter should be aware of signs indicating that the ranges of the constructs are varying, and take this into account when the grid is analysed. If the elicitee is asked for constructs which apply to all the elements, and the ratings are not "lopsided" (Bannister and Mair, 1968), then one must assume that the criterion of constant range is reasonably satisfied. The matching score used in the FOCUS algorithm to compare two constructs could be adapted to pick out alternative meaning patterns.

The correlation matrices of similarities between the elements and between the constructs which are then used to form clusters are usually calculated using either similarity or distance measures. Similarity coefficients are generally used with binary data, otherwise the most commonly used is the product-moment correlation coefficient. This measure has been criticised by many authors: Everitt gives an example to show its inadequacy:

> All that is required for a perfect correlation is that one set of scores be linearly related to a second set. For example, suppose the three sets of scores below were the scores for three individuals on five variables.
>
> | | | | | | |
> |---|---|---|---|---|---|
> | 1. | -1 | $-\frac{1}{2}$ | 0 | $+\frac{1}{2}$ | $+1$ |
> | 2. | -1 | 0 | 1 | 2 | 3 |
> | 3. | -1 | $-\frac{1}{2}$ | 0 | $+\frac{1}{2}$ | $+1\frac{1}{2}$ |
>
> The scores for subject 2 are twice those of subject 1 plus 1. The scores for subject 3 are the same as those for subject 1 except on variable 5. The correlation measure for subjects 1 and 2 is $+1$, and for 1 and 3 is 0·986 and so subjects 1 and 2 are measured as more similar than subjects 1 and 3.
>
> (*Everitt, 1974, p. 53*)

Distance measures or metrics are also used. A metric space is defined as a collection of points and a distance $d(x,y)$ defined for every ordered pair of points, satisfying:

(i) $d(x,y) \geqslant 0$; $d(x,y) = 0$ if and only if $x = y$;
(ii) $d(x,y) = d(y,x)$;
(iii) $d(x,y) + d(y,z) \geqslant d(x,z)$.

The most common metric is the Euclidean distance or root mean square distance:

$$d_{ij} = \left[\sum_{k=1}^{n} (a_{ik} - a_{jk})^2\right]^{1/2}$$

where a_{ik} is the entry in the cell on the ith row and jth column, and d_{ij} is the distance measure between points i and j. The metric used in the current work, developed by Thomas in his early work on cluster analysis, is the city block metric:

$$d_{ij} = \sum_{k=1}^{n} |a_{ik} - a_{jk}|.$$

This has the advantage that two elements are designated the same distance apart if they are either:

(i) two units apart on one variable (construct) and identical on the other, or
(ii) one unit apart on each variable.

For example:

1. 1 3
2. 2 4
3. 1 1

$d_{12} = 2$, $d_{13} = 2$ using the city block metric. Using the Euclidean metric, however, $d_{12} = \sqrt{2}$, $d_{13} = 2$; showing the discrepancy between the two systems.

These two measures are special cases where $r = 1$ and $r = 2$ respectively of the Minkowski metrics (Everitt, 1974) defined by:

$$d_{ij} = \left[\sum_{k=1}^{n} |a_{ik} - a_{jk}|^r \right]^{1/r}$$

Applied to a repertory grid, a_{ij} specifies the rating of element j on construct i. The present matching score is calculated from Minkowski's city block metric and is derived as detailed below.

III. Procedures for Assessing Matching

A. *Procedure I*

Consider the array of ratings of the n entities $(a_{i1}, a_{i2}, \ldots, a_{in})$, $1 \leqslant a_{ij} \leqslant 5$, $j = 1(1)n$. The sums of differences d_{ij} is calculated from equivalent entries of two such arrays:

$$d_{ij} = \sum_{k=1}^{n} |a_{ik} - a_{jk}|.$$

Since $\min(a_{ij}) = 1$ and $\max(a_{ij}) = 5$, the maximum value of d_{ij} $(=d)$ is $(5-1)n$, i.e. $d_{\max} = 4n$. d has the range 0 (perfect match) to $4n$ which is mapped for constructs into 100 to -100 by the linear transformation

$$d \rightarrow \frac{-200d}{4n} + 100,$$

and for elements into 100 to 0 by the linear transformation

$$d \rightarrow \frac{-100d}{4n} + 100.$$

B. *Procedure II*

Now, given a fixed array A the range of d is not 0 to $4n$ unless all the entities in A take the values 1 or 5. It is in fact calculated from:

(number of 1's and 5's) $\times$ 4 plus
(number of 2's and 4's) $\times$ 3 plus
(number of 3's) $\times$ 2

since these are the maximum differences of each type of entry from any other. For example:

$$\text{array } A = (3 \quad 2 \quad 2 \quad 1) \text{ has}$$
$$d_{\max} = (1 \times 4) + (2 \times 3) + (1 \times 2) = 12$$

as the first entity $e_1 = 3$ is never more than 2 away from any other value in the range 1 to 5. This $d_{\max}$ of 12 is much less than $4n$ which is 16. This procedure produces symmetrical values for the matching scores for A with B and $-A$ with B if either or both A and B are symmetrically distributed. $-A$ denotes the construct with the ratings reversed. All examples now given are of constructs since reversals must be considered as a major problem.

Example:

$$A = (1 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 5)$$
$$-A = (5 \quad 5 \quad 4 \quad 3 \quad 2 \quad 1 \quad 1)$$
$$B = (1 \quad 2 \quad 3 \quad 3 \quad 3 \quad 4 \quad 5)$$
$$d_{AB} = 4, \quad d_{-AB} = 16, \quad d_{B\max} = 20$$

Using the mapping

$$d \to \frac{-200d}{d_{B\max}} + 100, \qquad d_{AB} \to 60 \quad \text{and} \quad d_{-AB} \to -60.$$

With the first procedure I, $d_{AB} \to 71$, indicating greater similarity. However, a problem arises since $d_{A\max} \neq d_{B\max}$ so if the values are recalculated with reference to A, i.e. how much B differs from A, then values $d_{AB} = 67.67$ and $d_{-AB} = -33{\cdot}33$ are obtained since $d_{A\max} = 24$. As the concern is with the maximum value which can be taken, the minimum of these is the one required since no array can differ by more than this amount. So $d_{\max} = \min(d_{A\max}, d_{B\max})$.

C. *Procedure III*

If both A and B are asymmetrically distributed, then d_{AB} and d_{-AB} can be mapped by a linear transformation in such a way as to make them symmetric in the region 0 to $d_{\max}$. This is done by the mapping:

$$d_{AB} \to \tfrac{1}{2}(d_{\max} - d_{AB} - d_{-AB}) + d_{AB}$$
$$= \tfrac{1}{2}(d_{\max} + d_{AB} - d_{-AB}).$$

Incidentally, $d_{-AB} = d_{-BA}$, $d_{(-A)(-B)} = d_{AB}$, $\forall A, B$. Now a further difficulty occurs since even if A and B match perfectly, d_{-AB} is not necessarily equal to $d_{\max}$. This happens because the opposite of an entry having a value of 2, 3 or 4 does not differ from that entry by the maximum it could by having a value 5, 1/5 or 1 respectively. Consequently, the case may occur where A and B have perfect match, but produce a matching score not equal to zero. In general the mapping is now:

$$d_{AB} \to \frac{(-200)\frac{1}{2}(d_{\max} + d_{AB} - d_{-AB})}{d_{\max}} + 100$$

$$= \frac{(d_{-AB} - d_{AB})}{d_{\max}} \times 100.$$

Example:

$$\begin{aligned} A &= (1 \quad 1 \quad 2 \quad 3 \quad 1 \quad 5 \quad 2) \\ -A &= (5 \quad 5 \quad 4 \quad 3 \quad 5 \quad 1 \quad 4) \\ B &= (2 \quad 2 \quad 1 \quad 3 \quad 4 \quad 3 \quad 2) \end{aligned}$$

$d_{A\max} = 24$, $d_{B\max} = 20 \Rightarrow 20$; $d_{AB} = 8$, $d_{-AB} = 14$, so $d_{AB} \to 30$, $d_{-AB} \to -30$. This procedure has the effect of settling each construct symmetrically over the range it has been given, relative to any other construct. Since the new values of d_{AB} and d_{-AB} are equal but of opposite sign, only one need be calculated or used.

D. *Procedure IV*

Now suppose a table of differences is intuitively invented. The difference between rating values would be based on a personal view of what they represent and how they are used. For example, one might say that 1's and 5's are given when the element is near the pole; 2's and 4's are less specific; and 3's are a mixture of the two poles, or neither of the two poles. Consequently two values of 1 might be said to be essentially the same, two values of 2 less alike, and two values of 3 indicate neither similarity nor dissimilarity. The whole table must be symmetrical in both directions. So the value table might be:

	1	2	3	4	5
1	0	1	5	9	10
2	1	2	4	7	9
3	5	4	3	4	5
4	9	7	4	2	1
5	10	9	5	1	0

with 0 representing equivalence, and 10 representing opposite and equivalent. $d_{\max}$ is now calculated from:

(number of 1's and 5's) $\times$ 10 plus

(number of 2's and 4's) $\times$ 9 plus

(number of 3's) $\times$ 5.

Using this system with the previous example:

$$\begin{aligned} A &= (1 \quad 1 \quad 2 \quad 3 \quad 1 \quad 5 \quad 2) \\ -A &= (5 \quad 5 \quad 4 \quad 3 \quad 5 \quad 1 \quad 4) \\ B &= (2 \quad 2 \quad 1 \quad 3 \quad 4 \quad 3 \quad 2) \end{aligned}$$

$d_{AB} = 22$, $d_{-AB} = 43$, $d_{A\max} = 63$, $d_{B\max} = 56$.

With procedure II:

$$d \to \frac{-200d}{d_{\max}} + 100$$

so $d_{AB} \to 21$, $d_{-AB} \to -54$.

With procedure III:

$$d_{AB} \to \frac{(d_{-AB} - d_{AB})}{d_{\max}} \times 100$$

so $d_{AB} \to 38$, $d_{-AB} \to -38$.

E. *Procedure V*

This is a modification of the previous table giving:

	1	2	3	4	5
1	0	2	5	8	10
2	2	1	4	7	8
3	5	4	3	4	5
4	8	7	4	1	2
5	10	8	5	2	0

since it is felt that 1 − 2 is less similar than 2 − 2.

Now $d_{\max}$ is calculated from:

(number of 1's and 5's) × 10 plus
(number of 2's and 4's) × 8 plus
(number of 3's) × 5.

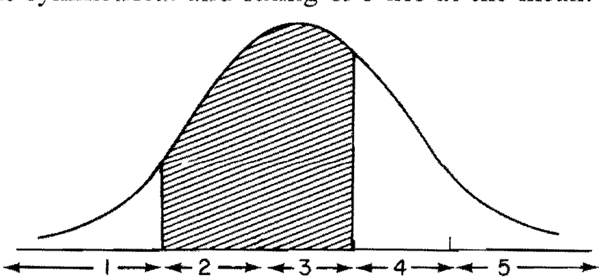
Using the previous example, $d_{AB} = 23$, $d_{-AB} = 41$, $d_{A\max} = 61$, $d_{B\max} = 52$. So now procedure II gives:

$d_{AB} \to 12$, $d_{-AB} \to -58$, and procedure III gives $d_{AB} \to 35$, $d_{-AB} \to -35$.

F. *Procedure VI*

Since many natural distributions are normal, the values could be computed as if a normal distribution is fitted to the rating values. It must be stressed that there is no theoretical reason to choose this distribution, it is a tentative subjective investigation as were the previous two procedures. The assumptions might be:

rating of 1 has theoretical range $-\infty$ to $1\frac{1}{2}$ or $-\infty$ to $-2{\cdot}25$ S.D.;
rating of 2 has theoretical range $1\frac{1}{2}$ to $2\frac{1}{2}$ or $-2{\cdot}25$ S.D. to $-0{\cdot}75$ S.D.;
rating of 3 has theoretical range $2\frac{1}{2}$ to $3\frac{1}{2}$ or $-0{\cdot}75$ S.D. to $+0{\cdot}75$ S.D.;
rating of 1 lies at the -3 S.D. mark;
the distribution is symmetrical and rating of 3 lies at the mean.



For the differences between values, the maximum differences are used. The area representing the difference between the ratings of 2 and 3 is shaded in the above diagram. The differences between 1 and 1, 2 and 2, etc., are given by the areas $-\infty$ to $1\frac{1}{2}$, $1\frac{1}{2}$ to $2\frac{1}{2}$, etc., respectively. The percentage values are obtained from normal tables:

1 from 5 has area 100%
1 from 3 has area 77·34%
2 from 3 has area 76·12%
1 from 2 has area 22·66%
2 from 4 has area 97·56%
2 from 5 has area 98·78%
5 from 5 has area 1·22%
4 from 4 has area 21·44%
3 from 3 has area 54·68%.

The other results may be obtained by symmetry. The table is found by dividing each value by 10 and rounding, giving the same range as previously.

	1	2	3	4	5
1	0	2	8	10	10
2	2	2	8	10	10
3	8	8	5	8	8
4	10	10	8	2	2
5	10	10	8	2	0

$d_{\max}$ is calculated from:

(number of 1's and 5's and 2's and 4's) $\times$ 10 plus
(number 3's) $\times$ 8.

Applied to the previous example, $d_{AB} = 31$, $d_{-AB} = 55$, $d_{A\max} = 68$, $d_{B\max} = 66$. Procedure II leads to $d_{AB} \to 6$, $d_{-AB} \to -67$, and procedure III to $d_{AB} \to 36$, $d_{-AB} \to -36$.

G. *Summary*

The example used was:

$$A = (1 \quad 1 \quad 2 \quad 3 \quad 1 \quad 5 \quad 2)$$
$$B = (2 \quad 2 \quad 1 \quad 3 \quad 4 \quad 3 \quad 2).$$

In each case the range of differences is 0 to 10, so for completeness, the formula for procedure I would become

$$d \to \frac{-200d}{10n} + 100.$$

Table A.1 gives all the computed values for each method described.

Table A.1

Comparison of methods for computing similarity

Formula		Table IV	Table V	Table VI
I	d_{AB}	37	34	11
	d_{-AB}	−23	−17	−57
II	d_{AB}	21	12	6
	d_{-AB}	−54	−58	−67
III	d_{AB}	38	35	36
	d_{-AB}	−38	−35	−36

The only way of comparing or assessing these different methods is to use them all on a person's grid and offer them as alternatives. No one way can be the right one for everybody, but an individual may find that one particular way is more sensitive than the others in reflecting his meaning system. In principle each method should be investigated for every individual, but in practice this is not being done at present.

H. *Reversing constructs*

The next problem which occurs is the establishing of criteria for reversing a construct if it would be better matched in that form. As it can be seen from Table A.1, only method III gives symmetrical values, the others must all be recalculated from the original ratings. Since d is the sum of differences, let d' denote the sum of differences when one construct is reversed. $d + d' \leqslant$ range of values, implying that not both matching scores can be negative. Both may be positive if middle values predominate, or they may be of opposite sign. When the FOCUS algorithm is used, the main criterion is the close matching of like constructs (and elements), so the criterion for reversing a construct has to be based on the individual match it makes with another construct, not the total or average with all other constructs. The actual choice of original or reversed form is therefore made at the time of incorporation into the cluster, both values having been previously calculated, as demonstrated in the FOCI output in Appendix B.

IV. "Not-applicable" Ratings

Another area which requires further work is how to deal with rating points which have the response "not applicable" (N.A.). At present, the way a construct is elicited, if such a rating does occur a 3 must be given. If there is a predominance of such ratings the construct is not suitable to be included in the analysis. One way of dealing with a grid containing a large number of N.A.'s is to focus initially distinguishing only the actual ratings against the N.A.'s, and use the SPACED display to identify blocks of such ratings. Each block of actual ratings may then be focused separately and recombined at a later stage.

A. *Subgrids and supergrids*

The incidence of N.A.'s on a construct does however indicate that the construct would be more appropriate at a lower level of organisation. The elements to which it does apply would be a reduced set, but more of the same type might be added at that stage. In this way a "subgrid" could be elicited, showing a subset of elements more finely discriminated at a more "sensory" level. A "supergrid" could also be elicited by taking clusters at the standard grid level of elements, which could be named, and used as single elements in the supergrid. Four or five clusters would be appropriate initially, more being added as the grid was built up. Some of the same standard grid constructs might be appropriate in the supergrid, others could be dropped or replaced by similar but superordinate constructs having a greater range of convenience. One current development, therefore, is to elicit the subgrid, standard grid and supergrid simultaneously, in a similar way to the ARGUS grids. This provides an alternative method of eliciting superordinate constructs from the usual method of "laddering". Laddering involves the identification of a central construct with a clearly preferred pole, and the elicitation of a higher level construct in answer to the question: "Why is that important to you?" (Hinkle, 1965).

V. Programs Beyond the Grid

The next scheduled program goes beyond the grid structure by incorporating several of these ideas. The first thing asked for is an account of the problem in hand. This is followed by the input of a list of items—people, events, things—which are in some way connected with the problem. These are in essence the elements, although there is no restriction on the mixture of types, merely that they in some way form or contribute to part of the problem. Many methods are used to entice out partially suppressed items such as asking for qualifications and refinements, similar and opposite items, logical and intuitive connections to existing items, and clusters of items. This stage is purely a brainstorming process, no evaluation being made, and no feedback given. It is found that as the items are elicited, relationships and patterns begin to form which identify the area and refine the definition of the problem. Before any other procedure is brought into operation the structure is beginning to develop. The first grouping procedure is to split the items into two groups, possibly overlapping, and describe the nature of the cut. This is repeated several times in order to settle the ideas which are pressing to the front of the head, then one split is decided upon which is used as the start of the rangefinder technique. This is iterated until a successful "construct" is extracted, then the whole rangefinder process repeated for other major divisions of items.

The nature of relationships can be explored using dyads of items and investigating questions like: "is there a relationship between item 1 and item 2; how strong is it; is the relationship between item 1 and item 2 the same as that between item 2 and item 1", that is, "is the relation symmetric"? Similarly, the relationships between clusters of items identified earlier opens up the investigation of patterning. There are many ways of asking questions about the relationships between the clusters which may provide indicators to a two- or three-dimensional plot of the items. At various stages the original item list must be reconsidered to include new items and delete those which have slipped beyond the area of interest as the problem is developed and reconstrued.

By laddering upwards from one or two of the most central and important constructs, an organisational structure can be built. An "implications grid" and a "resistance to change grid" can be also investigated (Hinkle, 1965). Consequently, a number of either intersecting or disjoint networks or entailment structures (Pask, Scott and Kallikourdis, 1973) may be elicited, and represented by the overlaying of the different patterns in some sort of topological map.

Consequently, a multitude of directions in which to proceed is visible. Many of the problems which have been met are general problems of psychological scaling. It is not possible to find a general solution to all problems, nor is it necessarily desirable. However, some of the problems have been identified and investigated, and through these investigations the choice of the city block metric for the focusing of the grid has been reinforced. This is due to the criterion of re-sorting the ratings to minimise the differences between any two adjacent rows of constructs or columns of elements over the whole grid, which produces the best display for the purpose of the feedback of the data from FOCUS and PEGASUS. This does not necessarily imply that the city block metric is the most suitable statistic when the nature of the operation is different such as that in SOCIOGRIDS or CORE. A series of studies is needed to establish the different criteria required for such operations, and how these may best be achieved with respect to different people, different types of grid, or different areas of experience. It seems that the criteria are not necessarily those of statistical significance, reliability or validity, but are more related to the ease of interpretation by the subject, and the level of personally significant awareness which can be experienced. Despite these difficulties, the technology of the repertory grid and the grid analysis offers a starting point for building and developing personal models of the world.

B. Output from the FOCI Program

FOCI is the FOCUS program, also showing how the matrices of matching scores and trees may be interpreted. It does not explain how or where to use a repertory grid but only the type of analysis used.

This grid was elicited from a student teacher in initial training who used as elements aspects of teaching which she felt to be personally important (Pope, 1977).

FOCI II
****
****

A PROGRAM DESIGNED TO ANALYSE AND FOCUS A REPERTORY GRID
WITH INTERPRETATION OF RESULTS.

USUALLY THE COMPUTER RUNS THE FOCUS PROGRAM WITHOUT ANY INTERPRETATION.
THIS PROGRAM (FOCI) GIVES AN INTERPRETATION OF THE OUTPUT FROM
THE FOCUS PROGRAM, BUT DOES NOT ATTEMPT TO EXPLAIN REPERTORY GRIDS
OR THEIR USAGE.
FOCUSING IS A METHOD FOR RE-SORTING THE ELEMENTS AND CONSTRUCTS IN
THE RAW GRID TO PRODUCE A FOCUSED GRID IN WHICH THE ELEMENTS AND
THE CONSTRUCTS ARE ARRANGED SO THAT THE ONES MOST ALIKE ARE NEAREST
TO EACH OTHER. IT CAN BE DONE QUITE EASILY WITH A PENCIL AND PAPER
BUT THE PROGRAM DOES ALL THE CALCULATING AND PRINTING FOR YOU.

IF YOU HAVE ELICITED A GRID WITH PEGASUS RECENTLY YOUR DATA MAY
ALREADY BE ON FILE BUT IF NOT YOU WILL HAVE TO TYPE IT ALL IN

IS YOUR DATA IN PEGASUS?YES
WHAT IS YOUR FILE NAME?CH927

BETH'S GRID

ELEMENTS	CONSTRUCTS	RATINGS
16	5	1 TO 5

RAW GRID

*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	1	1	2	2	1	1	3	3	1	2	3	1	2	1	1
2	3	3	1	5	5	1	1	2	5	1	2	1	1	3	1	1
3	4	4	3	1	5	2	2	2	3	4	3	2	2	1	1	3
4	1	1	1	2	2	1	1	1	2	1	1	2	1	1	1	1
5	5	5	2	3	4	1	1	2	5	4	4	1	2	2	2	3

THE UNITS OF OUTPUT WHICH YOU WILL NORMALLY GET WITH FOCUS ARE:

1) CONSTRUCT MATCHING SCORES
2) TREE FOR CONSTRUCTS
3) ELEMENT MATCHING SCORES
4) TREE FOR ELEMENTS AND FOCUSED GRID

THE FOLLOWING EXPLANATION RETAINS THIS ORDER BUT THE READER MAY FIND IT EASIER TO READ QUICKLY THROUGH THE FIRST PART AND THEN RE-READ 'FOCUSING THE CONSTRUCTS' AFTER A MORE DETAILED READING OF 'FOCUSING THE ELEMENTS'.

FOCUSING THE CONSTRUCTS
****

CONSTRUCTS ARE BIPOLAR. THAT MEANS THAT A CONSTRUCT CAN BE THOUGHT OF AS A LINE OR DIMENSION ALONG WHICH EACH ELEMENT HAS A PLACE IN RELATION TO ALL THE OTHER ELEMENTS, AND THE CONSTRUCT CAN BE LOOKED AT EITHER WAY ROUND.

```
 E.G.   FOR A FIVE POINT RATING SCALE :
             1     2     3     4     5
   POLE A    *-----------------------*   POLE B
 (E.G. LONG)                     +      (E.G. SHORT)
                                 E1
IS THE SAME AS
             1     2     3     4     5
   POLE B    *-----------------------*   POLE A
 (E.G. SHORT)      +                    (E.G. LONG)
                   E1
```

ELEMENT E1 IS STILL BETWEEN THE MIDDLE OF THE SCALE AND POLE B.
WE NEED TO LOOK FOR THE TWO CONSTRUCTS WHICH ARE MOST HIGHLY MATCHED, BUT BECAUSE OF THE BIPOLAR NATURE OF A CONSTRUCT A COMPLETE MISMATCH OR NEGATIVE MATCH IS AS SIGNIFICANT AS A COMPLETE POSITIVE MATCH.
TO ENSURE THAT THE BEST MATCH IS FOUND, ALL THE CONSTRUCTS ARE INCLUDED TWICE, ONCE WITH THE POLES AND THE RATINGS REVERSED, AND THE ACTUAL CHOICE OF ORIGINAL OR REVERSED FORM IS MADE AT THE TIME OF INCORPORATION INTO A CLUSTER.
THE CLUSTERS ARE FORMED BY SUCCESSIVELY CHOOSING THE PAIR OF CONSTRUCTS WHICH ARE MOST HIGHLY MATCHED. IF ONE OF THEM HAS BEEN CHOSEN BEFORE THEN THE NEW ONE IS ADDED INTO THAT GROUP OR CLUSTER NEXT TO THE ONE IT HAS BEEN MATCHED WITH.

TWO MATRICES OF CONSTRUCT MATCHING SCORES ARE PRODUCED FROM THE TWO FORMS OF THE CONSTRUCTS. EACH IS SYMMETRICAL ABOUT ITS LEADING DIAGONAL, SO TO REDUCE PRINTING TIME THE PRINTOUT SHOWS A HALF OF EACH OF THESE MATRICES PUT TOGETHER INTO ONE SQUARE.
THE NUMBERS RANGE FROM 100 FOR PERFECT MATCH, 0 FOR NO SIMILARITY, THROUGH TO -100 FOR PERFECT NEGATIVE MATCH.

CONSTRUCT MATCHING SCORES -- BETH'S GRID

```
    * 1   2   3   4   5
*************************
 1  *     50  25  81  18
    *
 2  *-32      31  43  43
    *
 3  * 6  -7       25  56
    *
 4  *-57 -44 -13      12
    *
 5  * 12 -25 -13  0
    *
```

FOR EXAMPLE IF WE PICK ON CONSTRUCT 1 WHICH IS

POLE 1 --IMPORTANT   POLE 5 --NOT IMPORTANT

THE LINE OF CONSTRUCT MATCHING SCORES WITH THE HIGHEST MATCH OF THE
ORIGINAL OR REVERSED FORMS OF EACH CONSTRUCT IS

```
        2   3   4   5
        50  25  81  18
```

IF YOU LOOK ALONG THIS LINE YOU CAN SEE HOW EACH OF YOUR CONSTRUCTS
RELATES TO THIS ONE. IT IS USED

50 PER CENT THE SAME AS LINKED TO FAMILY COMMITMENT---NOT LINKED TO FAM. COMMITMENT

25 PER CENT THE SAME AS CON. NEED FOR ADULT COMPANY---NOT CON. NEED FOR ADULT COMPANY

81 PER CENT THE SAME AS CONCERNED WITH HOW I FEEL---NOT CONCERNED WITH HOW I FEEL

18 PER CENT THE SAME AS TIED UP WITH SOCIAL LIFE---NOT TIED UP WITH SOCIAL LIFE

THE ONE MOST LIKE IT IS C 4 WHICH YOU CALLED
CONCERNED WITH HOW I FEEL---NOT CONCERNED WITH HOW I FEEL.

FOCUSING THE ELEMENTS
****

THE FOCUSING OF THE ELEMENTS IS A SIMILAR PROCESS TO THAT OF FOCUSING THE CONSTRUCTS BUT MUCH EASIER BECAUSE ELEMENTS ARE NOT BIPOLAR AND SO CANNOT BE MATCHED NEGATIVELY.
THE HIGHEST MATCH BETWEEN TWO ELEMENTS IS 100 AND THE LOWEST IS 0

THE TWO ELEMENTS THAT MATCH MOST HIGHLY ON ALL THE CONSTRUCTS ARE CHOSEN FIRST, THEN SUCCESSIVELY CLUSTERS ARE BUILT UP BY FINDING THE NEXT HIGHEST MATCH IN THE MATCHING SCORES MATRIX.

ELEMENT MATCHING SCORES -- BETH'S GRID

*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		100	70	55	70	60	60	60	70	85	80	45	65	65	60	75
2	100		70	55	70	60	60	60	70	85	80	45	65	65	60	75
3	70	70		55	50	90	90	80	50	85	80	75	95	75	90	95
4	55	55	55		75	55	55	65	75	50	65	60	60	80	65	60
5	70	70	50	75		40	40	50	80	65	70	45	45	55	40	55
6	60	60	90	55	40		100	80	40	75	70	85	95	75	90	85
7	60	60	90	55	40	100		80	40	75	70	85	95	75	90	85
8	60	60	80	65	50	80	80		60	65	80	85	85	85	80	75
9	70	70	50	75	80	40	40	60		55	70	55	45	55	40	55
10	85	85	85	50	65	75	75	65	55		85	60	80	60	75	90
11	80	80	80	65	70	70	70	80	70	85		65	75	75	70	85
12	45	45	75	60	45	85	85	85	55	60	65		80	70	75	70
13	65	65	95	60	45	95	95	85	45	80	75	80		80	95	90
14	65	65	75	80	55	75	75	85	55	60	75	70	80		85	70
15	60	60	90	65	40	90	90	80	40	75	70	75	95	85		85
16	75	75	95	60	55	85	85	75	55	90	85	70	90	70	85	

IF WE NOW LOOK AT ELEMENT 3 FOR EXAMPLE WHICH WAS

FEELING 'ON TOP'

YOU CAN SEE HOW SIMILARLY TO EACH OF THE OTHER ELEMENTS YOU HAVE CONSTRUED IT. IT IS

70 PER CENT SIMILAR TO DISCIPLINE

70 PER CENT SIMILAR TO ATMOSPHERE

55 PER CENT SIMILAR TO GOOD RELATIONSHIPS WITH STAFF

50 PER CENT SIMILAR TO GOOD WORK PRODUCED BY CHILDREN

90 PER CENT SIMILAR TO FEELING TIRED

90 PER CENT SIMILAR TO FAMILY COMMITMENTS

80 PER CENT SIMILAR TO PROBATIONARY YEAR

50 PER CENT SIMILAR TO PLEASANT BUILDING

85 PER CENT SIMILAR TO GETTING TO SCHOOL ON TIME

80 PER CENT SIMILAR TO AREA IN WHICH I TEACH

75 PER CENT SIMILAR TO EXTRA-CURRICULAR ACTIVITIES

95 PER CENT SIMILAR TO PREPARATION AND MARKING AT HOME

75 PER CENT SIMILAR TO LONG-TERM COMMITMENT

90 PER CENT SIMILAR TO NEEDING ADULT COMPANY

95 PER CENT SIMILAR TO RELATIONSHIP WITH CHILDREN

DON'T FORGET THAT THIS IS ONLY WITH RESPECT TO THE CONSTRUCTS YOU USED IN THIS GRID. IF YOU USED MORE CONSTRUCTS OR DIFFERENT CONSTRUCTS THESE VALUES COULD VARY.

YOUR CONSTRUCTS ARE:

CONCERNED WITH HOW I FEEL	NOT CONCERNED WITH HOW I FEEL
IMPORTANT	NOT IMPORTANT
LINKED TO FAMILY COMMITMENT	NOT LINKED TO FAM. COMMITMENT
TIED UP WITH SOCIAL LIFE	NOT TIED UP WITH SOCIAL LIFE
CON. NEED FOR ADULT COMPANY	NOT CON. NEED FOR ADULT COMPANY

FOR THE PURPOSE OF DISPLAYING YOUR GRID IN A LIMITED SPACE, PLEASE TYPE IN AN ABBREVIATION FOR EACH POLE NAME IN NO MORE THAN NINE CHARACTERS.

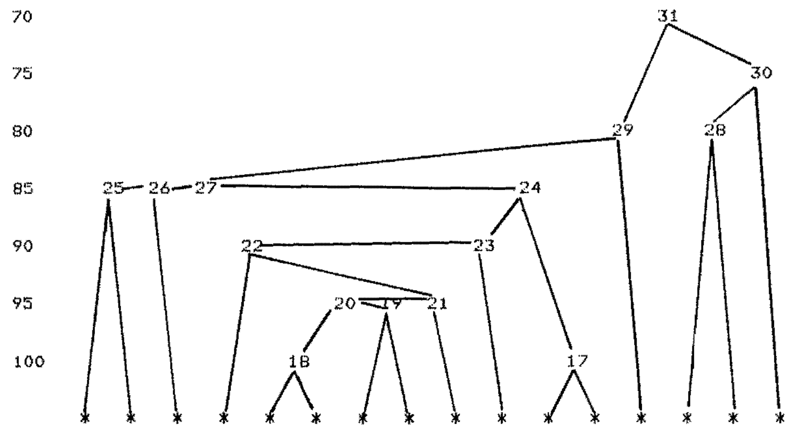
```
                                                        #########
        CONCERNED WITH HOW I FEEL                       ?FEELING
    NOT CONCERNED WITH HOW I FEEL                       ?NOT FEEL
                        IMPORTANT                       ?IMPORTANT
                    NOT IMPORTANT                       ?NOT IMP.
      LINKED TO FAMILY COMMITMENT                       ?FAM COMM
    NOT LINKED TO FAM. COMMITMENT                       ?NO FAM CM
           TIED UP WITH SOCIAL LIFE                     ?SOCIAL
       NOT TIED UP WITH SOCIAL LIFE                     ?NOT SOC.
        CON. NEED FOR ADULT COMPANY                     ?AD. COMP.
    NOT CON. NEED FOR ADULT COMPANY                     ?NOT AD COMP
```

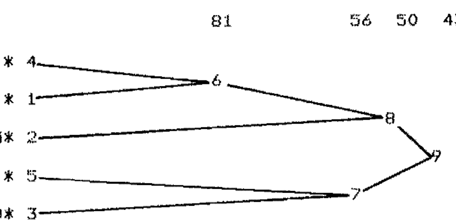
```
TO PRINT THE TREES AND GRID ON A COMPLETE PAGE, PRESS THE RETURN KEY
AFTER EACH QUESTION MARK UNTIL YOU SEE THE LINE, THEN TYPE 'READY'.


?
?
?
?
?
?
?READY
```

```
CLUSTERS ARE FORMED BY JOINING TWO NUMBERS TO
THE NEW CLUSTER NUMBER.
E.G. JOIN 7 AND 9 INTO CLUSTER 16  WOULD MEAN

     ELEMENT TREE             CONSTRUCT TREE

                               * 7.
          16                       .
          ..                         .
         .  .                          .
        .    .                          16
       .      .                        .
      *        *                     .
      7        9                   .
                               * 9.
```

```
TO JOIN UP THE CONSTRUCT TREE
*****************************


JOIN 4 AND 1 INTO CLUSTER 6

JOIN 5 AND 3 INTO CLUSTER 7

JOIN 6 AND 2 INTO CLUSTER 8

JOIN 8 AND 7 INTO CLUSTER 9
```

BETH'S FOCUSED GRID WITH ELEMENT AND CONSTRUCT TREES






```
               *  *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
             * 12  8  14  15  7   6  13   3  16  10   1   2  11   9   5   4
*******************************************************************************
FEELING    4 * 2   1   1   1   1   1   1   1   1   1   1   1   1   2   2   2  NOT FEEL * 4
             *
IMPORTANT 1  * 3   3   2   1   1   1   1   1   1   1   1   1   2   3   2   2  NOT IMP. * 1
             *
FAM COMM   2 * 1   2   3   1   1   1   1   1   1   1   3   3   2   5   5   5  NO FAM CM* 2
             *
SOCIAL     5 * 1   2   2   2   1   1   2   2   3   4   5   5   4   5   4   3  NOT SOC. * 5
             *
AD. COMP. 3  * 2   2   1   1   2   2   2   3   3   4   4   4   3   3   5   1  NOT AD CO* 3
             *
               *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
               *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   GOOD RELATIONSHIPS WITH STAFF
               *   *   *   *   *   *   *   *   *   *   *   *   *   *   GOOD WORK PRODUCED BY CHILDREN
               *   *   *   *   *   *   *   *   *   *   *   *   *   PLEASANT BUILDING
               *   *   *   *   *   *   *   *   *   *   *   *   AREA IN WHICH I TEACH
               *   *   *   *   *   *   *   *   *   *   *   ATMOSPHERE
               *   *   *   *   *   *   *   *   *   *   DISCIPLINE
               *   *   *   *   *   *   *   *   *   GETTING TO SCHOOL ON TIME
               *   *   *   *   *   *   *   *   RELATIONSHIP WITH CHILDREN
               *   *   *   *   *   *   *   FEELING "ON TOP"
               *   *   *   *   *   *   PREPARATION AND MARKING AT HOME
               *   *   *   *   *   FEELING TIRED
               *   *   *   *   FAMILY COMMITMENTS
               *   *   *   NEEDING ADULT COMPANY
               *   *   LONG-TERM COMMITMENT
               *   PROBATIONARY YEAR
               EXTRA-CURRICULAR ACTIVITIES
```

THIS IS BETH'S GRID

```
TO JOIN UP THE ELEMENT TREE
***************************

JOIN 1 AND 2 INTO CLUSTER 17

JOIN 7 AND 6 INTO CLUSTER 18

JOIN 13 AND 3 INTO CLUSTER 19

JOIN 18 AND 19 INTO CLUSTER 20

JOIN 20 AND 16 INTO CLUSTER 21

JOIN 15 AND 21 INTO CLUSTER 22

JOIN 22 AND 10 INTO CLUSTER 23

JOIN 23 AND 17 INTO CLUSTER 24

JOIN 12 AND 8 INTO CLUSTER 25

JOIN 25 AND 14 INTO CLUSTER 26

JOIN 26 AND 24 INTO CLUSTER 27

JOIN 9 AND 5 INTO CLUSTER 28

JOIN 27 AND 11 INTO CLUSTER 29

JOIN 28 AND 4 INTO CLUSTER 30

JOIN 29 AND 30 INTO CLUSTER 31




FOR AN EXPLANATION OF OTHER PROGRAMS ASK FOR A COPY OF
'NOTES ON THE COMPUTER PROGRAMS'.

THE MAIN PROGRAMS ARE:-
   FOCUS -- THE GRID ANALYSIS PROGRAM;
   *****

   PEGASUS -- AN INTERACTIVE PROGRAM TO ELICIT A GRID WITH
   *******                    REAL-TIME FEEDBACK;

   SOCIO-GRIDS -- A PROGRAM FOR EXPLORING COMMONALITY OF CONSTRUING
   ***********                IN A SMALL GROUP;

   ARGUS  -- AN INTERACTIVE PROGRAM FOR COUNSELLING AND THERAPY;
   *****

   CORE  -- AN INTERACTIVE PROGRAM TO FIND THE CORE COMMONALITY
   ****                       BETWEEN TWO GRIDS.
```

C. A Run of MIN-PEGASUS

This version of PEGASUS elicits a grid from the subject, allowing ongoing review and revision of the grid content. Finally the grid is focused in the usual way.

This is an elicitation of a grid about some of the computer programs which contribute to the repertory grid technology.

```
THIS PROGRAM INCORPORATES FOUR VERSIONS OF PEGASUS.
 1. A PEGASUS GRID ELICITATION STARTING A NEW GRID;
 2. A PEGASUS GRID ELICITATION WITH PART ALREADY
    ELICITED BY YOU RECENTLY;
 3. A PEGASUS GRID ELICITATION USING A STORED BANK
    OF CONSTRUCTS;
 4. A STRAIGHT KELLY REPERTORY GRID ELICITATION
    WITHOUT COMMENTARY.
WHAT IS THE NUMBER OF THE VERSION YOU WISH TO USE?4

                         PEGASUS II
                        ***********
                        ***********


PROGRAM ELICITS GRID AND SORTS USING SIMILARITIES




THIS IS A PROGRAM TO ELICIT A KELLY REPERTORY GRID.
PLEASE READ CAREFULLY EVERYTHING THAT IS PRINTED, AND
MAKE SURE YOU UNDERSTAND WHAT YOU HAVE TO DO.
A REPERTORY GRID IS A TECHNIQUE DEVISED BY KELLY TO
HELP YOU EXPLORE THE DIMENSIONS OF YOUR THINKING.


YOU MUST DECIDE ON A PURPOSE FOR DOING THE GRID AND
KEEP THIS IN MIND WHEN YOU CHOOSE THE ELEMENTS--THE
THINGS YOU ARE GOING TO THINK ABOUT DURING THE PROGRAM.
THESE ELEMENTS WILL THEN BE USED TO ELICIT CONSTRUCTS.


YOU ARE LIMITED TO 25 LETTERS AND SPACES FOR YOUR ELEMENT
AND CONSTRUCT NAMES.
IF YOU MAKE A TYPING ERROR PRESS THE DELETE KEY AS MANY
TIMES AS YOU WANT TO ERASE A CHARACTER,THEN CARRY ON.
THROUGHOUT THIS PROGRAM THE QUESTION WILL BE ASKED --
DO YOU NEED HELP? EACH TIME JUST TYPE  YES IF YOU DO AND
PRESS THE RETURN KEY
BEFORE YOU START THIS GRID, WHAT IS YOUR NAME OR IDENTIFICATION


?MILDRED
TYPE IN ON ONE LINE YOUR PURPOSE FOR DOING THIS GRID


?TO EXPLORE RELATIONSHIPS BETWEEN PROGRAMS




NAME SIX ELEMENTS.
YOU MUST CHOOSE A SET OF SIX ELEMENTS KEEPING IN MIND
WHY YOU WANT TO DO THIS GRID. THEY COULD BE PEOPLE,EVENTS,
PIECES OF MUSIC, PICTURES, BOOKS OR WHAT YOU WANT BUT
WHATEVER YOU CHOOSE THEY MUST BE OF THE SAME TYPE AND
EACH MUST BE WELL KNOWN TO YOU. TRY TO CHOOSE SPECIFIC
THINGS. NOW TYPE EACH ONE AFTER EACH QUESTION MARK.
DO NOT FORGET TO PRESS THE RETURN KEY AFTER EACH.
```

```
ELEMENT  1 ?FOCUS
ELEMENT  2 ?SPACED
ELEMENT  3 ?PEGASUS
ELEMENT  4 ?PEGBANK
ELEMENT  5 ?MIN-PEG
ELEMENT  6 ?SOCIOGRIDS
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 6
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 7 ?CORE(1)
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 7
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 8 ?CORE(2)
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 8
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 9 ?MINUS
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 9
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 10 ?ARGUS
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 10
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 11 ?FOCI
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 11
THAT YOU HAVE GOT SO FAR?YES
ELEMENT 12 ?PRE-PEG
CAN YOU THINK OF ANOTHER ELEMENT THAT BELONGS WITH THE 12
THAT YOU HAVE GOT SO FAR?NO




TRIAD FOR ELICITATION OF CONSTRUCT 1
 1 FOCUS
 2 SPACED
 3 PEGASUS


NAME THE PAIR


CAN YOU CHOOSE TWO OF THIS TRIAD OF ELEMENTS WHICH ARE IN
SOME WAY ALIKE AND DIFFERENT FROM THE OTHER ONE ?
TYPE IN THE NUMBERS OF THE PAIR ONE AFTER EACH QUESTION
MARK. DONT FORGET TO PRESS THE RETURN KEY AFTER EACH.



?1

?3



NAME THE POLES OF YOUR CONSTRUCT


NOW I WANT YOU TO THINK ABOUT WHAT YOU HAVE IN MIND WHEN YOU
SEPARATE THE PAIR FROM THE OTHER ONE.HOW CAN YOU DESCRIBE
THE TWO ENDS OR POLES OF THE SCALE WHICH DISCRIMINATE


FOCUS AND PEGASUS FROM SPACED
JUST TYPE ONE OR TWO WORDS FOR EACH POLE TO REMIND YOU WHAT
YOU ARE THINKING OR FEELING WHEN YOU USE THIS CONSTRUCT.



LEFT POLE RATED 1 --?MAJOR PROGRAMS
RIGHT POLE RATED 5 --?ADDITIONS TO PROGRAMS
```

```
TYPE IN THE RATINGS


NOW IF FOCUS AND PEGASUS ARE
ASSIGNED THE VALUE 1 AND SPACED IS
ASSIGNED THE VALUE  5

ACCORDING TO HOW YOU FEEL ABOUT THEM, PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5


 1 FOCUS        1
 3 PEGASUS      1
 2 SPACED       5
 4 PEGBANK     ?3
 5 MIN-PEG     ?4
 6 SOCIOGRIDS ?1
 7 CORE(1)     ?1
 8 CORE(2)     ?3
 9 MINUS       ?3
 10 ARGUS      ?2
 11 FOCI       ?4
 12 PRE-PEG    ?5


POLE 1 --MAJOR PROGRAMS

 1 FOCUS        1
 3 PEGASUS      1
 6 SOCIOGRIDS   1
 7 CORE(1)      1

 10 ARGUS       2

 4 PEGBANK      3
 8 CORE(2)      3
 9 MINUS        3

 5 MIN-PEG      4
 11 FOCI        4

 2 SPACED       5
 12 PRE-PEG     5

POLE 5 --ADDITIONS TO PROGRAMS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO

NOW YOU HAVE GOT ONE CONSTRUCT YOU KNOW WHAT TO DO.
A CONSTRUCT CAN BE THOUGHT OF AS A LINE ALONG WHICH
EACH OF YOUR ELEMENTS HAS A PLACE IN RELATION TO ALL THE
OTHER ELEMENTS.
PLEASE DO NOT USE CONSTRUCTS WHICH DO NOT APPLY TO ALL
YOUR ELEMENTS. AN EXAMPLE OF THIS IS:
REDHEAD---BLOND, AS IT IS IMPOSSIBLE TO RATE A PERSON
WITH BLACK HAIR ON THIS CONSTRUCT.
ONE POLE MUST BE IN SOME SENSE WHAT THE OTHER IS NOT,
AND THEY MUST DIVIDE YOUR ELEMENTS INTO TWO APPROXIMATELY
EQUAL GROUPS, SO PLEASE TRY TO AVOID CONSTRUCTS
WHERE NEARLY ALL THE ELEMENTS ARE AT ONE END. AN EXAMPLE MIGHT BE
A GREEN-EYED MONSTER---NOT A GREEN-EYED MONSTER




TRIAD FOR ELICITATION OF CONSTRUCT 2
 4 PEGBANK
 5 MIN-PEG
 6 SOCIOGRIDS
```

```
NAME THE PAIR

DO YOU NEED HELP?NO

?4

?5

NAME THE POLES OF YOUR CONSTRUCT

DO YOU NEED HELP?N

LEFT POLE RATED 1 --?ELICITATION
RIGHT POLE RATED 5 --?ANALYSIS

TYPE IN THE RATINGS

DO YOU NEED HELP?N




 4 PEGBANK      1
 5 MIN-PEG      1
 6 SOCIOGRIDS   5
 1 FOCUS       ?5
 2 SPACED      ?5
 3 PEGASUS     ?1
 7 CORE(1)     ?4
 8 CORE(2)     ?4
 9 MINUS       ?5
 10 ARGUS      ?1
 11 FOCI       ?5
 12 PRE-PEG    ?1

POLE 1 --ELICITATION

 3 PEGASUS      1
 4 PEGBANK      1
 5 MIN-PEG      1
 10 ARGUS       1
 12 PRE-PEG     1


 7 CORE(1)      4
 8 CORE(2)      4

 1 FOCUS        5
 2 SPACED       5
 6 SOCIOGRIDS   5
 9 MINUS        5
 11 FOCI        5

POLE 5 --ANALYSIS
```

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
DO YOU NEED HELP?N

HOW MANY?2
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?2
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?2




POLE 1 --ELICITATION

 3 PEGASUS      1
 10 ARGUS       1
 12 PRE-PEG     1

 4 PEGBANK      2
 5 MIN-PEG      2


 7 CORE(1)      4
 8 CORE(2)      4

 1 FOCUS        5
 2 SPACED       5
 6 SOCIOGRIDS   5
 9 MINUS        5
 11 FOCI        5

POLE 5 --ANALYSIS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

DO YOU WANT TO CHANGE THE POLE NAMES?N


TRIAD FOR ELICITATION OF CONSTRUCT 3
 1 FOCUS
 3 PEGASUS
 5 MIN-PEG


NAME THE PAIR


DO YOU NEED HELP?N


?3

?5


NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?N


LEFT POLE RATED 1 --?DEMANDING FOR USER
RIGHT POLE RATED 5 --?EASY FOR USER

TYPE IN THE RATINGS


DO YOU NEED HELP?N
```

```
 3 PEGASUS      1
 5 MIN-PEG      1
 1 FOCUS        5
 2 SPACED      ?5
 4 PEGBANK     ?1
 6 SOCIOGRIDS ?5
 7 CORE(1)     ?3
 8 CORE(2)     ?3
 9 MINUS       ?5
 10 ARGUS      ?1
 11 FOCI       ?4
 12 PRE-PEG    ?1


POLE 1 --DEMANDING FOR USER

 3 PEGASUS      1
 4 PEGBANK      1
 5 MIN-PEG      1
 10 ARGUS       1
 12 PRE-PEG     1


 7 CORE(1)      3
 8 CORE(2)      3

 11 FOCI        4

 1 FOCUS        5
 2 SPACED       5
 6 SOCIOGRIDS   5
 9 MINUS        5

POLE 5 --EASY FOR USER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
DO YOU NEED HELP?N


HOW MANY?1
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?2


POLE 1 --DEMANDING FOR USER

 3 PEGASUS      1
 4 PEGBANK      1
 10 ARGUS       1
 12 PRE-PEG     1

 5 MIN-PEG      2

 7 CORE(1)      3
 8 CORE(2)      3

 11 FOCI        4

 1 FOCUS        5
 2 SPACED       5
 6 SOCIOGRIDS   5
 9 MINUS        5

POLE 5 --EASY FOR USER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

DO YOU WANT TO CHANGE THE POLE NAMES?N
```

```
TRIAD FOR ELICITATION OF CONSTRUCT 4
 2 SPACED
 4 PEGBANK
 6 SOCIOGRIDS


NAME THE PAIR


DO YOU NEED HELP?N


?2

?6


NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?N


LEFT POLE RATED 1 --?PART OF AN EVENT
RIGHT POLE RATED 5 --?COMPLETE EVENT

TYPE IN THE RATINGS


DO YOU NEED HELP?N


 2 SPACED       1
 6 SOCIOGRIDS   1
 4 PEGBANK      5
 1 FOCUS       ?2
 3 PEGASUS     ?5
 5 MIN-PEG     ?4
 7 CORE(1)     ?2
 8 CORE(2)     ?1
 9 MINUS       ?1
 10 ARGUS      ?2
 11 FOCI       ?2
 12 PRE-PEG    ?2


POLE 1 --PART OF AN EVENT

 2 SPACED       1
 6 SOCIOGRIDS   1
 8 CORE(2)      1
 9 MINUS        1

 1 FOCUS        2
 7 CORE(1)      2
 10 ARGUS       2
 11 FOCI        2
 12 PRE-PEG     2


 5 MIN-PEG      4

 3 PEGASUS      5
 4 PEGBANK      5

POLE 5 --COMPLETE EVENT


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

DO YOU WANT TO CHANGE THE POLE NAMES?N
```

```
TRIAD FOR ELICITATION OF CONSTRUCT 5
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?YES
 1 FOCUS
 2 SPACED
 3 PEGASUS
 4 PEGBANK
 5 MIN-PEG
 6 SOCIOGRIDS
 7 CORE(1)
 8 CORE(2)
 9 MINUS
 10 ARGUS
 11 FOCI
 12 PRE-PEG
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?5
 5 MIN-PEG
?6
 6 SOCIOGRIDS
?11
 11 FOCI


NAME THE PAIR


DO YOU NEED HELP?N


?5

?11


NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?INDIVIDUAL GRID
RIGHT POLE RATED 5 --?MORE THAN ONE GRID

TYPE IN THE RATINGS


HELP?


 5 MIN-PEG      1
 11 FOCI        1
 6 SOCIOGRIDS   5
 1 FOCUS       ?1
 2 SPACED      ?1
 3 PEGASUS     ?1
 4 PEGBANK     ?4
 7 CORE(1)     ?4
 8 CORE(2)     ?4
 9 MINUS       ?4
 10 ARGUS      ?5
 12 PRE-PEG    ?2
```

```
POLE 1 --INDIVIDUAL GRID

 1 FOCUS        1
 2 SPACED       1
 3 PEGASUS      1
 5 MIN-PEG      1
 11 FOCI        1

 12 PRE-PEG     2


 4 PEGBANK      4
 7 CORE(1)      4
 8 CORE(2)      4
 9 MINUS        4

 6 SOCIOGRIDS   5
 10 ARGUS       5

POLE 5 --MORE THAN ONE GRID


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?




IS YOUR REASON FOR DOING THIS GRID STILL


TO EXPLORE RELATIONSHIPS BETWEEN PROGRAMS
?YES



TRIAD FOR ELICITATION OF CONSTRUCT 6
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 FOCUS
 2 SPACED
 3 PEGASUS
 4 PEGBANK
 5 MIN-PEG
 6 SOCIOGRIDS
 7 CORE(1)
 8 CORE(2)
 9 MINUS
 10 ARGUS
 11 FOCI
 12 PRE-PEG
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?5
 5 MIN-PEG
?6
 6 SOCIOGRIDS
?7
 7 CORE(1)


NAME THE PAIR


HELP?


?5

?7
```

```
NAME THE POLES OF YOUR CONSTRUCT

HELP?

LEFT POLE RATED 1 --?ONE PERSON INVOLVED
RIGHT POLE RATED 5 --?MORE THAN ONE PERSON

TYPE IN THE RATINGS

HELP?

 5 MIN-PEG      1
 7 CORE(1)      1
 6 SOCIOGRIDS   5
 1 FOCUS       ?1
 2 SPACED      ?1
 3 PEGASUS     ?1
 4 PEGBANK     ?3
 8 CORE(2)     ?4
 9 MINUS       ?4
 10 ARGUS      ?2
 11 FOCI       ?1
 12 PRE-PEG    ?1

POLE 1 --ONE PERSON INVOLVED

 1 FOCUS        1
 2 SPACED       1
 3 PEGASUS      1
 5 MIN-PEG      1
 7 CORE(1)      1
 11 FOCI        1
 12 PRE-PEG     1

 10 ARGUS       2

 4 PEGBANK      3

 8 CORE(2)      4
 9 MINUS        4

 6 SOCIOGRIDS   5

POLE 5 --MORE THAN ONE PERSON

DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?NO

YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE

?3

NAME THE POLES OF YOUR CONSTRUCT

LEFT POLE RATED 1 --?CONVERSATION WITH SELF
RIGHT POLE RATED 5 --?CONVERSATION WITH OTHERS
```

```
TYPE IN THE RATINGS


 1 FOCUS       ?2
 2 SPACED      ?2
 3 PEGASUS     ?1
 4 PEGBANK     ?3
 5 MIN-PEG     ?1
 6 SOCIOGRIDS ?5
 7 CORE(1)     ?1
 8 CORE(2)     ?4
 9 MINUS       ?4
 10 ARGUS      ?1
 11 FOCI       ?2
 12 PRE-PEG    ?1


POLE 1 --CONVERSATION WITH SELF

 3 PEGASUS      1
 5 MIN-PEG      1
 7 CORE(1)      1
 10 ARGUS       1
 12 PRE-PEG     1

 1 FOCUS        2
 2 SPACED       2
 11 FOCI        2

 4 PEGBANK      3

 8 CORE(2)      4
 9 MINUS        4

 6 SOCIOGRIDS  5

POLE 5 --CONVERSATION WITH OTHERS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?


YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3

NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?LAYOUT FOR DISPLAY
RIGHT POLE RATED 5 --?MAINLY RESULTS

TYPE IN THE RATINGS


 1 FOCUS       ?3
 2 SPACED      ?1
 3 PEGASUS     ?4
 4 PEGBANK     ?4
 5 MIN-PEG     ?4
 6 SOCIOGRIDS ?5
 7 CORE(1)     ?5
 8 CORE(2)     ?5
 9 MINUS       ?2
 10 ARGUS      ?5
 11 FOCI       ?3
 12 PRE-PEG    ?4
```

```
POLE 1 --LAYOUT FOR DISPLAY

 2 SPACED       1

 9 MINUS        2

 1 FOCUS        3
 11 FOCI        3

 3 PEGASUS      4
 4 PEGBANK      4
 5 MIN-PEG      4
 12 PRE-PEG     4

 6 SOCIOGRIDS   5
 7 CORE(1)      5
 8 CORE(2)      5
 10 ARGUS       5

POLE 5 --MAINLY RESULTS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?







YOU HAVE NOW GOT 8 CONSTRUCTS AND 12 ELEMENTS
AND YOU MUST DECIDE WHETHER THEY ARE THE IMPORTANT
ONES FOR YOU IN THE PURPOSE YOU HAD FOR DOING THIS
GRID WHICH YOU SAID WAS


TO EXPLORE RELATIONSHIPS BETWEEN PROGRAMS


IF YOU FEEL THAT ONE OR MORE OF YOUR CONSTRUCTS OR ELEMENTS
DOES NOT BELONG WITH THE OTHERS YOU MAY DELETE THEM



HERE IS A LIST OF YOUR ELEMENTS



 1 FOCUS
 2 SPACED
 3 PEGASUS
 4 PEGBANK
 5 MIN-PEG
 6 SOCIOGRIDS
 7 CORE(1)
 8 CORE(2)
 9 MINUS
 10 ARGUS
 11 FOCI
 12 PRE-PEG

DO YOU WANT TO DELETE AN ELEMENT?NO

HERE IS A LIST OF YOUR CONSTRUCTS



 1 MAJOR PROGRAMS--ADDITIONS TO PROGRAMS
 2 ELICITATION--ANALYSIS
 3 DEMANDING FOR USER--EASY FOR USER
 4 PART OF AN EVENT--COMPLETE EVENT
 5 INDIVIDUAL GRID--MORE THAN ONE GRID
 6 ONE PERSON INVOLVED--MORE THAN ONE PERSON
 7 CONVERSATION WITH SELF--CONVERSATION WITH OTHERS
 8 LAYOUT FOR DISPLAY--MAINLY RESULTS
```

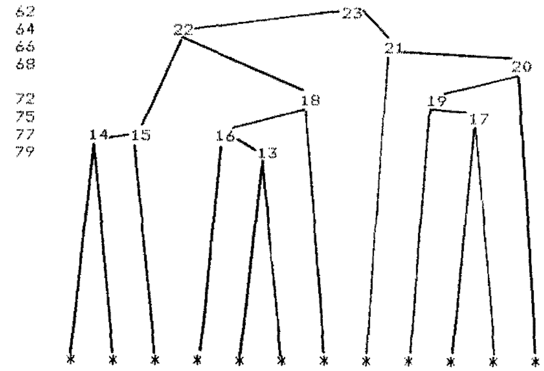
```
DO YOU WANT TO DELETE A CONSTRUCT?NO



YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3



NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?SELF-LEARNING AND THERAPY
RIGHT POLE RATED 5 --?LEARNING WITH OTHERS

TYPE IN THE RATINGS


 1 FOCUS       ?2
 2 SPACED      ?1
 3 PEGASUS     ?2
 4 PEGBANK     ?3
 5 MIN-PEG     ?1
 6 SOCIOGRIDS  ?5
 7 CORE(1)     ?1
 8 CORE(2)     ?5
 9 MINUS       ?2
 10 ARGUS      ?1
 11 FOCI       ?2
 12 PRE-PEG    ?2


POLE 1 --SELF-LEARNING AND THERAPY

 2 SPACED       1
 5 MIN-PEG      1
 7 CORE(1)      1
 10 ARGUS       1

 1 FOCUS        2
 3 PEGASUS      2
 9 MINUS        2
 11 FOCI        2
 12 PRE-PEG     2

 4 PEGBANK      3


 6 SOCIOGRIDS   5
 8 CORE(2)      5

POLE 5 --LEARNING WITH OTHERS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?N
```

```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE

?3


NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?FEEDBACK GIVEN DURING RUN
RIGHT POLE RATED 5 --?NO FEEDBACK GIVEN DURING RUN

TYPE IN THE RATINGS


 1 FOCUS       ?5
 2 SPACED      ?4
 3 PEGASUS     ?1
 4 PEGBANK     ?1
 5 MIN-PEG     ?2\3
 6 SOCIOGRIDS  ?5
 7 CORE(1)     ?2
 8 CORE(2)     ?2
 9 MINUS       ?5
 10 ARGUS      ?5
 11 FOCI       ?2
 12 PRE-PEG    ?1


POLE 1 --FEEDBACK GIVEN DURING RUN

 3 PEGASUS      1
 4 PEGBANK      1
 12 PRE-PEG     1

 7 CORE(1)      2
 8 CORE(2)      2
 11 FOCI        2

 5 MIN-PEG      3

 2 SPACED       4

 1 FOCUS        5
 6 SOCIOGRIDS   5
 9 MINUS        5
 10 ARGUS       5

POLE 5 --NO FEEDBACK GIVEN DURING RUN


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?
```

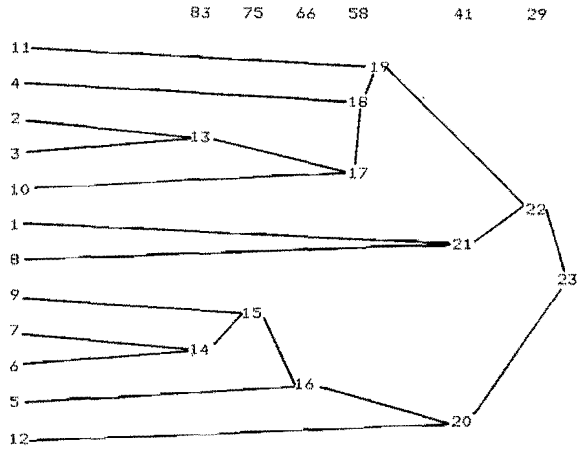
```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3

NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?SEVERAL VERSIONS AVAILABLE
RIGHT POLE RATED 5 --?STRAIGHT PROCEDURE

TYPE IN THE RATINGS


 1 FOCUS       ?1
 2 SPACED      ?4
 3 PEGASUS     ?2
 4 PEGBANK     ?1
 5 MIN-PEG     ?4
 6 SOCIOGRIDS ?5
 7 CORE(1)     ?5
 8 CORE(2)     ?5
 9 MINUS       ?5
 10 ARGUS      ?2
 11 FOCI       ?5
 12 PRE-PEG    ?4


POLE 1 --SEVERAL VERSIONS AVAILABLE

 1 FOCUS        1
 4 PEGBANK      1

 3 PEGASUS      2
 10 ARGUS       2


 2 SPACED       4
 5 MIN-PEG      4
 12 PRE-PEG     4

 6 SOCIOGRIDS   5
 7 CORE(1)      5
 8 CORE(2)      5
 9 MINUS        5
 11 FOCI        5

POLE 5 --STRAIGHT PROCEDURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?NO
DO YOU WANT TO FINISH NOW?NO







YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
```

```
NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?CLUSTERING
RIGHT POLE RATED 5 --?COMPARISON

TYPE IN THE RATINGS


 1 FOCUS       ?1
 2 SPACED      ?3
 3 PEGASUS     ?3
 4 PEGBANK     ?4
 5 MIN-PEG     ?1
 6 SOCIOGRIDS  ?1
 7 CORE(1)     ?5
 8 CORE(2)     ?5
 9 MINUS       ?5
 10 ARGUS      ?3
 11 FOCI       ?1
 12 PRE-PEG    ?3

POLE 1 --CLUSTERING

 1 FOCUS        1
 5 MIN-PEG      1
 6 SOCIOGRIDS   1
 11 FOCI        1


 2 SPACED       3
 3 PEGASUS      3
 10 ARGUS       3
 12 PRE-PEG     3

 4 PEGBANK      4

 7 CORE(1)      5
 8 CORE(2)      5
 9 MINUS        5

POLE 5 --COMPARISON


DO YOU WANT TO CHANGE ANY OF THESE VALUES?NO

DO YOU WANT TO CHANGE THE POLE NAMES?NO
DO YOU WANT TO FINISH NOW?YES






DO YOU WANT:
    1) A COMPLETE PRINTOUT OF THE ANALYSIS OF YOUR GRID
    2) ONLY THE RESULTS OF THE ANALYSIS
WHAT IS THE NUMBER OF YOUR CHOICE?2



CONSTRUCT  1  REVERSED
CONSTRUCT  4  REVERSED
```

FOCUSED GRID



	* 1	11	2	5	12	3	4	10	7	8	9	6	
11	1	5	4	4	4	2	1	2	5	5	5	5	11
4	4	4	5	2	4	1	1	4	4	5	5	5	4
2	5	5	5	2	1	1	2	1	4	4	5	5	2
3	5	4	5	2	1	1	1	1	3	3	5	5	3
10	5	2	4	3	1	1	1	5	2	2	5	5	10
1	5	2	1	2	1	5	3	4	5	3	3	5	1
8	3	3	1	4	4	4	4	5	5	5	2	5	8
9	2	2	1	1	2	2	3	1	1	5	2	5	9
7	2	2	2	1	1	1	3	1	1	4	4	5	7
6	1	1	1	1	1	1	3	2	1	4	4	5	6
5	1	1	1	1	2	1	4	5	4	4	4	5	5
12	1	1	3	1	3	3	4	3	5	5	5	1	12
	FOCUS	FOCI	SPACED	MIN-PEG	PRE-PEG	PEGASUS	PEGBANK	ARGUS	CORE(1)	CORE(2)	MINUS	SOCIOGRIDS	



SEVERAL VERSIONS AVAILABLE	---	STRAIGHT PROCEDURE
COMPLETE EVENT	---	PART OF AN EVENT
ELICITATION	---	ANALYSIS
DEMANDING FOR USER	---	EASY FOR USER
FEEDBACK GIVEN DURING RUN	---	NO FEEDBACK GIVEN DURING RUN
ADDITIONS TO PROGRAMS	---	MAJOR PROGRAMS
LAYOUT FOR DISPLAY	---	MAINLY RESULTS
SELF-LEARNING AND THERAPY	---	LEARNING WITH OTHERS
CONVERSATION WITH SELF	---	CONVERSATION WITH OTHERS
ONE PERSON INVOLVED	---	MORE THAN ONE PERSON
INDIVIDUAL GRID	---	MORE THAN ONE GRID
CLUSTERING	---	COMPARISON

THIS IS MILDRED'S GRID
PURPOSE:
TO EXPLORE RELATIONSHIPS BETWEEN PROGRAMS
DO YOU WANT YOUR GRID PUT ON FILE?NO

D. A Run of PEGASUS

This version of PEGASUS elicits a repertory grid offering real-time feedback of implications and links made by the subject, who is then encouraged to differentiate between highly clustered elements and highly clustered constructs.

This is an elicitation of a grid from a manager on the appraisal of his subordinates (Thomas, Shaw and Pope, 1977).

```
THIS PROGRAM INCORPORATES FOUR VERSIONS OF PEGASUS.
 1. A PEGASUS GRID ELICITATION STARTING A NEW GRID;
 2. A PEGASUS GRID ELICITATION WITH PART ALREADY
    ELICITED BY YOU RECENTLY;
 3. A PEGASUS GRID ELICITATION USING A STORED BANK
    OF CONSTRUCTS;
 4. A STRAIGHT KELLY REPERTORY GRID ELICITATION
    WITHOUT COMMENTARY.
WHAT IS THE NUMBER OF THE VERSION YOU WISH TO USE?1


                         PEGASUS II
                        ************
                        ************


PROGRAM ELICITS GRID AND SORTS USING SIMILARITIES





THIS IS A PROGRAM TO ELICIT A KELLY REPERTORY GRID.
PLEASE READ CAREFULLY EVERYTHING THAT IS PRINTED, AND
MAKE SURE YOU UNDERSTAND WHAT YOU HAVE TO DO.
A REPERTORY GRID IS A TECHNIQUE DEVISED BY KELLY TO
HELP YOU EXPLORE THE DIMENSIONS OF YOUR THINKING.


YOU MUST DECIDE ON A PURPOSE FOR DOING THE GRID AND
KEEP THIS IN MIND WHEN YOU CHOOSE THE ELEMENTS--THE
THINGS YOU ARE GOING TO THINK ABOUT DURING THE PROGRAM.
THESE ELEMENTS WILL THEN BE USED TO ELICIT CONSTRUCTS.


YOU ARE LIMITED TO 25 LETTERS AND SPACES FOR YOUR ELEMENT
AND CONSTRUCT NAMES.
IF YOU MAKE A TYPING ERROR PRESS THE DELETE KEY AS MANY
TIMES AS YOU WANT TO ERASE A CHARACTER,THEN CARRY ON.
THROUGHOUT THIS PROGRAM THE QUESTION WILL BE ASKED --
DO YOU NEED HELP? EACH TIME JUST TYPE  YES IF YOU DO AND
PRESS THE RETURN KEY
BEFORE YOU START THIS GRID, WHAT IS YOUR NAME OR IDENTIFICATION


?R
TYPE IN ON ONE LINE YOUR PURPOSE FOR DOING THIS GRID


?STAFF APPRAISAL





NAME SIX ELEMENTS.
YOU MUST CHOOSE A SET OF SIX ELEMENTS KEEPING IN MIND
WHY YOU WANT TO DO THIS GRID. THEY COULD BE PEOPLE,EVENTS,
PIECES OF MUSIC, PICTURES, BOOKS OR WHAT YOU WANT BUT
WHATEVER YOU CHOOSE THEY MUST BE OF THE SAME TYPE AND
EACH MUST BE WELL KNOWN TO YOU. TRY TO CHOOSE SPECIFIC
THINGS. NOW TYPE EACH ONE AFTER EACH QUESTION MARK.
DO NOT FORGET TO PRESS THE RETURN KEY AFTER EACH.
```

```
ELEMENT  1 ?W
ELEMENT  2 ?A
ELEMENT  3 ?J
ELEMENT  4 ?P
ELEMENT  5 ?C
ELEMENT  6 ?N


TRIAD FOR ELICITATION OF CONSTRUCT 1
 1 W
 2 A
 3 J

NAME THE PAIR

CAN YOU CHOOSE TWO OF THIS TRIAD OF ELEMENTS WHICH ARE IN
SOME WAY ALIKE AND DIFFERENT FROM THE OTHER ONE ?
TYPE IN THE NUMBERS OF THE PAIR ONE AFTER EACH QUESTION
MARK. DONT FORGET TO PRESS THE RETURN KEY AFTER EACH.



?1

?2

NAME THE POLES OF YOUR CONSTRUCT

NOW I WANT YOU TO THINK ABOUT WHAT YOU HAVE IN MIND WHEN YOU
SEPARATE THE PAIR FROM THE OTHER ONE.HOW CAN YOU DESCRIBE
THE TWO ENDS OR POLES OF THE SCALE WHICH DISCRIMINATE

W AND A FROM J
JUST TYPE ONE OR TWO WORDS FOR EACH POLE TO REMIND YOU WHAT
YOU ARE THINKING OR FEELING WHEN YOU USE THIS CONSTRUCT.



LEFT POLE RATED 1 --?LESS AMBITIOUS
RIGHT POLE RATED 5 --?MORE AMBITIOUS

TYPE IN THE RATINGS

NOW IF W AND A ARE
ASSIGNED THE VALUE 1 AND J IS
ASSIGNED THE VALUE  5

ACCORDING TO HOW YOU FEEL ABOUT THEM, PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5

 1 W           1
 2 A           1
 3 J           5
 4 P          ?1
 5 C          ?1
 6 N          ?3
```

POLE 1 --LESS AMBITIOUS

```
 1 W          1
 2 A          1
 4 P          1
 5 C          1


 6 N          3


 3 J          5
```

POLE 5 --MORE AMBITIOUS

DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?

NOW YOU HAVE GOT ONE CONSTRUCT YOU KNOW WHAT TO DO.
A CONSTRUCT CAN BE THOUGHT OF AS A LINE ALONG WHICH
EACH OF YOUR ELEMENTS HAS A PLACE IN RELATION TO ALL THE
OTHER ELEMENTS.
PLEASE DO NOT USE CONSTRUCTS WHICH DO NOT APPLY TO ALL
YOUR ELEMENTS. AN EXAMPLE OF THIS IS:
REDHEAD---BLOND, AS IT IS IMPOSSIBLE TO RATE A PERSON
WITH BLACK HAIR ON THIS CONSTRUCT.
ONE POLE MUST BE IN SOME SENSE WHAT THE OTHER IS NOT,
AND THEY MUST LIVIDE YOUR ELEMENTS INTO TWO APPROXIMATELY
EQUAL GROUPS, SO PLEASE TRY TO AVOID CONSTRUCTS
WHERE NEARLY ALL THE ELEMENTS ARE AT ONE END. AN EXAMPLE MIGHT BE
A GREEN-EYED MONSTER---NOT A GREEN-EYED MONSTER

TRIAD FOR ELICITATION OF CONSTRUCT .
 4 P
 5 C
 6 N

NAME THE PAIR

DO YOU NEED HELP?

?4

?5

NAME THE POLES OF YOUR CONSTRUCT

DO YOU NEED HELP?

LEFT POLE RATED 1 --?OVER 50
RIGHT POLE RATED 5 --?UNDER 50

```
POLE 1 --USES INITIATIVE

 2 A           1
 3 J           1
 5 C           1


 4 P           3
 6 N           3


 1 W           5

POLE 5 --LACKS INITIATIVE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?



TRIAD FOR ELICITATION OF CONSTRUCT 4
 2 A
 4 P
 6 N


NAME THE PAIR


DO YOU NEED HELP?


?2

?4


NAME THE POLES OF YOUR CONSTRUCT


DO YOU NEED HELP?


LEFT POLE RATED 1 --?PROGRAMMING KNOWLEDGE
RIGHT POLE RATED 5 --?NO PROGRAMMING KNOWLEDGE

TYPE IN THE RATINGS


DO YOU NEED HELP?


 2 A           1
 4 P           1
 6 N           5
 1 W          ?5
 3 J          ?1
 5 C          ?4


POLE 1 --PROGRAMMING KNOWLEDGE

 2 A           1
 3 J           1
 4 P           1



 5 C           4

 1 W           5
 6 N           5

POLE 5 --NO PROGRAMMING KNOWLEDGE
```

```
TYPE IN THE RATINGS

DO YOU NEED HELP?

 4 P            1
 5 C            1
 6 N            5
 1 W           ?3
 2 A           ?1
 3 J           ?4

POLE 1 --OVER 50

 2 A            1
 4 P            1
 5 C            1

 1 W            3

 3 J            4

 6 N            5

POLE 5 --UNDER 50

DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?



TRIAD FOR ELICITATION OF CONSTRUCT 3
 1 W
 3 J
 5 C

NAME THE PAIR

DO YOU NEED HELP?

?3

?5

NAME THE POLES OF YOUR CONSTRUCT

DO YOU NEED HELP?

LEFT POLE RATED 1 --?USES INITIATIVE
RIGHT POLE RATED 5 --?LACKS INITIATIVE

TYPE IN THE RATINGS

DO YOU NEED HELP?

 3 J            1
 5 C            1
 1 W            5
 2 A           ?1
 4 P           ?3
 6 N           ?3
```

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
DO YOU NEED HELP?


HOW MANY?3
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?5
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?5
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?1


POLE 1 --PROGRAMMING KNOWLEDGE

 3 J            1
 6 N            1



 5 C            4

 1 W            5
 2 A            5
 4 P            5

POLE 5 --NO PROGRAMMING KNOWLEDGE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?



THE TWO CONSTRUCTS YOU CALLED
 1 LESS AMBITIOUS--MORE AMBITIOUS
 4 NO PROGRAMMING KNOWLEDGE--PROGRAMMING KNOWLEDGE
ARE MATCHED AT THE  75 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
LESS AMBITIOUS YOU ARE ALSO SAYING
NO PROGRAMMING KNOWLEDGE
AND MOST OF THE TIME YOU ARE SAYING
MORE AMBITIOUS YOU ARE ALSO SAYING
PROGRAMMING KNOWLEDGE


THINK OF ANOTHER ELEMENT WHICH IS EITHER LESS AMBITIOUS AND PROGRAMMING KNOWLEDGE
OR NO PROGRAMMING KNOWLEDGE AND MORE AMBITIOUS
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?R
RATINGS :


LESS AMBITIOUS--MORE AMBITIOUS?4
OVER 50--UNDER 50?5
USES INITIATIVE--LACKS INITIATIVE?1
NO PROGRAMMING KNOWLEDGE--PROGRAMMING KNOWLEDGE?1

ELEMENT 7 --R

DO YOU WANT TO FINISH NOW?NO
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?YES
```

```
    * 1   4   2   5   7   3   6
**********************************
 4  * 1   1   1   2   1   5   5  * 4
    *
 1  * 1   1   1   1   4   5   3  * 1
    *
 2  * 3   1   1   1   5   4   5  * 2
    *
 3  * 5   3   1   1   1   1   3  * 3
    *
      *   *   *   *   *   *   *
      *   *   *   *   *   *   N
      *   *   *   *   *   J
      *   *   *   *   R
      *   *   *   C
      *   *   A
      *   P
      W
```

```
      NO PROGRAMMING KNOWLEDGE    ---  PROGRAMMING KNOWLEDGE

                LESS AMBITIOUS    ---  MORE AMBITIOUS

                       OVER 50    ---  UNDER 50

               USES INITIATIVE    ---  LACKS INITIATIVE
```

THIS IS R'S GRID
PURPOSE:
STAFF APPRAISAL

YOU HAVE NOW GOT 4 CONSTRUCTS AND 7 ELEMENTS
AND YOU MUST DECIDE WHETHER THEY ARE THE IMPORTANT
ONES FOR YOU IN THE PURPOSE YOU HAD FOR DOING THIS
GRID WHICH YOU SAID WAS

STAFF APPRAISAL

IF YOU FEEL THAT ONE OR MORE OF YOUR CONSTRUCTS OR ELEMENTS
DOES NOT BELONG WITH THE OTHERS YOU MAY DELETE THEM

HERE IS A LIST OF YOUR ELEMENTS

```
 1 W
 2 A
 3 J
 4 P
 5 C
 6 N
 7 R
```

DO YOU WANT TO DELETE AN ELEMENT?NO

HERE IS A LIST OF YOUR CONSTRUCTS

```
 1 LESS AMBITIOUS--MORE AMBITIOUS
 2 OVER 50--UNDER 50
 3 USES INITIATIVE--LACKS INITIATIVE
 4 NO PROGRAMMING KNOWLEDGE--PROGRAMMING KNOWLEDGE

DO YOU WANT TO DELETE A CONSTRUCT?NO
```

```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?1
ARE YOU HAPPY WITH THE AMOUNT OF FEEDBACK COMMENTARY
IS IT :   1)ABOUT RIGHT   2)TOO MUCH   3)TOO LITTLE
TYPE IN 1,2 OR 3


?1



TRIAD FOR ELICITATION OF CONSTRUCT 5
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 W
 2 A
 3 J
 4 P
 5 C
 6 N
 7 R
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?5
 5 C
?6
 6 N
?7
 7 R


NAME THE PAIR


DO YOU NEED HELP?


?6

?7


NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?GOOD RELATIONSHIP WITH STAFF
RIGHT POLE RATED 5 --?DIFFICULT STAFF RELATIONSHIPS
```

```
TYPE IN THE RATINGS

HELP?




 6 N            1
 7 R            1
 5 C            5
 1 W           ?2
 2 A           ?1
 3 J           ?1
 4 P           ?2

POLE 1 --GOOD RELATIONSHIP WITH STAFF

 2 A            1
 3 J            1
 6 N            1
 7 R            1

 1 W            2
 4 P            2



 5 C            5

POLE 5 --DIFFICULT STAFF RELATIONSHIPS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HELP?


HOW MANY?1
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?2


POLE 1 --GOOD RELATIONSHIP WITH STAFF

 2 A            1
 3 J            1
 7 R            1

 1 W            2
 4 P            2
 6 N            2



 5 C            5

POLE 5 --DIFFICULT STAFF RELATIONSHIPS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
```

```
THE TWO ELEMENTS  2 A AND  4 P
ARE MATCHED AT THE  85 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN A AND P
DO YOU WANT TO SPLIT THESE?YES


HELP?



NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?SUBJECT TO DISTURBANCE OUT OF HOURS
YOUR POLE NAME IS TOO LONG, PLEASE USE A SHORTER ONE


LEFT POLE RATED 1 --?DISTURBED OUT OF HOURS
RIGHT POLE RATED 5 --?WORKS STANDARD HOURS

TYPE IN THE RATINGS


 2 A            1
 4 P            5
 1 W           ?3
 3 J           ?3
 5 C           ?2
 6 N           ?3
 7 R           ?5


POLE 1 --DISTURBED OUT OF HOURS

 2 A            1

 5 C            2

 1 W            3
 3 J            3
 6 N            3


 4 P            5
 7 R            5

POLE 5 --WORKS STANDARD HOURS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HELP?


HOW MANY?1
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?4

POLE 1 --DISTURBED OUT OF HOURS

 2 A            1


 1 W            3
 3 J            3
 6 N            3

 5 C            4

 4 P            5
 7 R            5

POLE 5 --WORKS STANDARD HOURS
```

```
DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HELP?


HOW MANY?1
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?4


POLE 1 --DISTURBED OUT OF HOURS

 2 A           1


 3 J           3
 6 N           3

 1 W           4
 5 C           4

 4 P           5
 7 R           5

POLE 5 --WORKS STANDARD HOURS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

DO YOU WANT TO CHANGE THE POLE NAMES?N
DO YOU WANT TO FINISH NOW?N
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?N

YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3








NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?GOOD WORK PLANNING
RIGHT POLE RATED 5 --?LESS GOOD WORK PLANNING

TYPE IN THE RATINGS


 1 W          ?1
 2 A          ?2
 3 J          ?2
 4 P          ?1
 5 C          ?1
 6 N          ?4
 7 R          ?2
```

```
POLE 1 --GOOD WORK PLANNING

 1 W           1
 4 P           1
 5 C           1

 2 A           2
 3 J           2
 7 R           2


 6 N           4

POLE 5 --LESS GOOD WORK PLANNING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
THE TWO ELEMENTS  1 W AND  4 P
ARE MATCHED AT THE  82 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN W AND P
DO YOU WANT TO SPLIT THESE?NO

DO YOU WANT TO DELETE AN ELEMENT ?NO
DO YOU WANT TO FINISH NOW?NO
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?NO

YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
```

```
NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?DOESN'T LISTEN
RIGHT POLE RATED 5 --?LISTENS

TYPE IN THE RATINGS


 1 W          ?3
 2 A          ?4
 3 J          ?5
 4 P          ?1
 5 C          ?2
 6 N          ?5
 7 R          ?5
```

```
POLE 1 --DOESN'T LISTEN

 4 P          1

 5 C          2

 1 W          3

 2 A          4

 3 J          5
 6 N          5
 7 R          5

POLE 5 --LISTENS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
THE TWO CONSTRUCTS YOU CALLED
 2 OVER 50--UNDER 50
 8 DOESN'T LISTEN--LISTENS
ARE MATCHED AT THE  64 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
OVER 50 YOU ARE ALSO SAYING
DOESN'T LISTEN
AND MOST OF THE TIME YOU ARE SAYING
UNDER 50 YOU ARE ALSO SAYING
LISTENS


THINK OF ANOTHER ELEMENT WHICH IS EITHER OVER 50 AND LISTENS
OR DOESN'T LISTEN AND UNDER 50
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?
WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
THE TWO ELEMENTS  1 W AND  4 P
ARE MATCHED AT THE  78 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN W AND P
DO YOU WANT TO SPLIT THESE?YES


HELP?



NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?GOOD WRITTEN SKILLS
RIGHT POLE RATED 5 --?POOR WRITTEN SKILLS

TYPE IN THE RATINGS


 1 W          1
 4 P          5
 2 A         ?3
 3 J         ?3
 5 C         ?2
 6 N         ?4
 7 R         ?3
```

```
POLE 1 --GOOD WRITTEN SKILLS

 1 W           1

 5 C           2

 2 A           3
 3 J           3
 7 R           3

 6 N           4

 4 P           5

POLE 5 --POOR WRITTEN SKILLS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?



YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?1






TRIAD FOR ELICITATION OF CONSTRUCT 10
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 W
 2 A
 3 J
 4 P
 5 C
 6 N
 7 R
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?3
 3 J
?5
 5 C
?7
 7 R


NAME THE PAIR


HELP?


?3

?7
```

```
NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?INTEREST IN HARDWARE
RIGHT POLE RATED 5 --?LACK HARDWARE INTEREST

TYPE IN THE RATINGS


HELP?


 3 J            1
 7 R            1
 5 C            5
 1 W           ?4
 2 A           ?3
 4 P           ?4
 6 N           ?1


POLE 1 --INTEREST IN HARDWARE

 3 J            1
 6 N            1
 7 R            1


 2 A            3

 1 W            4
 4 P            4

 5 C            5

POLE 5 --LACK HARDWARE INTEREST


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?



THE TWO CONSTRUCTS YOU CALLED
 8 DOESN'T LISTEN--LISTENS
 10 LACK HARDWARE INTEREST--INTEREST IN HARDWARE
ARE MATCHED AT THE  71 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
DOESN'T LISTEN YOU ARE ALSO SAYING
LACK HARDWARE INTEREST
AND MOST OF THE TIME YOU ARE SAYING
LISTENS YOU ARE ALSO SAYING
INTEREST IN HARDWARE


THINK OF ANOTHER ELEMENT WHICH IS EITHER DOESN'T LISTEN AND INTEREST IN HARDWARE
OR LACK HARDWARE INTEREST AND LISTENS
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?
WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
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THE TWO ELEMENTS  3 J AND  7 R
ARE MATCHED AT THE  80 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN J AND R
DO YOU WANT TO SPLIT THESE?Y


HELP?Y


THINK OF A CONSTRUCT WHICH SEPARATES THESE
TWO ELEMENTS, AND THEN KEEPING THIS IN MIND


ACCORDING TO HOW YOU FEEL ABOUT THEM, PLEASE ASSIGN TO EACH
OF THE OTHER ELEMENTS IN TURN A PROVISIONAL VALUE FROM 1 TO 5


NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?EXPERIENCE
RIGHT POLE RATED 5 --?LACKS EXPERIENCE

TYPE IN THE RATINGS


 3 J           1
 7 R           5
 1 W          ?3
 2 A          ?2
 4 P          ?2
 5 C          ?3
 6 N          ?2


POLE 1 --EXPERIENCE

 3 J           1

 2 A           2
 4 P           2
 6 N           2

 1 W           3
 5 C           3


 7 R           5

POLE 5 --LACKS EXPERIENCE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?
DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?



YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?2
WHAT IS YOUR ELEMENT?G
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RATINGS :


LESS AMBITIOUS--MORE AMBITIOUS?2
OVER 50--UNDER 50?4
USES INITIATIVE--LACKS INITIATIVE?5
NO PROGRAMMING KNOWLEDGE--PROGRAMMING KNOWLEDGE?4
GOOD RELATIONSHIP WITH STAFF--DIFFICULT STAFF RELATIONSHIPS?1
DISTURBED OUT OF HOURS--WORKS STANDARD HOURS?3
GOOD WORK PLANNING--LESS GOOD WORK PLANNING?4
DOESN'T LISTEN--LISTENS?3
GOOD WRITTEN SKILLS--POOR WRITTEN SKILLS?2
LACK HARDWARE INTEREST--INTEREST IN HARDWARE?5
EXPERIENCE--LACKS EXPERIENCE?1

ELEMENT 8 --G

YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3

NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?RESPONSIBLE FOR STAFF
RIGHT POLE RATED 5 --?NO STAFF RESPONSIBILITIES

TYPE IN THE RATINGS


 1 W          ?2
 2 A          ?1
 3 J          ?1
 4 P          ?1
 5 C          ?2
 6 N          ?5
 7 R          ?2
 8 G          ?4


POLE 1 --RESPONSIBLE FOR STAFF

 2 A           1
 3 J           1
 4 P           1

 1 W           2
 5 C           2
 7 R           2


 8 G           4

 6 N           5

POLE 5 --NO STAFF RESPONSIBILITIES


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
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THE TWO CONSTRUCTS YOU CALLED
 7 GOOD WORK PLANNING--LESS GOOD WORK PLANNING
 12 RESPONSIBLE FOR STAFF--NO STAFF RESPONSIBILITIES
ARE MATCHED AT THE  68 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
GOOD WORK PLANNING YOU ARE ALSO SAYING
RESPONSIBLE FOR STAFF
AND MOST OF THE TIME YOU ARE SAYING
LESS GOOD WORK PLANNING YOU ARE ALSO SAYING
NO STAFF RESPONSIBILITIES


THINK OF ANOTHER ELEMENT WHICH IS EITHER GOOD WORK PLANNING AND NO STAFF RESPONSIBILI
OR RESPONSIBLE FOR STAFF AND LESS GOOD WORK PLANNING
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?
WOULD YOU LIKE TO:
      1)DELETE A CONSTRUCT
      2)REPLACE THE TWO CONSTRUCTS BY ONE
      3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
THE TWO ELEMENTS  6 N AND  8 G
ARE MATCHED AT THE  75 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN N AND G
DO YOU WANT TO SPLIT THESE?Y


HELP?N



NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?OVERALL PERFORMANCE GOOD
RIGHT POLE RATED 5 --?POOR OVERALL PERFORMANCE

TYPE IN THE RATINGS


 6 N           1
 8 G           5
 1 W          ?3
 2 A          ?2
 3 J          ?1
 4 P          ?2
 5 C          ?2
 7 R          ?1


POLE 1 --OVERALL PERFORMANCE GOOD

 3 J           1
 6 N           1
 7 R           1

 2 A           2
 4 P           2
 5 C           2

 1 W           3


 8 G           5

POLE 5 --POOR OVERALL PERFORMANCE
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DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y\Y
HELP?


HOW MANY?1
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?2


POLE 1 --OVERALL PERFORMANCE GOOD

 3 J           1
 7 R           1

 2 A           2
 4 P           2
 5 C           2
 6 N           2

 1 W           3


 8 G           5

POLE 5 --POOR OVERALL PERFORMANCE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?Y
LEFT POLE RATED 1 --?GOOD OVERALL PERFORMANCE
RIGHT POLE RATED 5 --?POOR OVERALL PERFORMANCE
DO YOU WANT TO FINISH NOW?


DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?



YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3

NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?WILLINGNESS TO CHANGE
RIGHT POLE RATED 5 --?UNWILLING TO CHANGE

TYPE IN THE RATINGS


 1 W          ?4
 2 A          ?2
 3 J          ?1
 4 P          ?4
 5 C          ?3
 6 N          ?2
 7 R          ?2
 8 G          ?4
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POLE 1 --WILLINGNESS TO CHANGE

 3 J           1

 2 A           2
 6 N           2
 7 R           2

 5 C           3

 1 W           4
 4 P           4
 8 G           4

POLE 5 --UNWILLING TO CHANGE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?



THE TWO CONSTRUCTS YOU CALLED
 8 DOESN'T LISTEN--LISTENS
 14 UNWILLING TO CHANGE--WILLINGNESS TO CHANGE
ARE MATCHED AT THE  62 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
DOESN'T LISTEN YOU ARE ALSO SAYING
UNWILLING TO CHANGE
AND MOST OF THE TIME YOU ARE SAYING
LISTENS YOU ARE ALSO SAYING
WILLINGNESS TO CHANGE


THINK OF ANOTHER ELEMENT WHICH IS EITHER DOESN'T LISTEN AND WILLINGNESS TO CHANGE
OR UNWILLING TO CHANGE AND LISTENS
IF YOU REALLY CANNOT DO THIS THEN JUST PRESS RETURN AFTER THE
FIRST QUESTION MARK, BUT PLEASE TRY. THEN YOU MUST GIVE
THIS ELEMENT A RATING VALUE ON EACH CONSTRUCT IN TURN.
AFTER EACH QUESTION MARK TYPE A VALUE FROM 1 TO 5
WHAT IS YOUR ELEMENT?

WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
THE TWO ELEMENTS  1 W AND  4 P
ARE MATCHED AT THE  76 PERCENT LEVEL
THIS MEANS THAT SO FAR YOU HAVE NOT DISTINGUISHED
BETWEEN W AND P
DO YOU WANT TO SPLIT THESE?NO

DO YOU WANT TO DELETE AN ELEMENT ?NO
DO YOU WANT TO FINISH NOW?NO

DO YOU WANT A PRINTOUT OF THE FOCUSED GRID SO FAR?NO
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```
YOU HAVE ONE OF THREE CHOICES. YOU MAY
1)ELICIT A CONSTRUCT FROM A TRIAD
2)ADD ANOTHER ELEMENT
3)ADD ANOTHER CONSTRUCT
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3

NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?STAFF COMMITTEE MEMBERS
RIGHT POLE RATED 5 --?NOT STAFF COMMITTEE MEMBERS

TYPE IN THE RATINGS


 1 W          ?5
 2 A          ?5
 3 J          ?5
 4 P          ?5
 5 C          ?1
 6 N          ?5
 7 R          ?5
 8 G          ?1


POLE 1 --STAFF COMMITTEE MEMBERS

 5 C           1
 8 G           1




 1 W           5
 2 A           5
 3 J           5
 4 P           5
 6 N           5
 7 R           5

POLE 5 --NOT STAFF COMMITTEE MEMBERS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?

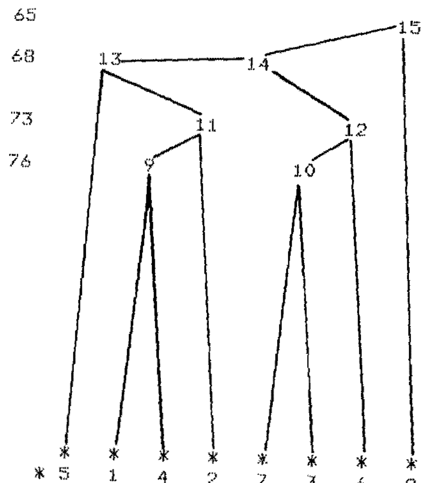

YOU HAVE NOW GOT THE MAXIMUM NUMBER OF CONSTRUCTS
AND YOU MUST STOP

DO YOU WANT:
    1) A COMPLETE PRINTOUT OF THE ANALYSIS OF YOUR GRID
    2) ONLY THE RESULTS OF THE ANALYSIS
WHAT IS THE NUMBER OF YOUR CHOICE?2

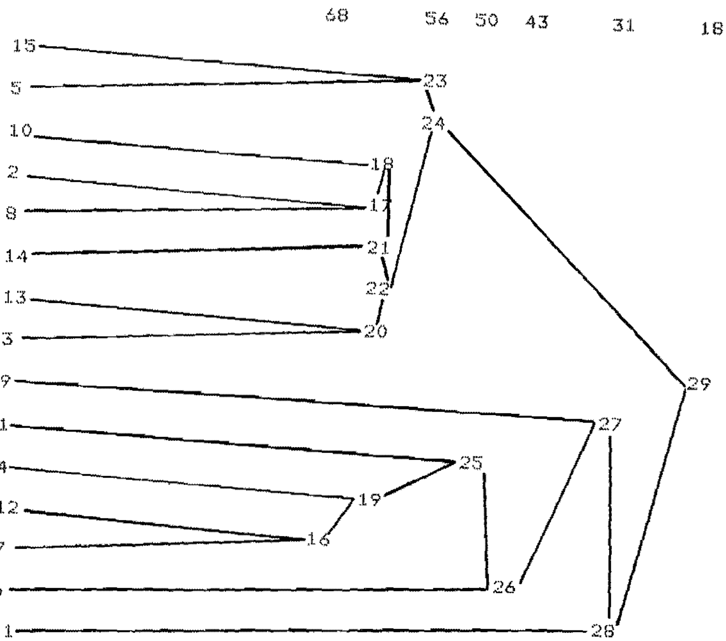


CONSTRUCT  3  REVERSED
CONSTRUCT  5  REVERSED
CONSTRUCT  6  REVERSED
CONSTRUCT  11  REVERSED
CONSTRUCT  13  REVERSED
CONSTRUCT  15  REVERSED
```

FOCUSED GRID



	5	1	4	2	7	3	6	8	
15	1	5	5	5	5	5	5	1	15
5	1	4	4	5	5	5	4	5	5
10	1	2	2	3	5	5	5	5	10
2	1	3	1	1	5	4	5	4	2
8	2	3	1	4	5	5	5	3	8
14	3	2	2	4	4	5	4	2	14
13	4	3	4	4	5	5	4	1	13
3	5	1	3	5	5	5	3	1	3
9	2	1	5	3	3	3	4	2	9
1	1	1	1	1	4	5	3	2	1
4	2	1	1	1	1	5	5	4	4
12	2	2	1	1	2	1	5	4	12
7	1	1	1	2	2	2	4	4	7
6	2	2	1	5	1	3	3	3	6
11	3	3	4	4	1	5	4	5	11
	C	W	P	A	R	J	N	G	



STAFF COMMITTEE MEMBERS	---	NOT STAFF COMMITTEE MEMBERS
DIFFICULT STAFF RELATIONSHIPS	---	GOOD RELATIONSHIP WITH STAFF
LACK HARDWARE INTEREST	---	INTEREST IN HARDWARE
OVER 50	---	UNDER 50
DOESN'T LISTEN	---	LISTENS
UNWILLING TO CHANGE	---	WILLINGNESS TO CHANGE
POOR OVERALL PERFORMANCE	---	GOOD OVERALL PERFORMANCE
LACKS INITIATIVE	---	USES INITIATIVE
GOOD WRITTEN SKILLS	---	POOR WRITTEN SKILLS
LESS AMBITIOUS	---	MORE AMBITIOUS
NO PROGRAMMING KNOWLEDGE	---	PROGRAMMING KNOWLEDGE
RESPONSIBLE FOR STAFF	---	NO STAFF RESPONSIBILITIES
GOOD WORK PLANNING	---	LESS GOOD WORK PLANNING
WORKS STANDARD HOURS	---	DISTURBED OUT OF HOURS
LACKS EXPERIENCE	---	EXPERIENCE

THIS IS R'S GRID
PURPOSE:
STAFF APPRAISAL
DO YOU WANT YOUR GRID PUT ON FILE?NO

E. A Run of PEGASUS–BANK

This version of PEGASUS provides a stored bank of constructs from an "expert" in the field from which the elements are chosen. Commentary is given on highly related constructs both within the grid elicited from the subject himself and also between the two grids.

```
THIS PROGRAM INCORPORATES FOUR VERSIONS OF PEGASUS.
 1. A PEGASUS GRID ELICITATION STARTING A NEW GRID;
 2. A PEGASUS GRID ELICITATION WITH PART ALREADY
    ELICITED BY YOU RECENTLY;
 3. A PEGASUS GRID ELICITATION USING A STORED BANK
    OF CONSTRUCTS;
 4. A STRAIGHT KELLY REPERTORY GRID ELICITATION
    WITHOUT COMMENTARY.
WHAT IS THE NUMBER OF THE VERSION YOU WISH TO USE?3

WHAT IS YOUR FILE NAME?XMH
```

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PEGASUS II
************
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PROGRAM ELICITS GRID AND SORTS USING SIMILARITIES









THIS IS A PROGRAM TO ELICIT A KELLY REPERTORY GRID.
PLEASE READ CAREFULLY EVERYTHING THAT IS PRINTED, AND
MAKE SURE YOU UNDERSTAND WHAT YOU HAVE TO DO.
A REPERTORY GRID IS A TECHNIQUE DEVISED BY KELLY TO
HELP YOU EXPLORE THE DIMENSIONS OF YOUR THINKING.


YOU ARE LIMITED TO 25 LETTERS AND SPACES FOR YOUR ELEMENT
AND CONSTRUCT NAMES.
IF YOU MAKE A TYPING ERROR PRESS THE DELETE KEY AS MANY
TIMES AS YOU WANT TO ERASE A CHARACTER,THEN CARRY ON.
THROUGHOUT THIS PROGRAM THE QUESTION WILL BE ASKED --
DO YOU NEED HELP? EACH TIME JUST TYPE  YES IF YOU DO AND
PRESS THE RETURN KEY
BEFORE YOU START THIS GRID, WHAT IS YOUR NAME OR IDENTIFICATION


?LYNN
TYPE IN ON ONE LINE YOUR PURPOSE FOR DOING THIS GRID


?CONVERSE WITH THE EXPERT
THERE ARE 8 CONSTRUCTS ALREADY IN THIS GRID

AFTER EACH OF THE ELEMENTS USED IN THE GRID
TYPE YES (OR Y) IF YOU WANT TO INCLUDE IT

ELEMENT 1 CRETINISM
?Y
ELEMENT 2 PHENYLKETONURIA
?Y
ELEMENT 3 DOWN'S SYNDROME
?Y
ELEMENT 4 RUBELLA SYNDROME
?Y
ELEMENT 5 LESCH-NYHAN SYNDROME
?
ELEMENT 5 HURLER'S SYNDROME
?
ELEMENT 5 HUNTER'S SYNDROME
?Y
ELEMENT 6 CEREBRAL PALSY
?Y
ELEMENT 7 SPINA BIFIDA
?Y
ELEMENT 8 KLINEFELTER'S SYNDROME
?Y
ELEMENT 9 HYDROCEPHALUS
?Y
ELEMENT 10 TUBEROUS SCLEROSIS
?Y
ELEMENT 11 AUTISM
?Y
ELEMENT 12 TURNER'S SYNDROME
?
ELEMENT 12 MICROCEPHALY
?Y
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TRIAD FOR ELICITATION OF CONSTRUCT 9
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?NO
 10 TUBEROUS SCLEROSIS
 3 DOWN'S SYNDROME
 9 HYDROCEPHALUS


NAME THE PAIR


HELP?10


?9

?10


NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?NON GENETIC ROOT
RIGHT POLE RATED 5 --?GENETIC ROOT

TYPE IN THE RATINGS


HELP?


 9 HYDROCEPHALUS              1
 10 TUBEROUS SCLEROSIS        1
 3 DOWN'S SYNDROME            5
 1 CRETINISM  ?3
 2 PHENYLKETONURIA           ?1
 4 RUBELLA SYNDROME          ?1
 5 HUNTER'S SYNDROME         ?1
 6 CEREBRAL PALSY            ?1
 7 SPINA BIFIDA              ?1
 8 KLINEFELTER'S SYNDROME    ?5
 11 AUTISM    ?3
 12 MICROCEPHALY             ?1


POLE 1 --NON GENETIC ROOT

 2 PHENYLKETONURIA            1
 4 RUBELLA SYNDROME           1
 5 HUNTER'S SYNDROME          1
 6 CEREBRAL PALSY             1
 7 SPINA BIFIDA               1
 9 HYDROCEPHALUS              1
 10 TUBEROUS SCLEROSIS        1
 12 MICROCEPHALY              1


 1 CRETINISM   3
 11 AUTISM     3


 3 DOWN'S SYNDROME            5
 8 KLINEFELTER'S SYNDROME     5

POLE 5 --GENETIC ROOT


DO YOU WANT TO CHANGE ANY OF THESE VALUES?
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DO YOU WANT TO CHANGE THE POLE NAMES?YES
LEFT POLE RATED 1 --?GENETIC ROOT NOT FOUND
RIGHT POLE RATED 5 --?GENETIC ROOT FOUND
THE TWO CONSTRUCTS YOU CALLED
 6 PRENATAL AETIOLOGY--POST- OR PERI-NATAL AETIOLOGY
 9 GENETIC ROOT NOT FOUND--GENETIC ROOT FOUND
ARE MATCHED AT THE  62 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
PRENATAL AETIOLOGY YOU ARE ALSO SAYING
GENETIC ROOT NOT FOUND
AND MOST OF THE TIME YOU ARE SAYING
POST- OR PERI-NATAL AETIOLOGY YOU ARE ALSO SAYING
GENETIC ROOT FOUND


WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
DO YOU WANT TO FINISH NOW?NO



TRIAD FOR ELICITATION OF CONSTRUCT 10
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?NO
 11 AUTISM
 12 MICROCEPHALY
 9 HYDROCEPHALUS


NAME THE PAIR


HELP?


?9

?12


NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?DEFINED PHYSICAL APPEAR.
RIGHT POLE RATED 5 --?LESS OBVIOUS PHYS. APPEAR.

TYPE IN THE RATINGS


HELP?


 9 HYDROCEPHALUS             1
 12 MICROCEPHALY             1
 11 AUTISM      5
 1 CRETINISM  ?1
 2 PHENYLKETONURIA          ?5
 3 DOWN'S SYNDROME          ?1
 4 RUBELLA SYNDROME         ?3
 5 HUNTER'S SYNDROME        ?3
 6 CEREBRAL PALSY           ?3
 7 SPINA BIFIDA             ?4
 8 KLINEFELTER'S SYNDROME   ?1
 10 TUBEROUS SCLEROSIS      ?3
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POLE 1 --DEFINED PHYSICAL APPEAR.

 1 CRETINISM    1
 3 DOWN'S SYNDROME           1
 8 KLINEFELTER'S SYNDROME    1
 9 HYDROCEPHALUS             1
 12 MICROCEPHALY             1


 4 RUBELLA SYNDROME          3
 5 HUNTER'S SYNDROME         3
 6 CEREBRAL PALSY            3
 10 TUBEROUS SCLEROSIS       3

 7 SPINA BIFIDA              4

 2 PHENYLKETONURIA           5
 11 AUTISM      5

POLE 5 --LESS OBVIOUS PHYS. APPEAR.


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?
IS YOUR REASON FOR DOING THIS GRID STILL


CONVERSE WITH THE EXPERT
?Y



TRIAD FOR ELICITATION OF CONSTRUCT 11
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?Y
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?2
 2 PHENYLKETONURIA
?4
 4 RUBELLA SYNDROME
?11
 11 AUTISM


NAME THE PAIR


HELP?2


?4

?2


NAME THE POLES OF YOUR CONSTRUCT
```

```
HELP?

LEFT POLE RATED 1 --?FIND AT \/SOON AFTER BIRTH
RIGHT POLE RATED 5 --?APPEAR LATER

TYPE IN THE RATINGS

HELP?

 4 RUBELLA SYNDROME            1
 2 PHENYLKETONURIA             1
 11 AUTISM     5
 1 CRETINISM  ?3
 3 DOWN'S SYNDROME            ?1
 5 HUNTER'S SYNDROME          ?5
 6 CEREBRAL PALSY             ?3
 7 SPINA BIFIDA               ?1
 8 KLINEFELTER'S SYNDROME     ?2
 9 HYDROCEPHALUS              ?1
 10 TUBEROUS SCLEROSIS        ?3
 12 MICROCEPHALY              ?1

POLE 1 --FIND AT/SOON AFTER BIRTH

 2 PHENYLKETONURIA             1
 3 DOWN'S SYNDROME             1
 4 RUBELLA SYNDROME            1
 7 SPINA BIFIDA                1
 9 HYDROCEPHALUS               1
 12 MICROCEPHALY               1

 8 KLINEFELTER'S SYNDROME      2

 1 CRETINISM   3
 6 CEREBRAL PALSY              3
 10 TUBEROUS SCLEROSIS         3

 5 HUNTER'S SYNDROME           5
 11 AUTISM     5

POLE 5 --APPEAR LATER

DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?

TRIAD FOR ELICITATION OF CONSTRUCT 12
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?NO
 11 AUTISM
 3 DOWN'S SYNDROME
 12 MICROCEPHALY

NAME THE PAIR

HELP?

?TREATMENT
PLEASE TYPE A NUMBER BETWEEN 1 AND 12
?3

?12
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NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?TREATMENT LESS EFFECTIVE
RIGHT POLE RATED 5 --?TREATMENT MORE EFFECTIVE

TYPE IN THE RATINGS


HELP?


 3 DOWN'S SYNDROME            1
 12 MICROCEPHALY              1
 11 AUTISM     5
 1 CRETINISM  ?4
 2 PHENYLKETONURIA           ?5
 4 RUBELLA SYNDROME          ?2
 5 HUNTER'S SYNDROME         ?3
 6 CEREBRAL PALSY            ?3
 7 SPINA BIFIDA              ?4
 8 KLINEFELTER'S SYNDROME    ?1
 9 HYDROCEPHALUS             ?4
 10 TUBEROUS SCLEROSIS       ?1


POLE 1 --TREATMENT LESS EFFECTIVE

 3 DOWN'S SYNDROME            1
 8 KLINEFELTER'S SYNDROME     1
 10 TUBEROUS SCLEROSIS        1
 12 MICROCEPHALY              1

 4 RUBELLA SYNDROME           2

 5 HUNTER'S SYNDROME          3
 6 CEREBRAL PALSY             3

 1 CRETINISM   4
 7 SPINA BIFIDA               4
 9 HYDROCEPHALUS              4

 2 PHENYLKETONURIA            5
 11 AUTISM     5

POLE 5 --TREATMENT MORE EFFECTIVE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
THE TWO CONSTRUCTS YOU CALLED
 4 AMENABLE TO MEDICAL TREATMENT--NO KNOWN MEDICAL TREATMENT
 12 TREATMENT MORE EFFECTIVE--TREATMENT LESS EFFECTIVE
ARE MATCHED AT THE  70 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
AMENABLE TO MEDICAL TREATMENT YOU ARE ALSO SAYING
TREATMENT MORE EFFECTIVE
AND MOST OF THE TIME YOU ARE SAYING
NO KNOWN MEDICAL TREATMENT YOU ARE ALSO SAYING
TREATMENT LESS EFFECTIVE


WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


?3
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DO YOU WANT TO FINISH NOW?NO


TRIAD FOR ELICITATION OF CONSTRUCT 13
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?YES
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?9
 9 HYDROCEPHALUS
?4
 4 RUBELLA SYNDROME
?8
 8 KLINEFELTER'S SYNDROME


NAME THE PAIR


HELP?


?9

?4


NAME THE POLES OF YOUR CONSTRUCT


HELP?


LEFT POLE RATED 1 --?PRE-NAT. DEVEL. ABNORMAL
RIGHT POLE RATED 5 --?GENETIC

TYPE IN THE RATINGS


HELP?


 9 HYDROCEPHALUS                1
 4 RUBELLA SYNDROME             1
 8 KLINEFELTER'S SYNDROME       5
 1 CRETINISM  ?5
 2 PHENYLKETONURIA             ?5
 3 DOWN'S SYNDROME             ?5
 5 HUNTER'S SYNDROME           ?5
 6 CEREBRAL PALSY              ?1
 7 SPINA BIFIDA                ?1
 10 TUBEROUS SCLEROSIS         ?5
 11 AUTISM    ?5
 12 MICROCEPHALY               ?1
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POLE 1 --PRE-NAT. DEVEL. ABNORMAL

 4 RUBELLA SYNDROME           1
 6 CEREBRAL PALSY             1
 7 SPINA BIFIDA               1
 9 HYDROCEPHALUS              1
 12 MICROCEPHALY              1



 1 CRETINISM   5
 2 PHENYLKETONURIA            5
 3 DOWN'S SYNDROME            5
 5 HUNTER'S SYNDROME          5
 8 KLINEFELTER'S SYNDROME     5
 10 TUBEROUS SCLEROSIS        5
 11 AUTISM     5

POLE 5 --GENETIC


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?YES
LEFT POLE RATED 1 --?PRE NAT. PHYS. DEV. DAMAGE
RIGHT POLE RATED 5 --?GENETIC/METABOLIC
DO YOU WANT TO FINISH NOW?



TRIAD FOR ELICITATION OF CONSTRUCT 14
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?YES
 1 CRETINISM
 2 PHENYLKETONURIA
 3 DOWN'S SYNDROME
 4 RUBELLA SYNDROME
 5 HUNTER'S SYNDROME
 6 CEREBRAL PALSY
 7 SPINA BIFIDA
 8 KLINEFELTER'S SYNDROME
 9 HYDROCEPHALUS
 10 TUBEROUS SCLEROSIS
 11 AUTISM
 12 MICROCEPHALY
TYPE IN THE NUMBERS OF THE ELEMENTS ONE AFTER EACH QUESTION MARK


?4
 4 RUBELLA SYNDROME
?6
 6 CEREBRAL PALSY
?11
 11 AUTISM


NAME THE PAIR


HELP?4


?4

?6


NAME THE POLES OF YOUR CONSTRUCT


HELP?
```
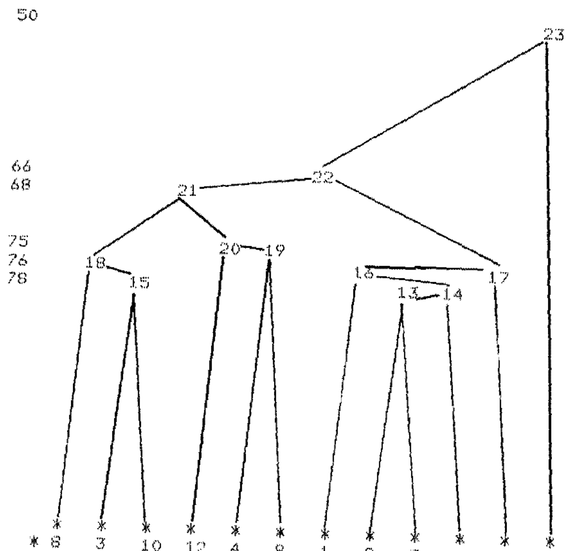

```
LEFT POLE RATED 1 --?PHS. \\YS.DISABLE. U\USUAL.GROSS
RIGHT POLE RATED 5 --?PHYS.DISABLE.LESS

TYPE IN THE RATINGS


HELP?


 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 11 AUTISM      5
 1 CRETINISM  ?3
 2 PHENYLKETONURIA          ?5
 3 DOWN'S SYNDROME          ?3
 5 HUNTER'S SYNDROME        ?5
 7 SPINA BIFIDA             ?1
 8 KLINEFELTER'S SYNDROME   ?5
 9 HYDROCEPHALUS            ?2
 10 TUBEROUS SCLEROSIS      ?2
 12 MICROCEPHALY            ?1


POLE 1 --PHSYS.DISABLE. USUAL.GROSS

 4 RUBELLA SYNDROME          1
 6 CEREBRAL PALSY            1
 7 SPINA BIFIDA              1
 12 MICROCEPHALY             1

 9 HYDROCEPHALUS             2
 10 TUBEROUS SCLEROSIS       2

 1 CRETINISM   3
 3 DOWN'S SYNDROME           3


 2 PHENYLKETONURIA           5
 5 HUNTER'S SYNDROME         5
 8 KLINEFELTER'S SYNDROME    5
 11 AUTISM      5

POLE 5 --PHYS.DISABLE.LESS


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
DO YOU WANT TO FINISH NOW?



TRIAD FOR ELICITATION OF CONSTRUCT 15
WOULD YOU LIKE TO CHOOSE YOUR OWN TRIAD ?NO
 11 AUTISM
 5 HUNTER'S SYNDROME
 3 DOWN'S SYNDROME


NAME THE PAIR


HELP?


?11

?3


NAME THE POLES OF YOUR CONSTRUCT
```

```
HELP?

LEFT POLE RATED 1 --?KNOW ABOUT THIS
RIGHT POLE RATED 5 --?I AM TI\OTALLY IGNORANT

TYPE IN THE RATINGS


HELP?


 11 AUTISM      1
 3 DOWN'S SYNDROME            1
 5 HUNTER'S SYNDROME          5
 1 CRETINISM  ?3
 2 PHENYLKETONURIA           ?1
 4 RUBELLA SYNDROME          ?1
 6 CEREBRAL PALSY            ?1
 7 SPINA BIFIDA              ?1
 8 KLINEFELTER'S SYNDROME    ?1
 9 HYDROCEPHALUS             ?1
 10 TUBEROUS SCLEROSIS       ?3
 12 MICROCEPHALY             ?1


POLE 1 --KNOW ABOUT THIS

 2 PHENYLKETONURIA            1
 3 DOWN'S SYNDROME            1
 4 RUBELLA SYNDROME           1
 6 CEREBRAL PALSY             1
 7 SPINA BIFIDA               1
 8 KLINEFELTER'S SYNDROME     1
 9 HYDROCEPHALUS              1
 11 AUTISM      1
 12 MICROCEPHALY              1


 1 CRETINISM   3
 10 TUBEROUS SCLEROSIS        3


 5 HUNTER'S SYNDROME          5

POLE 5 --I AM TOTALLY IGNORANT


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
THE TWO CONSTRUCTS YOU CALLED
 11 APPEAR LATER--FIND AT/SOON AFTER BIRTH
 15 I AM TOTALLY IGNORANT--KNOW ABOUT THIS
ARE MATCHED AT THE  70 PERCENT LEVEL
THIS MEANS THAT MOST OF THE TIME YOU ARE SAYING
APPEAR LATER YOU ARE ALSO SAYING
I AM TOTALLY IGNORANT
AND MOST OF THE TIME YOU ARE SAYING
FIND AT/SOON AFTER BIRTH YOU ARE ALSO SAYING
KNOW ABOUT THIS


WOULD YOU LIKE TO:
     1)DELETE A CONSTRUCT
     2)REPLACE THE TWO CONSTRUCTS BY ONE
     3)JUST CARRY ON
WHAT IS THE NUMBER OF THE CHOICE YOU HAVE MADE


? 2
DELETE THE TWO CONSTRUCTS FIRST, THEN ADD THE NEW ONE,
AND RATE EACH ELEMENT IN TURN ON THE NEW CONSTRUCT.
```

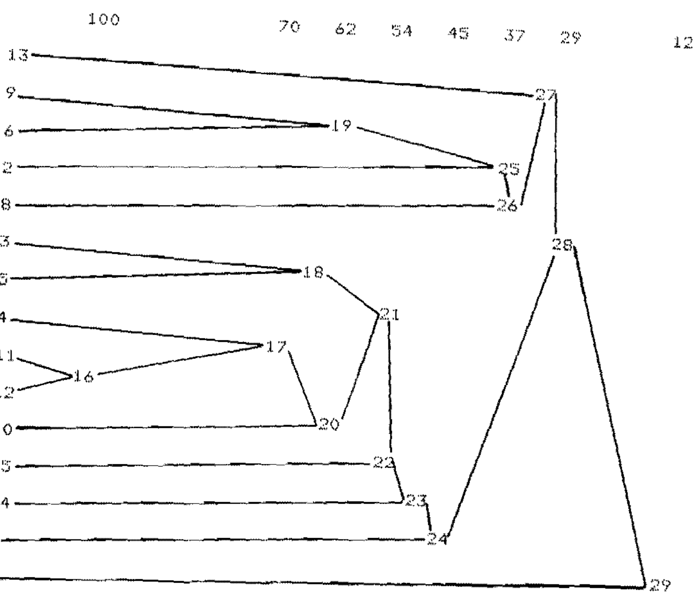
```
WHAT IS THE NUMBER OF THE CONSTRUCT?1
YOU MAY ONLY DELETE YOUR OWN CONSTRUCTS


WHAT IS THE NUMBER OF THE CONSTRUCT?11
CONSTRUCT 11 DELETED

DO YOU WANT TO DELETE A CONSTRUCT?NO


NAME THE POLES OF YOUR CONSTRUCT


LEFT POLE RATED 1 --?CONGENITAL
RIGHT POLE RATED 5 --?POST NATAL. DEV

TYPE IN THE RATINGS


 1 CRETINISM  ?1
 2 PHENYLKETONURIA          ?1
 3 DOWN'S SYNDROME          ?1
 4 RUBELLA SYNDROME         ?1
 5 HUNTER'S SYNDROME        ?3
 6 CEREBRAL PALSY           ?1\3
 7 SPINA BIFIDA             ?1
 8 KLINEFELTER'S SYNDROME   ?1
 9 HYDROCEPHALUS            ?1
 10 TUBEROUS SCLEROSIS      ?1
 11 AUTISM    ?5
 12 MICROCEPHALY            ?1


POLE 1 --CONGENITAL

 1 CRETINISM   1
 2 PHENYLKETONURIA           1
 3 DOWN'S SYNDROME           1
 4 RUBELLA SYNDROME          1
 7 SPINA BIFIDA              1
 8 KLINEFELTER'S SYNDROME    1
 9 HYDROCEPHALUS             1
 10 TUBEROUS SCLEROSIS       1
 12 MICROCEPHALY             1


 5 HUNTER'S SYNDROME         3
 6 CEREBRAL PALSY            3


 11 AUTISM     5

POLE 5 --POST NATAL. DEV


DO YOU WANT TO CHANGE ANY OF THESE VALUES?

DO YOU WANT TO CHANGE THE POLE NAMES?
YOU HAVE NOW GOT THE MAXIMUM NUMBER OF CONSTRUCTS
AND YOU MUST STOP


DO YOU WANT:
    1) A COMPLETE PRINTOUT OF THE ANALYSIS OF YOUR GRID
    2) ONLY THE RESULTS OF THE ANALYSIS
WHAT IS THE NUMBER OF YOUR CHOICE?2
```

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 13 REVERSED

FOCUSED GRID



	8	3	10	12	4	9	1	2	7	6	5	11	
13	1	1	1	5	5	5	1	1	5	5	1	1	13
9	1	1	5	5	5	5	3	5	5	5	5	3	9
6	1	5	5	5	4	4	5	5	5	5	5	4	6
2	3	5	5	3	1	3	4	4	4	4	4	2	2
8	1	4	5	4	1	1	5	5	3	1	2	1	8
3	4	3	5	1	4	4	4	2	3	1	2	1	3
5	4	5	5	2	4	2	2	2	3	1	2	2	5
4	4	5	5	5	5	2	1	2	3	4	4	1	4
11	5	5	5	5	4	2	2	1	2	3	3	1	11
12	5	5	5	5	4	2	2	1	2	3	3	1	12
10	5	5	3	5	3	5	5	1	2	3	3	1	10
15	5	5	5	5	5	5	5	5	5	3	3	1	15
14	5	5	3	5	5	5	3	5	5	5	1	5	14
7	5	4	2	2	2	4	5	4	5	4	1	5	7
1	1	2	2	1	1	1	5	5	5	5	5	1	1



AUTISM
HUNTER'S SYNDROME
CEREBRAL PALSY
SPINA BIFIDA
PHENYLKETONURIA
CRETINISM
HYDROCEPHALUS
RUBELLA SYNDROME
MICROCEPHALY
TUBEROUS SCLEROSIS
DOWN'S SYNDROME
KLINEFELTER'S SYNDROME

PHSYS.DISABLE. USUAL.GROSS	---	PHYS.DISABLE.LESS
GENETIC ROOT FOUND	---	GENETIC ROOT NOT FOUND
POST- OR PERI-NATAL AETIOLOGY	---	PRENATAL AETIOLOGY
NO OBVIOUS GENETIC DISORDER	---	GENETIC DISORDER
SEVERE PHYSICAL HANDICAPS	---	LESS SEVERE PHYSICAL HANDICAPS
SEVERELY MENTALLY HANDICAPPED	---	MILDLY MENTALLY HANDICAPPED
DETERIORATING CONDITION	---	STATIC CONDITION
AMENABLE TO MEDICAL TREATMENT	---	NO KNOWN MEDICAL TREATMENT
TREATMENT MORE EFFECTIVE	---	TREATMENT LESS EFFECTIVE
GENETIC/METABOLIC	---	PRE NAT. PHYS. DEV. DAMAGE
LESS OBVIOUS PHYS. APPEAR.	---	DEFINED PHYSICAL APPEAR.
POST NATAL. DEV	---	CONGENITAL
I AM TOTALLY IGNORANT	---	KNOW ABOUT THIS
BEHAVIOUR DISORDERS	---	NO INTRINSIC BEHAVIOUR DISORDERS
NO OBVIOUS METABOLIC DISORDER	---	INBORN ERROR OF METABOLISM

```
THIS IS LYNN'S GRID
PURPOSE:
CONVERSE WITH THE EXPERT
DO YOU WANT YOUR GRID PUT ON FILE?NO
```

F. Output from the MINUS Program

This output shows the difference between two grids with the same elements and constructs, elicited from the same person on two separate occasions.

The elements in the two grids were books which on the first occasion had been recently read by the subject.

MINUS II
****
****

THIS PROGRAM COMPARES TWO GRIDS OF MAXIMUM SIZE 15X15
AND PRINTS OUT THE DIFFERENCE BETWEEN THEM

IS YOUR DATA ALREADY ON FILE?YES
WHAT IS YOUR FILE NAME?III

BOOKS I - BOOKS II

THE MEASURE OF DIFFERENCE RANGES FROM 0 IF IDENTICAL GRIDS
TO 100 IF MAXIMUM DIFFERENCE OCCURS BETWEEN THE TWO

PERCENTAGE DIFFERENCE MEASURE IN GRIDS 1 AND 2 IS 15.3125

*	1	2	3	4	5	6	7	8	9	10
1		1		1		1		1		1
2		1		2	1	1		1	1	1
3			1	1	2			2	2	
4	1			2			1	1		
5		1	1			1	2	1		
6				2	1		2			
7				1		1				
8	1	2		1	1	1	2	1	1	

NOW FOCUS THE DIFFERENCE GRID BY RUNNING FOCMIN
AND USING FILENAME MINDA

G. A Run of CORE

This version shows the interactive elicitation of the core part which is common to the two grids elicited from the same person on two separate occasions.

The elements in the grids were books recently read by the subject. The deletion of elements and constructs showing a difference on the second occasion was continued until exhaustion, leaving just the core grid.

```
                    CORE II
                   *********
                   *********

A PROGRAM DESIGNED TO ANALYSE AND FOCUS TWO REPERTORY GRIDS
AND FIND THE CORE CONSTRUCTS AND ELEMENTS.
DEVISED AND WRITTEN BY MILDRED L.G. SHAW




THIS PROGRAM STARTS WITH TWO GRIDS OF MAXIMUM SIZE 15X15
ELICITED WITH THE SAME ELEMENTS AND CONSTRUCTS.
IT SUCCESSIVELY AND INTERACTIVELY DELETES ELEMENTS AND
CONSTRUCTS WHICH ARE NOT USED IN THE SAME WAY IN BOTH GRIDS.
THE ELEMENT OR CONSTRUCT COMMENTED ON MAY NOT BE UNIQUE
EVERY TIME.


IF YOU CHOOSE NOT TO DELETE AN ELEMENT OR CONSTRUCT YOU
WILL NOT BE ASKED AGAIN.
NOTE THAT THE NUMBERS OF YOUR ELEMENTS AND CONSTRUCTS
WILL CHANGE AS YOU GO THROUGH. TO HELP YOU IDENTIFY EACH
ONE THEY WILL BE CALLED E1, E2, .... AND C1, C2, ....


IS YOUR DATA ALREADY ON FILE?YES
WHAT IS YOUR FILE NAME?III




ITERATION 1
************

THE ELEMENT MATCH VALUES ARE: 93  84  93  68  84  84  78  78  87  93

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 4 THAT IS E 4 MATCHED AT 68.75 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 4 HAS BEEN DELETED

ELEMENT 1 IS E 1
ELEMENT 2 IS E 2
ELEMENT 3 IS E 3
ELEMENT 4 IS E 5
ELEMENT 5 IS E 6
ELEMENT 6 IS E 7
ELEMENT 7 IS E 8
ELEMENT 8 IS E 9
ELEMENT 9 IS E 10



ITERATION 2
************

THE CONSTRUCT MATCH VALUES ARE: 77  66  61  83  66  83  94  50

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 8 THAT IS C 8 MATCHED AT 50 PERCENT

DO YOU WANT TO DELETE IT?YES
CONSTRUCT 8 HAS BEEN DELETED

CONSTRUCT 1 IS C 1
CONSTRUCT 2 IS C 2
CONSTRUCT 3 IS C 3
CONSTRUCT 4 IS C 4
CONSTRUCT 5 IS C 5
CONSTRUCT 6 IS C 6
CONSTRUCT 7 IS C 7
```

```
ITERATION 3
************


THE ELEMENT MATCH VALUES ARE: 96  89  92  85  85  82  78  89  92

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 7 THAT IS E 8 MATCHED AT 78.5714 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 7 HAS BEEN DELETED

ELEMENT 1 IS E 1
ELEMENT 2 IS E 2
ELEMENT 3 IS E 3
ELEMENT 4 IS E 5
ELEMENT 5 IS E 6
ELEMENT 6 IS E 7
ELEMENT 7 IS E 9
ELEMENT 8 IS E 10



ITERATION 4
************


THE CONSTRUCT MATCH VALUES ARE: 81  68  68  87  68  81  93

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 2 THAT IS C 2 MATCHED AT 68.75 PERCENT

DO YOU WANT TO DELETE IT?YES
CONSTRUCT 2 HAS BEEN DELETED

CONSTRUCT 1 IS C 1
CONSTRUCT 2 IS C 3
CONSTRUCT 3 IS C 4
CONSTRUCT 4 IS C 5
CONSTRUCT 5 IS C 6
CONSTRUCT 6 IS C 7



ITERATION 5
************


THE ELEMENT MATCH VALUES ARE: 95  91  91  87  87  79  91  95

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 6 THAT IS E 7 MATCHED AT 79.1666 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 6 HAS BEEN DELETED

ELEMENT 1 IS E 1
ELEMENT 2 IS E 2
ELEMENT 3 IS E 3
ELEMENT 4 IS E 5
ELEMENT 5 IS E 6
ELEMENT 6 IS E 9
ELEMENT 7 IS E 10
```

```
ITERATION 6
************

THE CONSTRUCT MATCH VALUES ARE: 78  64  92  78  92  92

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 2 THAT IS C 3 MATCHED AT 64.2857 PERCENT

DO YOU WANT TO DELETE IT?YES
CONSTRUCT 2 HAS BEEN DELETED

CONSTRUCT 1 IS C 1
CONSTRUCT 2 IS C 4
CONSTRUCT 3 IS C 5
CONSTRUCT 4 IS C 6
CONSTRUCT 5 IS C 7



ITERATION 7
************

THE ELEMENT MATCH VALUES ARE: 95  90  95  95  85  100  95

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 5 THAT IS E 6 MATCHED AT 85 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 5 HAS BEEN DELETED

ELEMENT 1 IS E 1
ELEMENT 2 IS E 2
ELEMENT 3 IS E 3
ELEMENT 4 IS E 5
ELEMENT 5 IS E 9
ELEMENT 6 IS E 10



ITERATION 8
************

THE CONSTRUCT MATCH VALUES ARE: 83  91  83  91  100

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 1 THAT IS C 1 MATCHED AT 83.3333 PERCENT

DO YOU WANT TO DELETE IT?YES
CONSTRUCT 1 HAS BEEN DELETED

CONSTRUCT 1 IS C 4
CONSTRUCT 2 IS C 5
CONSTRUCT 3 IS C 6
CONSTRUCT 4 IS C 7



ITERATION 9
************

THE ELEMENT MATCH VALUES ARE: 93  93  93  93  100  100

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 1 THAT IS E 1 MATCHED AT 93.75 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 1 HAS BEEN DELETED

ELEMENT 1 IS E 2
ELEMENT 2 IS E 3
ELEMENT 3 IS E 5
ELEMENT 4 IS E 9
ELEMENT 5 IS E 10
```

```
ITERATION 10
************

THE CONSTRUCT MATCH VALUES ARE: 100  80  90  100

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 2 THAT IS C 5 MATCHED AT 80 PERCENT

DO YOU WANT TO DELETE IT?YES
CONSTRUCT 2 HAS BEEN DELETED

CONSTRUCT 1 IS C 4
CONSTRUCT 2 IS C 6
CONSTRUCT 3 IS C 7


ITERATION 11
************

THE ELEMENT MATCH VALUES ARE: 100  100  91  100  100

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 3 THAT IS E 5 MATCHED AT 91.6666 PERCENT

DO YOU WANT TO DELETE IT?YES
ELEMENT 3 HAS BEEN DELETED

ELEMENT 1 IS E 2
ELEMENT 2 IS E 3
ELEMENT 3 IS E 9
ELEMENT 4 IS E 10


ITERATION 12
************

THE CONSTRUCT MATCH VALUES ARE: 100  100  100

THE CONSTRUCT WHICH IS USED LEAST SIMILARLY IN BOTH GRIDS IS
CONSTRUCT 1 THAT IS C 4 MATCHED AT 100 PERCENT

DO YOU WANT TO DELETE IT?NO


ITERATION 13
************

THE ELEMENT MATCH VALUES ARE: 100  100  100  100

THE ELEMENT WHICH IS SEEN LEAST SIMILARLY IN BOTH GRIDS IS
ELEMENT 1 THAT IS E 2 MATCHED AT 100 PERCENT

DO YOU WANT TO DELETE IT?NO
YOUR ORIGINAL DATA IS IN THE FILE NAMED III

CHOOSE ANOTHER FOUR-LETTER FILE NAME FOR YOUR CORE GRIDS?CIII

THESE GRIDS MAY BE PROCESSED ON THE FOCUS PROGRAM
IN THE USUAL WAY.
```

```
YOUR TWO CORE GRIDS WILL NOW BE PRINTED OUT INDICATING
THE ORIGINAL ELEMENT AND CONSTRUCT NUMBERS.
THEY WILL ONLY BE IDENTICAL IF ALL MATCHES LESS THAN
100% HAVE BEEN DELETED.
```

```
RAW GRID 1 I

    * 1   2   3   4
**********************
 1  * 1   5   5   1  C 4

 2  * 4   1   1   1  C 6

 3  * 2   1   5   1  C 7

      *   *   *   *
      *   *   *   E 10
      *   *   E 9
      *   E 3
      E 2
```

```
RAW GRID 2 II

    * 1   2   3   4
**********************
 1  * 1   5   5   1  C 4

 2  * 4   1   1   1  C 6

 3  * 2   1   5   1  C 7

      *   *   *   *
      *   *   *   E 10
      *   *   E 9
      *   E 3
      E 2
```

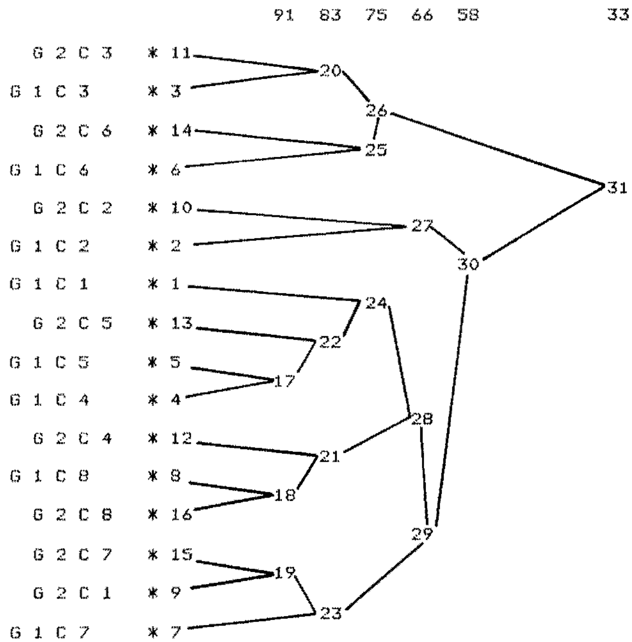
H. Output from the SOCIOGRIDS Program

This output shows all the options other than the focusing of the single grids. As there are six grids, there are fifteen possible pairs of grids which are numbered 7 to 21. The socionets are then listed for both maximum and minimum values followed by the mode grid which is numbered 22. Grids 23 to 28 then show each single grid focused with the mode grid.

These six grids are obtained from a run of ARGUS and consequently all have the same number of constructs. This is not a necessary requirement in the general case.

```
                    SOCIOGRIDS II
                   ***************
                   ***************

A PROGRAM DESIGNED TO ANALYSE AND FOCUS A SET OF
REPERTORY GRIDS.




THIS PROGRAM FOCUSES GRIDS SINGLY AND IN PAIRS
IT COMPUTES A SET OF SOCIONETS AND A MODE GRID
WHICH IS THEN FOCUSED WITH EACH RAW GRID IN TURN

ARE YOUR GRIDS ALREADY ON FILE
TYPE 1 FOR NO, 2 FOR YES?2
HOW MANY GRIDS DO YOU WANT TO FOCUS IN PAIRS?6
DO YOU WANT YOUR GRIDS FOCUSED SINGLY
TYPE 1 FOR NO, 2 FOR YES?1
DO YOU WANT PRINTOUT OF THE GRIDS IN PAIRS
TYPE 1 FOR NO, 2 FOR YES?2
DO YOU WANT: 1)JUST SOCIONETS
             2)JUST THE MODE GRID
             3)BOTH SOCIONETS AND THE MODE GRID.
WHAT IS THE NUMBER OF YOUR CHOICE?3

DO YOU WISH TO :
   1) SPECIFY THE NUMBER OF CONSTRUCTS IN THE MODE GRID NOW
OR 2) DECIDE ON THE NUMBER OF CONSTRUCTS IN THE MODE AFTER
      SEEING THE TABLE OF AVERAGE VALUES OF MATCHED CONSTRUCTS
WHAT IS THE NUMBER OF YOUR CHOICE?1

HOW MANY MODE CONSTRUCTS WOULD YOU LIKE
PLEASE NOTE THAT ON A TELETYPE THE MAX NUMBER IS 15?8
DO YOU WANT PRINTOUT OF EACH GRID WITH THE MODE
TYPE 1 FOR NO, 2 FOR YES?2

WHAT FILE NAME?CH925


GRID 7 IS GRID 1 WITH GRID 2
********************************


ELEMENTS       CONSTRUCTS     RATINGS
 6              16             1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
***************************************

G 1 C 1          75
G 1 C 2          66.6666
G 1 C 3          83.3333
G 1 C 4          75
G 1 C 5          83.3333
G 1 C 6          75
G 1 C 7          83.3333
G 1 C 8          91.6666

G 2 C 1          83.3333
G 2 C 2          66.6666
G 2 C 3          83.3333
G 2 C 4          83.3333
G 2 C 5          83.3333
G 2 C 6          75
G 2 C 7          75
G 2 C 8          91.6666



CONSTRUCT  6  REVERSED
CONSTRUCT  9  REVERSED
CONSTRUCT  14  REVERSED
```

TREE FOR CONSTRUCTS -- GRID 7



FOCUSED GRID 7

	* 3	2	5	4	6	1
11	* 1	4	5	5	5	3
3	* 1	4	5	5	5	1
14	* 3	4	5	5	5	2
6	* 2	3	5	4	5	2
10	* 5	4	4	3	3	2
2	* 5	4	4	4	1	1
1	* 3	3	4	4	2	2
13	* 2	3	4	3	2	1
5	* 2	3	3	2	2	1
4	* 3	3	3	2	2	1
12	* 2	3	3	2	4	2
8	* 1	3	3	2	3	2
16	* 1	3	3	2	3	3
15	* 2	2	2	1	3	3
9	* 1	2	2	1	3	3
7	* 1	1	2	1	3	2

MEASURE OF SIMILARITY IN GRIDS 1 AND 2 IS 79.6875
1 ON 2 IS 79.1666 2 ON 1 IS 80.2083

GRID 8 IS GRID 1 WITH GRID 3
****

ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

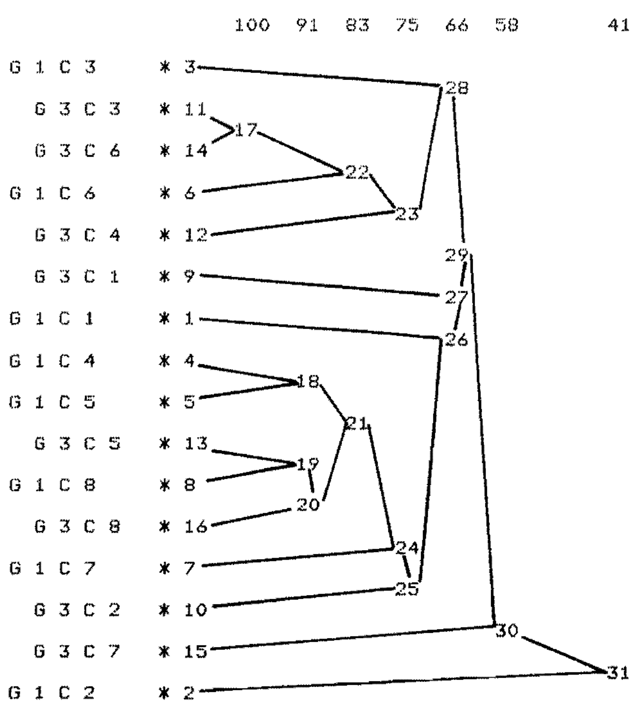
HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 1 C 1	66.6666
G 1 C 2	58.3333
G 1 C 3	66.6666
G 1 C 4	75
G 1 C 5	83.3333
G 1 C 6	83.3333
G 1 C 7	75
G 1 C 8	91.6666

G 3 C 1	66.6666
G 3 C 2	75
G 3 C 3	83.3333
G 3 C 4	75
G 3 C 5	91.6666
G 3 C 6	83.3333
G 3 C 7	66.6666
G 3 C 8	91.6666

CONSTRUCT 2 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 8



FOCUSED GRID 8

	*	6	5	2	4	3	1
3	*	5	5	4	5	1	1
11	*	5	5	4	4	3	2
14	*	5	5	4	4	3	2
6	*	5	5	3	4	2	2
12	*	4	4	3	3	2	2
9	*	3	4	4	3	3	1
1	*	2	4	3	4	3	2
4	*	2	3	3	2	3	1
5	*	2	3	3	2	2	1
13	*	2	3	3	2	1	2
8	*	3	3	3	2	1	2
16	*	3	3	2	2	1	2
7	*	3	2	1	1	1	2
10	*	3	2	1	3	1	3
15	*	2	2	2	1	2	3
2	*	5	2	2	2	1	5

MEASURE OF SIMILARITY IN GRIDS 1 AND 3 IS 77.0833
1 ON 3 IS 75 3 ON 1 IS 79.1666

GRID 9 IS GRID 1 WITH GRID 4
****

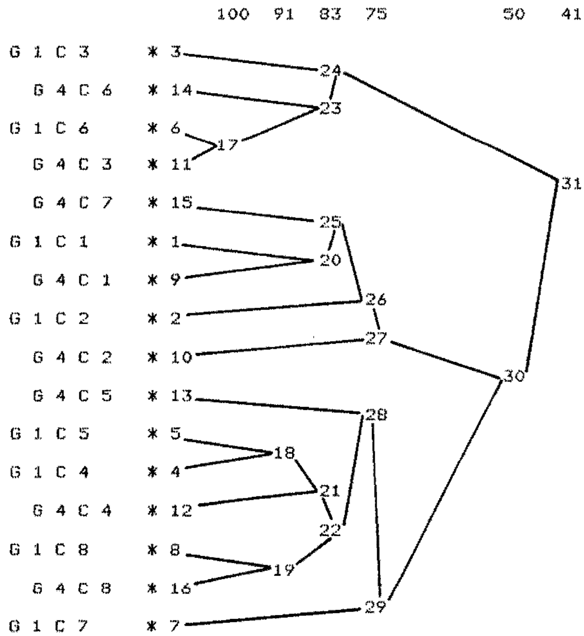
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 1 C 1	83.3333
G 1 C 2	75
G 1 C 3	83.3333
G 1 C 4	83.3333
G 1 C 5	75
G 1 C 6	100
G 1 C 7	75
G 1 C 8	91.6666
G 4 C 1	83.3333
G 4 C 2	75
G 4 C 3	100
G 4 C 4	83.3333
G 4 C 5	75
G 4 C 6	83.3333
G 4 C 7	83.3333
G 4 C 8	91.6666

CONSTRUCT 3 REVERSED
CONSTRUCT 11 REVERSED
CONSTRUCT 15 REVERSED

TREE FOR CONSTRUCTS -- GRID 9



FOCUSED GRID 9

	* 6	5	4	2	3	1
3	* 1	1	1	2	5	5
14	* 1	1	1	2	4	4
6	* 1	1	2	3	4	4
11	* 1	1	2	3	4	4
15	* 2	4	4	3	4	3
1	* 2	4	4	3	3	2
9	* 2	4	4	4	3	1
2	* 1	4	4	4	5	1
10	* 2	4	3	4	5	2
13	* 1	4	3	3	2	1
5	* 2	3	2	3	2	1
4	* 2	3	2	3	3	1
12	* 3	3	2	3	3	2
8	* 3	3	2	3	1	2
16	* 3	3	2	2	1	2
7	* 3	2	1	1	1	2

MEASURE OF SIMILARITY IN GRIDS 1 AND 4 IS 83.8541
1 ON 4 IS 83.3333 4 ON 1 IS 84.375

GRID 10 IS GRID 1 WITH GRID 5
****

ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

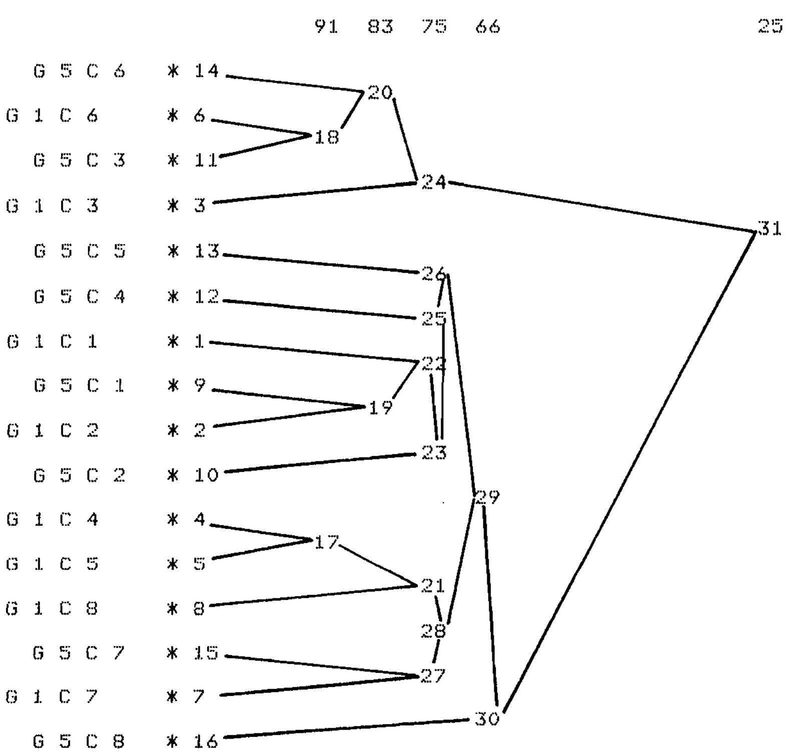
HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 1 C 1	75
G 1 C 2	83.3333
G 1 C 3	75
G 1 C 4	66.6666
G 1 C 5	75
G 1 C 6	91.6666
G 1 C 7	75
G 1 C 8	75

G 5 C 1	83.3333
G 5 C 2	75
G 5 C 3	91.6666
G 5 C 4	75
G 5 C 5	75
G 5 C 6	83.3333
G 5 C 7	75
G 5 C 8	75

CONSTRUCT 6 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 10



FOCUSED GRID 10

*	5	2	4	6	1	3
14 *	5	4	4	5	3	2
6 *	5	3	4	5	2	2
11 *	5	3	4	5	1	2
3 *	5	4	5	5	1	1
13 *	4	3	3	1	1	2
12 *	4	4	3	2	2	2
1 *	4	3	4	2	2	3
9 *	4	4	4	2	1	4
2 *	4	4	4	1	1	5
10 *	3	4	3	2	1	5
4 *	3	3	2	2	1	3
5 *	3	3	2	2	1	2
8 *	3	3	2	3	2	1
15 *	2	2	3	3	2	1
7 *	2	1	1	3	2	1
16 *	3	1	1	2	1	2

MEASURE OF SIMILARITY IN GRIDS 1 AND 5 IS 78.125
1 ON 5 IS 77.0833 5 ON 1 IS 79.1666

GRID 11 IS GRID 1 WITH GRID 6
****

ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

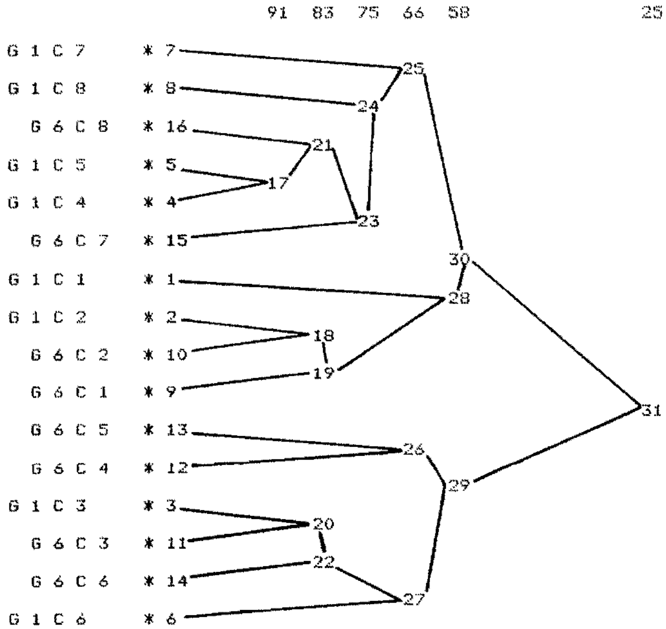
HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 1 C 1	58.3333
G 1 C 2	83.3333
G 1 C 3	83.3333
G 1 C 4	75
G 1 C 5	83.3333
G 1 C 6	66.6666
G 1 C 7	58.3333
G 1 C 8	75

G 6 C 1	66.6666
G 6 C 2	83.3333
G 6 C 3	83.3333
G 6 C 4	58.3333
G 6 C 5	58.3333
G 6 C 6	66.6666
G 6 C 7	75
G 6 C 8	83.3333

CONSTRUCT 6 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 11



FOCUSED GRID 11

	1	3	2	5	4	6
7	2	1	1	2	1	3
8	2	1	3	3	2	3
16	1	1	3	3	2	1
5	1	2	3	3	2	2
4	1	3	3	3	2	2
15	3	3	3	3	1	2
1	2	3	3	4	4	2
2	1	5	4	4	4	1
10	1	5	4	3	4	2
9	1	5	4	3	5	3
13	1	2	4	5	3	1
12	1	2	5	5	5	2
3	1	1	4	5	5	5
11	1	1	2	5	5	5
14	1	1	1	5	4	5
6	2	2	3	5	4	5

MEASURE OF SIMILARITY IN GRIDS 1 AND 6 IS 72.3958
1 ON 6 IS 72.9166 6 ON 1 IS 71.875

GRID 12 IS GRID 2 WITH GRID 3
****

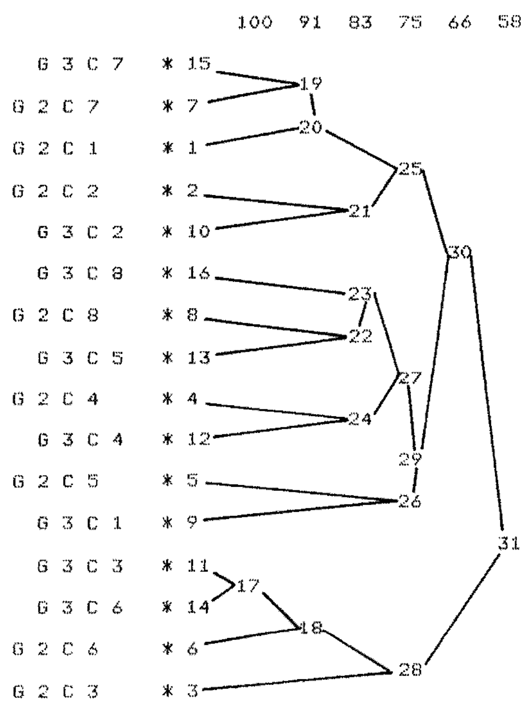
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 2 C 1	83.3333
G 2 C 2	83.3333
G 2 C 3	66.6666
G 2 C 4	83.3333
G 2 C 5	75
G 2 C 6	91.6666
G 2 C 7	91.6666
G 2 C 8	83.3333
G 3 C 1	75
G 3 C 2	83.3333
G 3 C 3	91.6666
G 3 C 4	83.3333
G 3 C 5	83.3333
G 3 C 6	91.6666
G 3 C 7	91.6666
G 3 C 8	83.3333

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 12



FOCUSED GRID 12

	*	6	5	2	4	3	1
15	*	2	2	2	1	2	3
7	*	3	2	2	1	2	3
1	*	3	2	2	1	1	3
2	*	3	2	2	3	1	4
10	*	3	2	1	3	1	3
16	*	3	3	2	2	1	2
8	*	3	3	3	2	1	3
13	*	2	3	3	2	1	2
4	*	4	3	3	2	2	2
12	*	4	4	3	3	2	2
5	*	2	4	3	3	2	1
9	*	3	4	4	3	3	1
11	*	5	5	4	4	3	2
14	*	5	5	4	4	3	2
6	*	5	5	4	5	3	2
3	*	5	5	4	5	1	3

MEASURE OF SIMILARITY IN GRIDS 2 AND 3 IS 83.8541
2 ON 3 IS 82.2916 3 ON 2 IS 85.4166

GRID 13 IS GRID 2 WITH GRID 4
****

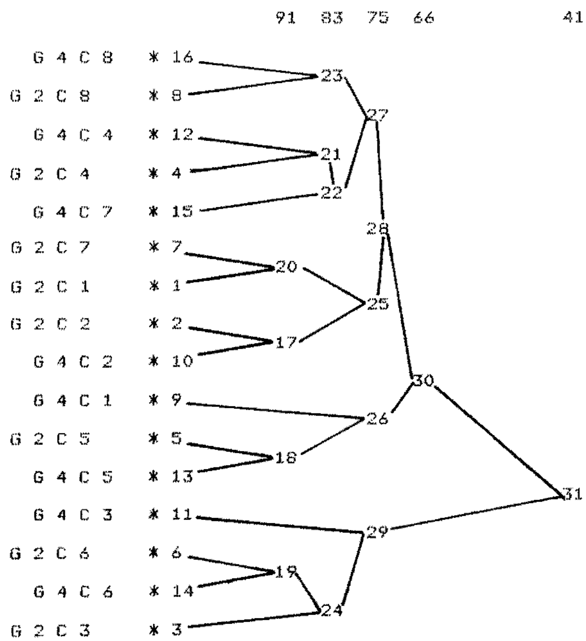
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 2 C 1	75
G 2 C 2	91.6666
G 2 C 3	83.3333
G 2 C 4	83.3333
G 2 C 5	91.6666
G 2 C 6	91.6666
G 2 C 7	75
G 2 C 8	83.3333
G 4 C 1	75
G 4 C 2	91.6666
G 4 C 3	75
G 4 C 4	83.3333
G 4 C 5	91.6666
G 4 C 6	91.6666
G 4 C 7	83.3333
G 4 C 8	83.3333

CONSTRUCT 4 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED
CONSTRUCT 16 REVERSED

TREE FOR CONSTRUCTS -- GRID 13



FOCUSED GRID 13

	* 3	2	5	4	6	1
16	* 5	4	3	4	3	4
8	* 5	3	3	4	3	3
12	* 3	3	3	4	3	4
4	* 4	3	3	4	2	4
15	* 4	3	4	4	2	3
7	* 4	4	4	5	3	3
1	* 5	4	4	5	3	3
2	* 5	4	4	3	3	2
10	* 5	4	4	3	2	2
9	* 3	4	4	4	2	1
5	* 2	3	4	3	2	1
13	* 2	3	4	3	1	1
11	* 2	3	5	4	5	2
6	* 3	4	5	5	5	2
14	* 2	4	5	5	5	2
3	* 1	4	5	5	5	3

MEASURE OF SIMILARITY IN GRIDS 2 AND 4 IS 84.375
2 ON 4 IS 84.375 4 ON 2 IS 84.375

GRID 14 IS GRID 2 WITH GRID 5
****

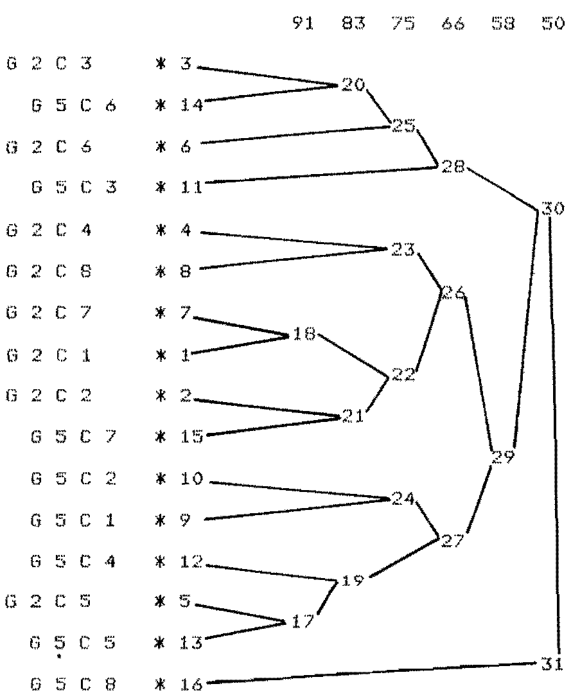
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 2 C 1	75
G 2 C 2	83.3333
G 2 C 3	83.3333
G 2 C 4	58.3333
G 2 C 5	91.6666
G 2 C 6	75
G 2 C 7	66.6666
G 2 C 8	66.6666
G 5 C 1	66.6666
G 5 C 2	75
G 5 C 3	66.6666
G 5 C 4	83.3333
G 5 C 5	91.6666
G 5 C 6	83.3333
G 5 C 7	83.3333
G 5 C 8	58.3333

CONSTRUCT 3 REVERSED
CONSTRUCT 4 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 11 REVERSED
CONSTRUCT 15 REVERSED

TREE FOR CONSTRUCTS -- GRID 14



FOCUSED GRID 14

	*	1	6	5	2	4	3
3	*	3	1	1	2	1	5
14	*	3	1	1	2	2	4
6	*	4	1	1	2	1	3
11	*	5	1	1	3	2	4
4	*	4	2	3	3	4	4
8	*	3	3	3	3	4	5
7	*	3	3	4	4	5	4
1	*	3	3	4	4	5	5
2	*	2	3	4	4	3	5
15	*	4	3	4	4	3	5
10	*	1	2	3	4	3	5
9	*	1	2	4	4	4	4
12	*	2	2	4	4	3	2
5	*	1	2	4	3	3	2
13	*	1	1	4	3	3	2
16	*	1	2	3	1	1	2

MEASURE OF SIMILARITY IN GRIDS 2 AND 5 IS 75.5208
2 ON 5 IS 75 5 ON 2 IS 76.0416

GRID 15 IS GRID 2 WITH GRID 6
****

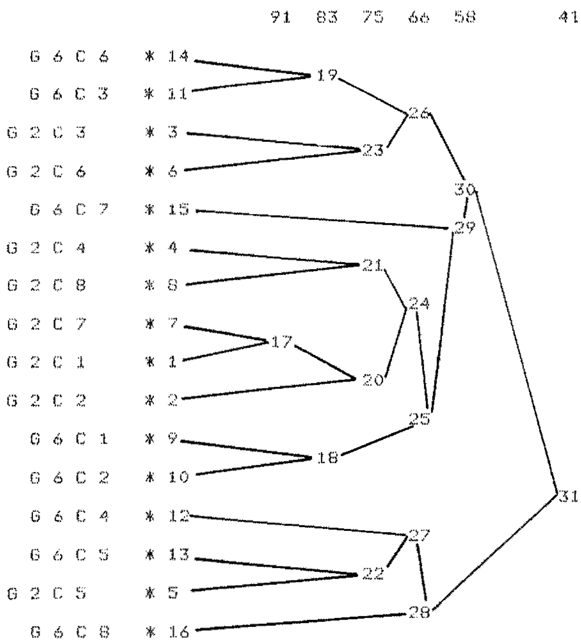
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 2 C 1	75
G 2 C 2	66.6666
G 2 C 3	66.6666
G 2 C 4	58.3333
G 2 C 5	75
G 2 C 6	58.3333
G 2 C 7	66.6666
G 2 C 8	66.6666
G 6 C 1	75
G 6 C 2	66.6666
G 6 C 3	66.6666
G 6 C 4	58.3333
G 6 C 5	75
G 6 C 6	50
G 6 C 7	66.6666
G 6 C 8	66.6666

CONSTRUCT 4 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED

TREE FOR CONSTRUCTS -- GRID 15



FOCUSED GRID 15

	* 6	4	5	2	3	1
14	* 5	4	5	1	1	1
11	* 5	5	5	2	1	1
3	* 5	5	5	4	1	3
6	* 5	5	5	4	3	2
15	* 4	5	3	3	3	3
4	* 2	4	3	3	4	4
8	* 3	4	3	3	5	3
7	* 3	5	4	4	4	3
1	* 3	5	4	4	5	3
2	* 3	3	4	4	5	2
9	* 3	5	3	4	5	1
10	* 2	4	3	4	5	1
12	* 2	5	5	5	2	1
13	* 1	3	5	4	2	1
5	* 2	3	4	3	2	1
16	* 1	2	3	3	1	1

MEASURE OF SIMILARITY IN GRIDS 2 AND 6 IS 66.1458
2 ON 6 IS 66.6666 6 ON 2 IS 65.625

GRID 16 IS GRID 3 WITH GRID 4
****

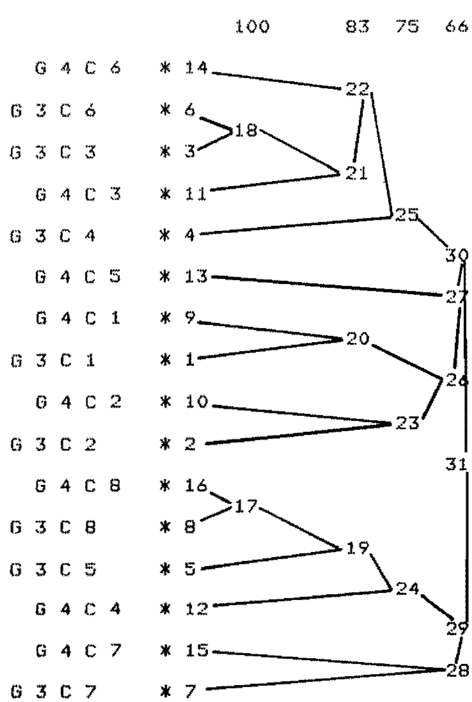
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 3 C 1	83.3333
G 3 C 2	75
G 3 C 3	83.3333
G 3 C 4	75
G 3 C 5	83.3333
G 3 C 6	83.3333
G 3 C 7	66.6666
G 3 C 8	100
G 4 C 1	83.3333
G 4 C 2	75
G 4 C 3	83.3333
G 4 C 4	75
G 4 C 5	66.6666
G 4 C 6	83.3333
G 4 C 7	66.6666
G 4 C 8	100

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 3 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 11 REVERSED
CONSTRUCT 13 REVERSED

TREE FOR CONSTRUCTS -- GRID 16



FOCUSED GRID 16

*	6	5	2	4	3	1
14 *	1	1	2	1	4	4
6 *	1	1	2	2	3	4
3 *	1	1	2	2	3	4
11 *	1	1	3	2	4	4
4 *	2	2	3	3	4	4
13 *	5	2	3	3	4	5
9 *	4	2	2	2	3	5
1 *	3	2	2	3	3	5
10 *	4	2	2	3	1	4
2 *	3	2	1	3	1	3
16 *	3	3	2	2	1	2
8 *	3	3	2	2	1	2
5 *	2	3	3	2	1	2
12 *	3	3	3	2	3	2
15 *	4	2	3	2	2	3
7 *	2	2	2	1	2	3

MEASURE OF SIMILARITY IN GRIDS 3 AND 4 IS 80.2083
3 ON 4 IS 81.25   4 ON 3 IS 79.1666

GRID 17 IS GRID 3 WITH GRID 5
****

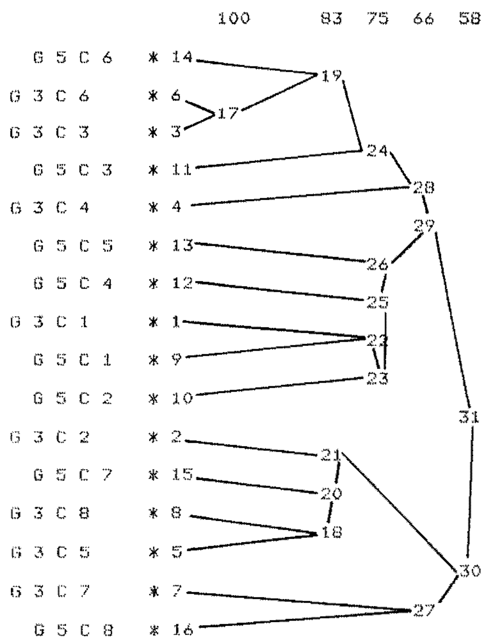
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 3 C 1	75
G 3 C 2	83.3333
G 3 C 3	83.3333
G 3 C 4	75
G 3 C 5	66.6666
G 3 C 6	83.3333
G 3 C 7	66.6666
G 3 C 8	83.3333
G 5 C 1	75
G 5 C 2	66.6666
G 5 C 3	75
G 5 C 4	75
G 5 C 5	66.6666
G 5 C 6	83.3333
G 5 C 7	83.3333
G 5 C 8	66.6666

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 3 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 11 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 13 REVERSED

TREE FOR CONSTRUCTS -- GRID 17



FOCUSED GRID 17

	*	6	5	2	4	3	1
14	*	1	1	2	2	4	3
6	*	1	1	2	2	3	4
3	*	1	1	2	2	3	4
11	*	1	1	3	2	4	5
4	*	2	2	3	3	4	4
13	*	5	2	3	3	4	5
12	*	4	2	2	3	4	4
1	*	3	2	2	3	3	5
9	*	4	2	2	2	2	5
10	*	4	3	2	3	1	5
2	*	3	2	1	3	1	3
15	*	3	2	2	3	1	2
8	*	3	3	2	2	1	2
5	*	2	3	3	2	1	2
7	*	2	2	2	1	2	3
16	*	2	3	1	1	2	1

MEASURE OF SIMILARITY IN GRIDS 3 AND 5 IS 75.5208
3 ON 5 IS 77.0833 5 ON 3 IS 73.9583

GRID 18 IS GRID 3 WITH GRID 6
****

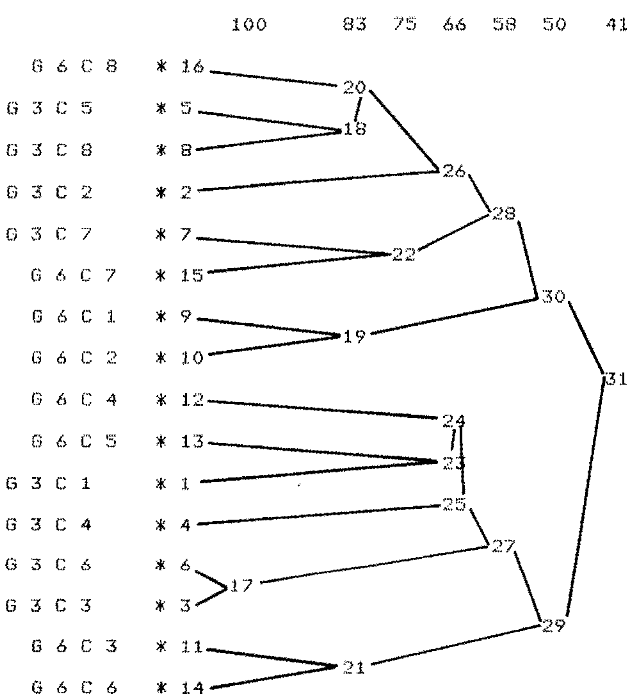
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 3 C 1	66.6666
G 3 C 2	50
G 3 C 3	50
G 3 C 4	58.3333
G 3 C 5	83.3333
G 3 C 6	50
G 3 C 7	75
G 3 C 8	66.6666
G 6 C 1	66.6666
G 6 C 2	66.6666
G 6 C 3	50
G 6 C 4	50
G 6 C 5	66.6666
G 6 C 6	50
G 6 C 7	75
G 6 C 8	83.3333

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 3 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 11 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 13 REVERSED

TREE FOR CONSTRUCTS -- GRID 18



	*	6	5	2	4	3	1
16	*	1	3	3	2	1	1
5	*	2	3	3	2	1	2
8	*	3	3	2	2	1	2
2	*	3	2	1	3	1	3
7	*	2	2	2	1	2	3
15	*	2	3	3	1	3	3
9	*	3	3	2	1	1	5
10	*	4	3	2	2	1	5
12	*	4	1	1	1	4	5
13	*	5	1	2	3	4	5
1	*	3	2	2	3	3	5
4	*	2	2	3	3	4	4
6	*	1	1	2	2	3	4
3	*	1	1	2	2	3	4
11	*	1	1	4	1	5	5
14	*	1	1	5	2	5	5

MEASURE OF SIMILARITY IN GRIDS 3 AND 6 IS 63.0208
3 ON 6 IS 62.5 6 ON 3 IS 63.5417

GRID 19 IS GRID 4 WITH GRID 5
****

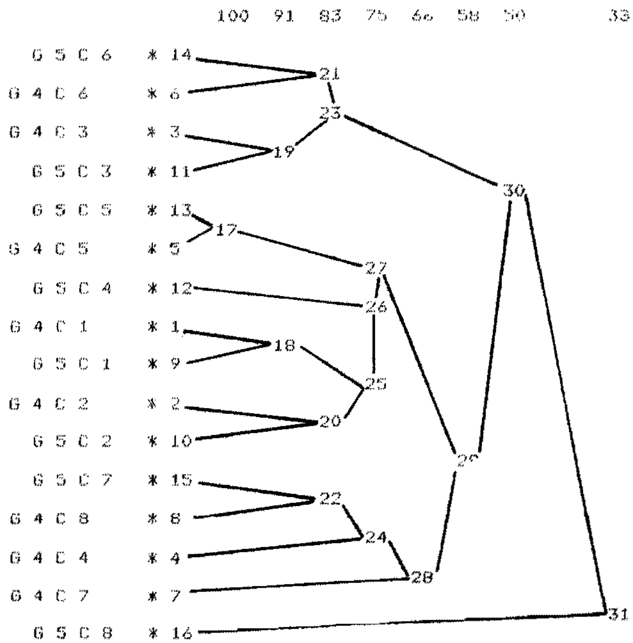
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 4 C 1	91.6666
G 4 C 2	83.3333
G 4 C 3	91.6666
G 4 C 4	58.3333
G 4 C 5	100
G 4 C 6	83.3333
G 4 C 7	75
G 4 C 8	83.3333
G 5 C 1	91.6666
G 5 C 2	83.3333
G 5 C 3	91.6666
G 5 C 4	75
G 5 C 5	100
G 5 C 6	83.3333
G 5 C 7	83.3333
G 5 C 8	58.3333

CONSTRUCT 4 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED
CONSTRUCT 16 REVERSED

TREE FOR CONSTRUCTS -- GRID 19



FOCUSED GRID 19

	* 3	2	4	5	6	1
14	* 2	4	4	5	5	3
6	* 2	4	5	5	5	2
3	* 2	3	4	5	5	2
11	* 2	3	4	5	5	1
13	* 2	3	3	4	1	1
5	* 2	3	3	4	1	1
12	* 2	4	3	4	2	2
1	* 3	4	4	4	2	1
9	* 4	4	4	4	2	1
2	* 5	4	3	4	2	2
10	* 5	4	3	3	2	1
15	* 5	4	3	4	3	4
8	* 5	4	4	3	3	4
4	* 3	3	4	3	3	4
7	* 4	3	4	4	2	3
16	* 4	5	5	3	4	5

MEASURE OF SIMILARITY IN GRIDS 4 AND 5 IS 83.3333
4 ON 5 IS 83.3333 5 ON 4 IS 83.3333

GRID 20 IS GRID 4 WITH GRID 6
****

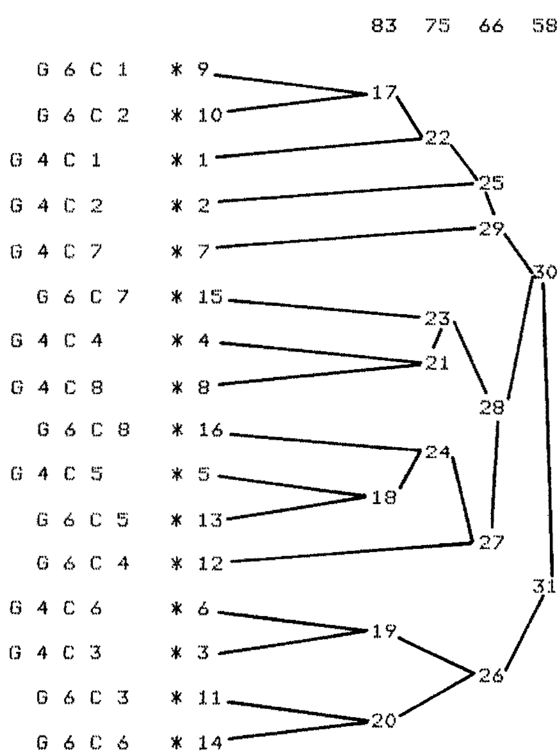
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 4 C 1	75
G 4 C 2	75
G 4 C 3	66.6666
G 4 C 4	75
G 4 C 5	83.3333
G 4 C 6	66.6666
G 4 C 7	58.3333
G 4 C 8	66.6666
G 6 C 1	66.6666
G 6 C 2	75
G 6 C 3	66.6666
G 6 C 4	66.6666
G 6 C 5	83.3333
G 6 C 6	66.6666
G 6 C 7	75
G 6 C 8	75

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 20



FOCUSED GRID 20

	*	1	3	2	4	5	6
9	*	5	1	2	1	3	3
10	*	5	1	2	2	3	4
1	*	5	3	2	2	2	4
2	*	4	1	2	3	2	4
7	*	3	2	3	2	2	4
15	*	3	3	3	1	3	2
4	*	2	3	3	2	3	3
8	*	2	1	2	2	3	3
16	*	1	1	3	2	3	1
5	*	1	2	3	3	4	1
13	*	1	2	4	3	5	1
12	*	1	2	5	5	5	2
6	*	2	2	4	5	5	5
3	*	2	2	3	4	5	5
11	*	1	1	2	5	5	5
14	*	1	1	1	4	5	5

MEASURE OF SIMILARITY IN GRIDS 4 AND 6 IS 71.3541
4 ON 6 IS 70.8333 6 ON 4 IS 71.875

GRID 21 IS GRID 5 WITH GRID 6
****

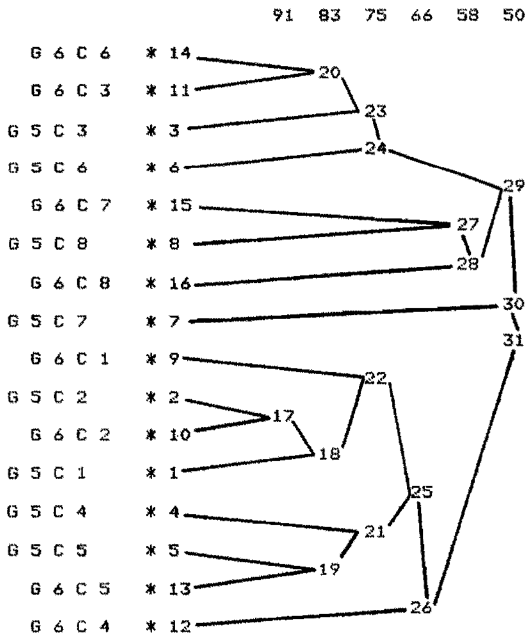
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 5 C 1	83.3333
G 5 C 2	91.6666
G 5 C 3	75
G 5 C 4	75
G 5 C 5	83.3333
G 5 C 6	50
G 5 C 7	50
G 5 C 8	58.3333
G 6 C 1	75
G 6 C 2	91.6666
G 6 C 3	75
G 6 C 4	58.3333
G 6 C 5	83.3333
G 6 C 6	75
G 6 C 7	58.3333
G 6 C 8	75

CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED
CONSTRUCT 16 REVERSED

TREE FOR CONSTRUCTS -- GRID 21



FOCUSED GRID 21

	* 6	5	4	2	3	1
14	* 5	5	4	1	1	1
11	* 5	5	5	2	1	1
3	* 5	5	4	3	2	1
6	* 5	5	4	4	2	3
15	* 4	3	5	3	3	3
8	* 4	3	5	5	4	5
16	* 5	3	4	3	5	5
7	* 3	4	3	4	5	4
9	* 3	3	5	4	5	1
2	* 2	3	3	4	5	1
10	* 2	3	4	4	5	1
1	* 2	4	4	4	4	1
4	* 2	4	3	4	2	2
5	* 1	4	3	3	2	1
13	* 1	5	3	4	2	1
12	* 2	5	5	5	2	1

MEASURE OF SIMILARITY IN GRIDS 5 AND 6 IS 72.3958
5 ON 6 IS 70.8333 6 ON 5 IS 73.9583

GRIDMIX MATRIX OF SIMILARITY MEASURES USING MAXIMUM VALUES
****

	* 1	2	3	4	5	6
1	*	80	79	84	79	72
2	* 80		85	84	76	66
3	* 79	85		81	77	63
4	* 84	84	81		83	71
5	* 79	76	77	83		73
6	* 72	66	63	71	73	

1	2	3	4	5	6	LINK COUNT	NEW LINK	MAX VALUE	MAX/MIN
	2	3				1	2 > 3	85.41	3.12
	2	3	4			2	4 > 2	84.37	0
1	2	3	4			3	1 > 4	84.37	1.04
1	2	3	4	5		4	5 > 4	83.33	0
1	2	3	4	5		5	4 > 3	81.25	2.08
1	2	3	4	5		6	1 > 2	80.2	1.04
1	2	3	4	5		7	1 > 3	79.16	4.16
1	2	3	4	5		8	1 > 5	79.16	2.08
1	2	3	4	5		9	5 > 3	77.08	3.12
1	2	3	4	5		10	2 > 5	76.04	1.04
1	2	3	4	5	6	11	5 > 6	73.95	3.12
1	2	3	4	5	6	12	6 > 1	72.91	1.04
1	2	3	4	5	6	13	4 > 6	71.87	1.04
1	2	3	4	5	6	14	6 > 2	66.66	1.04
1	2	3	4	5	6	15	3 > 6	63.54	1.04

GRIDMIX MATRIX OF SIMILARITY MEASURES USING MINIMUM VALUES
****

	* 1	2	3	4	5	6
1	*	79	75	83	77	71
2	* 79		82	84	75	65
3	* 75	82		79	73	62
4	* 83	84	79		83	70
5	* 77	75	73	83		70
6	* 71	65	62	70	70	

1	2	3	4	5	6	LINK COUNT	NEW LINK	MIN VALUE	MAX/MIN
	2		4			1	4 > 2	84.37	0
	2		4	5		2	5 > 4	83.33	0
1	2		4	5		3	1 > 4	83.33	1.04
1	2	3	4	5		4	2 > 3	82.29	3.12
1	2	3	4	5		5	1 > 2	79.16	1.04
1	2	3	4	5		6	4 > 3	79.16	2.08
1	2	3	4	5		7	1 > 5	77.08	2.08
1	2	3	4	5		8	1 > 3	75	4.16
1	2	3	4	5		9	2 > 5	75	1.04
1	2	3	4	5		10	5 > 3	73.95	3.12
1	2	3	4	5	6	11	6 > 1	71.87	1.04
1	2	3	4	5	6	12	4 > 6	70.83	1.04
1	2	3	4	5	6	13	5 > 6	70.83	3.12
1	2	3	4	5	6	14	6 > 2	65.62	1.04
1	2	3	4	5	6	15	3 > 6	62.5	1.04

TABLE OF AVERAGE MATCH VALUES FOR EACH CONSTRUCT
****

GRIDS ARE NUMBERED ALONG THE TOP, CONSTRUCTS DOWN THE SIDE

*	1	2	3	4	5	6
1 *	71	78	73	81	79	69
2 *	73	78	73	79	78	76
3 *	78	76	78	83	79	68
4 *	74	73	73	74	76	58
5 *	79	83	81	83	83	73
6 *	83	78	78	81	76	61
7 *	73	74	73	73	74	69
8 *	84	78	84	84	63	76

MODE		CONSTRUCTS	AVERAGE MATCH
1	--	G 1 C 8	84.99
2	--	G 3 C 8	84.99
3	--	G 4 C 8	84.99
4	--	G 4 C 3	83.33
5	--	G 2 C 5	83.33
6	--	G 4 C 5	83.33
7	--	G 5 C 5	83.33
8	--	G 1 C 6	83.33

GRID NUMBER 22
****

ELEMENTS	CONSTRUCTS	RATINGS
6	8	1 TO 5

RAW GRID 22

	* 1	2	3	4	5	6
1	* 2	3	1	2	3	3
2	* 2	2	1	2	3	3
3	* 2	2	1	2	3	3
4	* 2	3	2	4	5	5
5	* 1	3	2	3	4	2
6	* 1	3	2	3	4	1
7	* 1	3	2	3	4	1
8	* 4	3	4	2	1	1

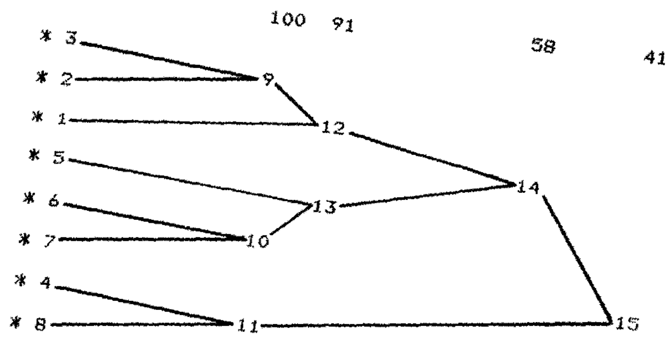
IN THE FOLLOWING MATRIX OF CONSTRUCT MATCHING SCORES
THE UPPER RIGHT HALF SHOWS THE MATCHING SCORES.
THE LOWER LEFT HALF SHOWS THE MATCHING SCORES
WHEN THE COLUMN OF CONSTRUCTS IS REVERSED.(SEE MANUAL)

CONSTRUCT MATCHING SCORES -- GRID 22

	* 1	2	3	4	5	6	7	8
1	*	91	91	41	58	50	50	25
2	* 25		100	33	50	41	41	16
3	* 25	16		33	50	41	41	16
4	* 25	16	16		50	41	41	-17
5	* 25	16	16	16		91	91	16
6	* 16	8	8	25	8		100	25
7	* 16	8	8	25	8	0		25
8	* 41	33	33	100	50	41	41	

CONSTRUCT 8 REVERSED

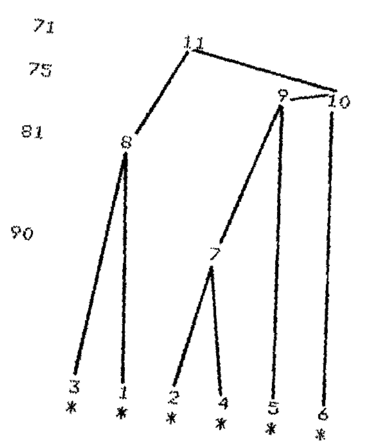
TREE FOR CONSTRUCTS -- GRID 22



ELEMENT MATCHING SCORES -- GRID 22

*	1	2	3	4	5	6
1 *		71	81	68	43	68
2 *	71		71	90	71	65
3 *	81	71		68	43	56
4 *	68	90	68		75	68
5 *	43	71	43	75		75
6 *	68	65	56	68	75	

TREE FOR ELEMENTS --GRID 22



FOCUSED GRID 22

*	3	1	2	4	5	6
3 *	1	2	2	2	3	3
2 *	1	2	2	2	3	3
1 *	1	2	3	2	3	3
5 *	2	1	3	3	4	2
6 *	2	1	3	3	4	1
7 *	2	1	3	3	4	1
4 *	2	2	3	4	5	5
8 *	2	2	3	4	5	5

GRID 23 IS GRID 22 WITH GRID 1
****

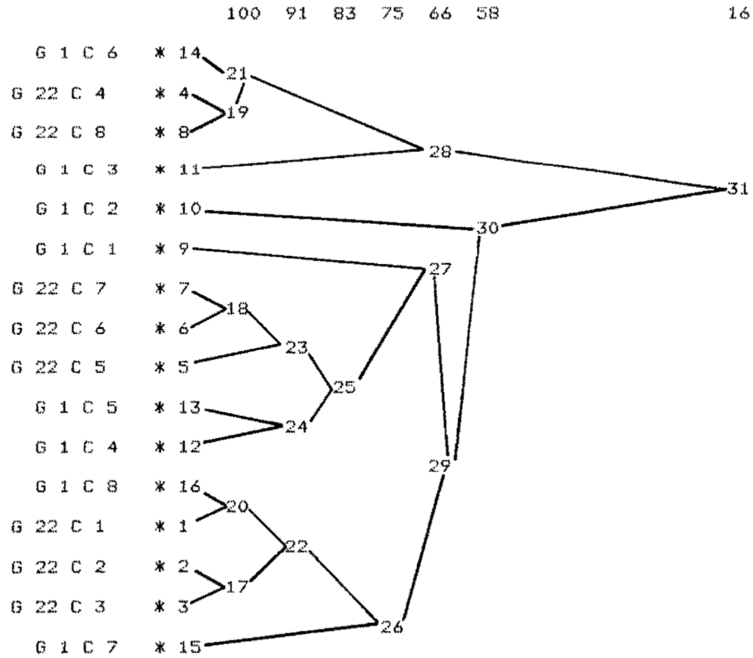
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 22 C 1	100
G 22 C 2	91.6666
G 22 C 3	91.6666
G 22 C 4	100
G 22 C 5	83.3333
G 22 C 6	75
G 22 C 7	75
G 22 C 8	100
G 1 C 1	75
G 1 C 2	58.3333
G 1 C 3	66.6666
G 1 C 4	75
G 1 C 5	83.3333
G 1 C 6	100
G 1 C 7	75
G 1 C 8	100

CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 23



FOCUSED GRID 23

	* 1	3	2	4	5	6
14	* 2	2	3	4	5	5
4	* 2	2	3	4	5	5
8	* 2	2	3	4	5	5
11	* 1	1	4	5	5	5
10	* 1	5	4	4	4	1
9	* 2	3	3	4	4	2
7	* 1	2	3	3	4	1
6	* 1	2	3	3	4	1
5	* 1	2	3	3	4	2
13	* 1	2	3	2	3	2
12	* 1	3	3	2	3	2
16	* 2	1	3	2	3	3
1	* 2	1	3	2	3	3
2	* 2	1	2	2	3	3
3	* 2	1	2	2	3	3
15	* 2	1	1	1	2	3

MEASURE OF SIMILARITY IN GRIDS 22 AND 1 IS 84.375
22 ON 1 IS 89.5833 1 ON 22 IS 79.1666

GRID 24 IS GRID 22 WITH GRID 2
****

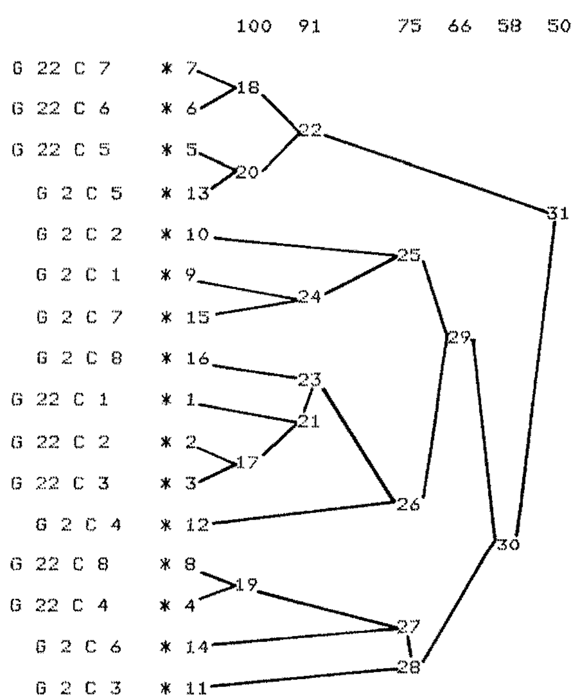
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 22 C 1	91.6666
G 22 C 2	83.3333
G 22 C 3	83.3333
G 22 C 4	75
G 22 C 5	100
G 22 C 6	91.6666
G 22 C 7	91.6666
G 22 C 8	75
G 2 C 1	75
G 2 C 2	66.6666
G 2 C 3	66.6666
G 2 C 4	83.3333
G 2 C 5	100
G 2 C 6	75
G 2 C 7	66.6666
G 2 C 8	91.6666

CONSTRUCT 5 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 13 REVERSED
CONSTRUCT 14 REVERSED

TREE FOR CONSTRUCTS -- GRID 24



FOCUSED GRID 24

*	4	2	5	6	1	3
7	3	3	2	5	5	4
6	3	3	2	5	5	4
5	3	3	2	4	5	4
13	3	3	2	4	5	4
10	3	2	2	3	4	1
9	1	2	2	3	3	1
15	1	2	2	3	3	2
16	2	3	3	3	3	1
1	2	3	3	3	2	1
2	2	2	3	3	2	1
3	2	2	3	3	2	1
12	2	3	3	4	2	2
8	4	3	5	5	2	2
4	4	3	5	5	2	2
14	5	4	5	5	2	3
11	5	4	5	5	3	1

MEASURE OF SIMILARITY IN GRIDS 22 AND 2 IS 82.2916
22 ON 2 IS 86.4583 2 ON 22 IS 78.125

GRID 25 IS GRID 22 WITH GRID 3
****

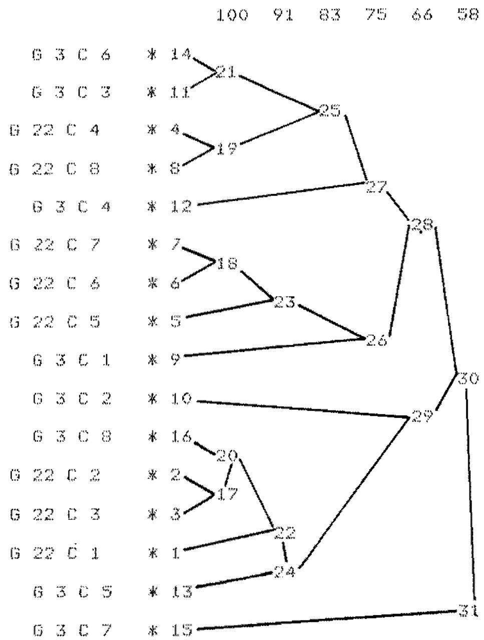
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 22 C 1	91.6666
G 22 C 2	100
G 22 C 3	100
G 22 C 4	83.3333
G 22 C 5	75
G 22 C 6	66.6666
G 22 C 7	66.6666
G 22 C 8	83.3333
G 3 C 1	75
G 3 C 2	66.6666
G 3 C 3	83.3333
G 3 C 4	75
G 3 C 5	91.6666
G 3 C 6	83.3333
G 3 C 7	58.3333
G 3 C 8	100

CONSTRUCT 4 REVERSED
CONSTRUCT 5 REVERSED
CONSTRUCT 6 REVERSED
CONSTRUCT 7 REVERSED
CONSTRUCT 8 REVERSED
CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 11 REVERSED

TREE FOR CONSTRUCTS -- GRID 25



FOCUSED GRID 25

*	6	5	2	4	3	1
14 *	1	1	2	2	3	4
11 *	1	1	2	2	3	4
4 *	1	1	3	2	4	4
8 *	1	1	3	2	4	4
12 *	2	2	3	3	4	4
7 *	5	2	3	3	4	5
6 *	5	2	3	3	4	5
5 *	4	2	3	3	4	5
9 *	3	2	2	3	3	5
10 *	3	2	1	3	1	3
16 *	3	3	2	2	1	2
2 *	3	3	2	2	1	2
3 *	3	3	2	2	1	2
1 *	3	3	3	2	1	2
13 *	2	3	3	2	1	2
15 *	2	2	2	1	2	3

MEASURE OF SIMILARITY IN GRIDS 22 AND 3 IS 81.25
22 ON 3 IS 83.3333 3 ON 22 IS 79.1666

GRID 26 IS GRID 22 WITH GRID 4
****

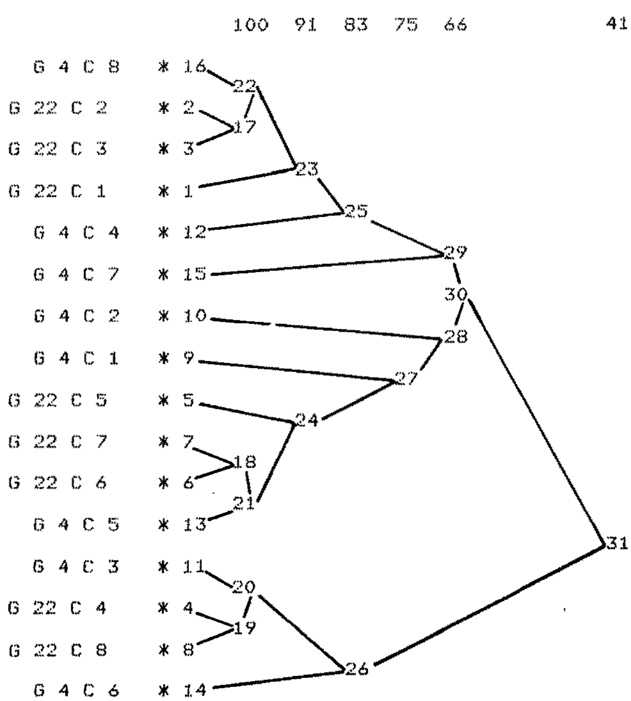
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 22 C 1	91.6666
G 22 C 2	100
G 22 C 3	100
G 22 C 4	100
G 22 C 5	91.6666
G 22 C 6	100
G 22 C 7	100
G 22 C 8	100
G 4 C 1	75
G 4 C 2	58.3333
G 4 C 3	100
G 4 C 4	83.3333
G 4 C 5	100
G 4 C 6	83.3333
G 4 C 7	66.6666
G 4 C 8	100

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 3 REVERSED
CONSTRUCT 12 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED
CONSTRUCT 16 REVERSED

TREE FOR CONSTRUCTS -- GRID 26



FOCUSED GRID 26

```
     * 1    3    2    4    5    6
******************************
 16 * 4    5    4    4    3    3

 2  * 4    5    4    4    3    3

 3  * 4    5    4    4    3    3

 1  * 4    5    3    4    3    3

 12 * 4    3    3    4    3    3

 15 * 3    4    3    4    4    2

 10 * 2    5    4    3    4    2

 9  * 1    3    4    4    4    2

 5  * 1    2    3    3    4    2

 7  * 1    2    3    3    4    1

 6  * 1    2    3    3    4    1

 13 * 1    2    3    3    4    1

 11 * 2    2    3    4    5    5

 4  * 2    2    3    4    5    5

 8  * 2    2    3    4    5    5

 14 * 2    2    4    5    5    5
```

MEASURE OF SIMILARITY IN GRIDS 22 AND 4 IS 90.625
22 ON 4 IS 97.9166   4 ON 22 IS 83.3333

GRID 27 IS GRID 22 WITH GRID 5
****

ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

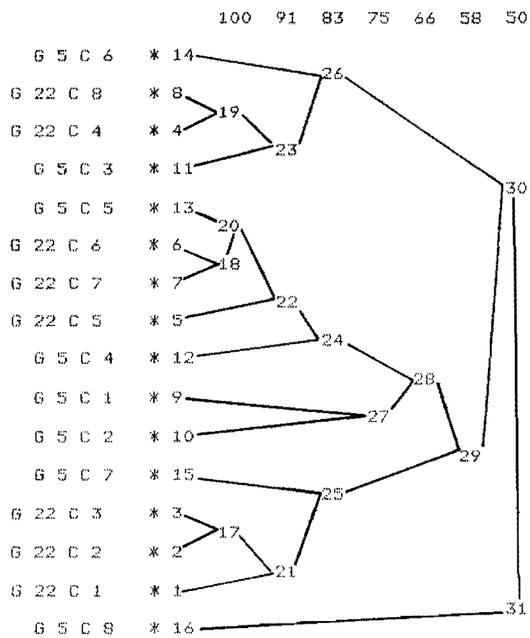
HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

```
G 22 C 1        75
G 22 C 2        83.3333
G 22 C 3        83.3333
G 22 C 4        91.6666
G 22 C 5        91.6666
G 22 C 6        100
G 22 C 7        100
G 22 C 8        91.6666

G 5 C 1         66.6666
G 5 C 2         58.3333
G 5 C 3         91.6666
G 5 C 4         83.3333
G 5 C 5         100
G 5 C 6         83.3333
G 5 C 7         83.3333
G 5 C 8         58.3333
```

CONSTRUCT 1 REVERSED
CONSTRUCT 2 REVERSED
CONSTRUCT 3 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED
CONSTRUCT 16 REVERSED

K*

TREE FOR CONSTRUCTS -- GRID 27



FOCUSED GRID 27

	* 1	3	2	4	5	6
14	* 3	2	4	4	5	5
8	* 2	2	3	4	5	5
4	* 2	2	3	4	5	5
11	* 1	2	3	4	5	5
13	* 1	2	3	3	4	1
6	* 1	2	3	3	4	1
7	* 1	2	3	3	4	1
5	* 1	2	3	3	4	2
12	* 2	2	4	3	4	2
9	* 1	4	4	4	4	2
10	* 1	5	4	3	3	2
15	* 4	5	4	3	4	3
3	* 4	5	4	4	3	3
2	* 4	5	4	4	3	3
1	* 4	5	3	4	3	3
16	* 5	4	5	5	3	4

MEASURE OF SIMILARITY IN GRIDS 22 AND 5 IS 83.8541
22 ON 5 IS 89.5833 5 ON 22 IS 78.125

GRID 28 IS GRID 22 WITH GRID 6
****

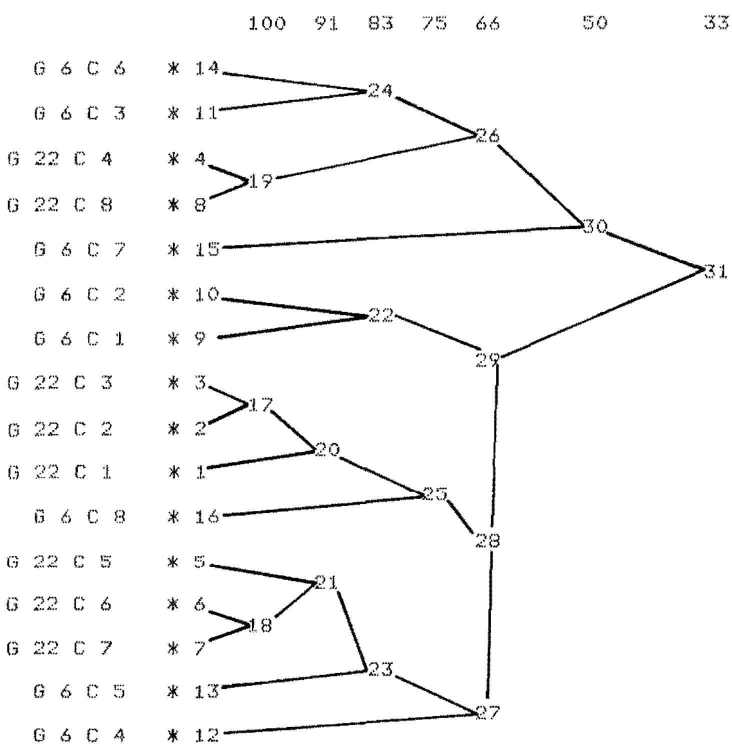
ELEMENTS	CONSTRUCTS	RATINGS
6	16	1 TO 5

HIGHEST CONSTRUCT MATCHES BETWEEN GRIDS
****

G 22 C 1	75
G 22 C 2	66.6666
G 22 C 3	66.6666
G 22 C 4	66.6666
G 22 C 5	75
G 22 C 6	83.3333
G 22 C 7	83.3333
G 22 C 8	66.6666
G 6 C 1	66.6666
G 6 C 2	66.6666
G 6 C 3	66.6666
G 6 C 4	58.3333
G 6 C 5	83.3333
G 6 C 6	66.6666
G 6 C 7	58.3333
G 6 C 8	75

CONSTRUCT 9 REVERSED
CONSTRUCT 10 REVERSED
CONSTRUCT 14 REVERSED
CONSTRUCT 15 REVERSED

TREE FOR CONSTRUCTS -- GRID 28



FOCUSED GRID 28

	*	1	3	2	4	5	6
14	*	1	1	1	4	5	5
11	*	1	1	2	5	5	5
4	*	2	2	3	4	5	5
8	*	2	2	3	4	5	5
15	*	3	3	3	5	3	4
10	*	5	1	2	2	3	4
9	*	5	1	2	1	3	3
3	*	2	1	2	2	3	3
2	*	2	1	2	2	3	3
1	*	2	1	3	2	3	3
16	*	1	1	3	2	3	1
5	*	1	2	3	3	4	2
6	*	1	2	3	3	4	1
7	*	1	2	3	3	4	1
13	*	1	2	4	3	5	1
12	*	1	2	5	5	5	2

MEASURE OF SIMILARITY IN GRIDS 22 AND 6 IS 70.3125
22 ON 6 IS 72.9166 6 ON 22 IS 67.7083

MODE ON GRID 1 IS 89.5833 GRID 1 ON MODE IS 79.1666
MODE ON GRID 2 IS 86.4583 GRID 2 ON MODE IS 78.125
MODE ON GRID 3 IS 83.3333 GRID 3 ON MODE IS 79.1666
MODE ON GRID 4 IS 97.9166 GRID 4 ON MODE IS 83.3333
MODE ON GRID 5 IS 89.5833 GRID 5 ON MODE IS 78.125
MODE ON GRID 6 IS 72.9166 GRID 6 ON MODE IS 67.7083

I. A Run of ARGUS

The grid elicitations in ARGUS are similar to the procedure used in the MIN–PEGASUS program. No comment is made on similarities or high matches, but opportunity is given to review ratings along a construct as it is elicited.

This version of ARGUS uses role positions chosen by the subject as the perspectives from which each grid respectively is elicited, and also as the elements for consideration.

```
                         ARGUS II
                        **********
                        **********




THIS PROGRAM ASSUMES THAT YOU ARE FAMILIAR WITH THE KELLY REPERTORY
GRID, THE PEGASUS PROGRAM AND THE TERMINAL, SO THE MINIMUM OF
INSTRUCTIONS WILL BE GIVEN. IF YOU NEED ANY HELP OR ADVICE ASK
THE PERSON WHO HELPED YOU TO LOG IN TO THE PROGRAM.
FIRST OF ALL PLEASE TYPE IN YOUR NAME.
?JAMES


THIS IS A PROGRAM TO ELICIT A GRID ABOUT ROLES THAT
YOU ASSUME IN YOUR LIFE.
THINK OF SIX OR SEVEN ROLES THAT ARE FAMILIAR TO YOU
AND IN WHICH YOU FEEL YOU ARE COMPETENT OR LESS COMPETENT.
CHOOSE ROLES THAT YOU HAVE KNOWN VERY WELL.
SOME SUGGESTIONS ARE PARENT, SISTER/BROTHER, DAUGHTER/SON,
FRIEND OF THE SAME SEX, FRIEND OF OPPOSITE SEX, HUSBAND/WIFE,
COLLEAGUES AT WORK, NEIGHBOUR, BOSS/SUBORDINATE.
MAKE A LIST OF THE SIX WHICH YOU FEEL ARE MOST IMPORTANT TO YOU,
AND HAVE MOST INFLUENCE ON YOUR LIFE, THEN TYPE THEM
IN ONE AFTER EACH QUESTION MARK.


ELEMENT  1 --?STUDENT
ELEMENT  2 --?TEACHER
ELEMENT  3 --?SCIENTIST
ELEMENT  4 --?THERAPIST
ELEMENT  5 --?FATHER
ELEMENT  6 --?SON


FOR THE FIRST THREE CONSTRUCTS ASSUME YOU ARE IN THE ROLE OF

STUDENT




TRIAD FOR ELICITATION OF CONSTRUCT 1
 1 STUDENT
 2 TEACHER
 3 SCIENTIST


NAME THE PAIR
?1

?3


NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?RECEIVER
RIGHT POLE (RATED 5 )--?GIVER

TYPE IN THE RATINGS
 1 STUDENT      1
 3 SCIENTIST    1
 2 TEACHER      5
 4 THERAPIST   ?4
 5 FATHER      ?4
 6 SON         ?2
```

```
POLE 1 --RECEIVER

 1 STUDENT      1
 3 SCIENTIST    1

 6 SON          2


 4 THERAPIST    4
 5 FATHER       4

 2 TEACHER      5

POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?3
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?12
NEW RATING FOR ELEMENT 1 ?2
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?3
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?3


POLE 1 --RECEIVER

 3 SCIENTIST    1

 1 STUDENT      2
 6 SON          2

 2 TEACHER      3

 4 THERAPIST    4
 5 FATHER       4


POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?3


POLE 1 --RECEIVER


 1 STUDENT      2
 6 SON          2

 2 TEACHER      3
 3 SCIENTIST    3

 4 THERAPIST    4
 5 FATHER       4

POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N
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TRIAD FOR ELICITATION OF CONSTRUCT 2
 1 STUDENT
 4 THERAPIST
 6 SON


NAME THE PAIR
?1

?6


NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?FOLLOWER
RIGHT POLE (RATED 5 )--?LEADER

TYPE IN THE RATINGS
 1 STUDENT      1
 6 SON          1
 4 THERAPIST    5
 2 TEACHER     ?4
 3 SCIENTIST   ?3
 5 FATHER      ?4


POLE 1 --FOLLOWER

 1 STUDENT      1
 6 SON          1


 3 SCIENTIST    3

 2 TEACHER      4
 5 FATHER       4

 4 THERAPIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?2
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?5
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?4


POLE 1 --FOLLOWER

 1 STUDENT      1
 6 SON          1



 2 TEACHER      4
 4 THERAPIST    4
 5 FATHER       4

 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N
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```
TRIAD FOR ELICITATION OF CONSTRUCT 3
 1 STUDENT
 3 SCIENTIST
 5 FATHER


NAME THE PAIR
?1

?3


NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?ACADEMIC
RIGHT POLE (RATED 5 )--?REAL

TYPE IN THE RATINGS
 1 STUDENT      1
 3 SCIENTIST    1
 5 FATHER       5
 2 TEACHER     ?4
 4 THERAPIST   ?5
 6 SON         ?5


POLE 1 --ACADEMIC

 1 STUDENT      1
 3 SCIENTIST    1



 2 TEACHER      4

 4 THERAPIST    5
 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N


NOW THAT YOU HAVE GOT THREE CONSTRUCTS I WANT YOU TO FILL IN A SET OF
RATINGS FOR EACH CONSTRUCT AS IF YOU WERE IN EACH OF THE OTHER ROLES IN
TURN AND BUILD UP ONE GRID FOR EACH OF THESE POSITIONS.


IMAGINE YOURSELF AS TEACHER
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
TEACHER WOULD DO.


CONSTRUCT 1
RECEIVER---GIVER

 1 STUDENT     ?3
 2 TEACHER     ?3
 3 SCIENTIST   ?5
 4 THERAPIST   ?5
 5 FATHER      ?4
 6 SON         ?3
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POLE 1 --RECEIVER


 1 STUDENT      3
 2 TEACHER      3
 6 SON          3

 5 FATHER       4

 3 SCIENTIST    5
 4 THERAPIST    5

POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?4


POLE 1 --RECEIVER


 1 STUDENT      3
 6 SON          3

 2 TEACHER      4
 5 FATHER       4

 3 SCIENTIST    5
 4 THERAPIST    5

POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 2
FOLLOWER---LEADER

 1 STUDENT     ?2
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?3


POLE 1 --FOLLOWER


 1 STUDENT      2

 4 THERAPIST    3
 6 SON          3

 2 TEACHER      4
 5 FATHER       4

 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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CONSTRUCT 3
ACADEMIC---REAL

 1 STUDENT     ?3
 2 TEACHER     ?4
 3 SCIENTIST   ?1
 4 THERAPIST   ?5
 5 FATHER      ?5
 6 SON         ?5


POLE 1 --ACADEMIC

 3 SCIENTIST    1


 1 STUDENT      3

 2 TEACHER      4

 4 THERAPIST    5
 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

THINK OF AN IMPORTANT CONSTRUCT THAT YOU AS
TEACHER WOULD USE WHEN THINKING ABOUT THESE POSITIONS,
TYPE IN THE POLE NAMES AND THE RATINGS AS YOU AS
TEACHER WOULD HAVE USED IT.

NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?RECEPTIVE
RIGHT POLE (RATED 5 )--?CLOSED

TYPE IN THE RATINGS
 1 STUDENT     ?2
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?4


POLE 1 --RECEPTIVE


 1 STUDENT      2
 3 SCIENTIST    2
 4 THERAPIST    2

 2 TEACHER      3
 5 FATHER       3

 6 SON          4


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N



IMAGINE YOURSELF AS SCIENTIST
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
SCIENTIST WOULD DO.
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CONSTRUCT 1
RECEIVER---GIVER

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?3
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?3


POLE 1 --RECEIVER

 1 STUDENT      1


 3 SCIENTIST    3
 4 THERAPIST    3
 6 SON          3

 2 TEACHER      4
 5 FATHER       4


POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 2
FOLLOWER---LEADER

 1 STUDENT     ?3
 2 TEACHER     ?5
 3 SCIENTIST   ?5
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?3


POLE 1 --FOLLOWER



 1 STUDENT      3
 4 THERAPIST    3
 6 SON          3

 5 FATHER       4

 2 TEACHER      5
 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 3
ACADEMIC---REAL

 1 STUDENT     ?2
 2 TEACHER     ?4
 3 SCIENTIST   ?3
 4 THERAPIST   ?4
 5 FATHER      ?5
 6 SON         ?5
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POLE 1 --ACADEMIC


 1 STUDENT      2

 3 SCIENTIST    3

 2 TEACHER      4
 4 THERAPIST    4

 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 4
RECEPTIVE---CLOSED

 1 STUDENT     ?2
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?4


POLE 1 --RECEPTIVE


 1 STUDENT      2
 3 SCIENTIST    2

 2 TEACHER      3
 4 THERAPIST    3

 5 FATHER       4
 6 SON          4


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?4
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?4
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?4
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?2
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?2


POLE 1 --RECEPTIVE


 5 FATHER       2
 6 SON          2

 2 TEACHER      3
 4 THERAPIST    3

 1 STUDENT      4
 3 SCIENTIST    4


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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THINK OF AN IMPORTANT CONSTRUCT THAT YOU AS
SCIENTIST WOULD USE WHEN THINKING ABOUT THESE POSITIONS,
TYPE IN THE POLE NAMES AND THE RATINGS AS YOU AS
SCIENTIST WOULD HAVE USED IT.

NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?DEVELOPING
RIGHT POLE (RATED 5 )--?STATIONARY

TYPE IN THE RATINGS
 1 STUDENT    ?2
 2 TEACHER    ?3
 3 SCIENTIST  ?1
 4 THERAPIST  ?2
 5 FATHER     ?3
 6 SON        ?2


POLE 1 --DEVELOPING

 3 SCIENTIST   1

 1 STUDENT     2
 4 THERAPIST   2
 6 SON         2

 2 TEACHER     3
 5 FATHER      3


POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N



IMAGINE YOURSELF AS THERAPIST
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
THERAPIST WOULD DO.


CONSTRUCT 1
RECEIVER---GIVER

 1 STUDENT    ?1
 2 TEACHER    ?4
 3 SCIENTIST  ?3
 4 THERAPIST  ?4
 5 FATHER     ?4
 6 SON        ?2


POLE 1 --RECEIVER

 1 STUDENT     1

 6 SON         2

 3 SCIENTIST   3

 2 TEACHER     4
 4 THERAPIST   4
 5 FATHER      4


POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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CONSTRUCT 2
FOLLOWER---LEADER

 1 STUDENT     ?2
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?2

POLE 1 --FOLLOWER


 1 STUDENT      2
 6 SON          2

 4 THERAPIST    3

 2 TEACHER      4
 5 FATHER       4

 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 3
ACADEMIC---REAL

 1 STUDENT     ?2
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?4
 5 FATHER      ?5
 6 SON         ?5

POLE 1 --ACADEMIC


 1 STUDENT      2
 3 SCIENTIST    2

 2 TEACHER      3

 4 THERAPIST    4

 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 4
RECEPTIVE---CLOSED

 1 STUDENT     ?2
 2 TEACHER     ?4
 3 SCIENTIST   ?3
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?3
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POLE 1 --RECEPTIVE


 1 STUDENT     2
 4 THERAPIST   2

 3 SCIENTIST   3
 5 FATHER      3
 6 SON         3

 2 TEACHER     4


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?3


POLE 1 --RECEPTIVE


 1 STUDENT     2
 4 THERAPIST   2

 2 TEACHER     3
 3 SCIENTIST   3
 5 FATHER      3
 6 SON         3


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 5
DEVELOPING---STATIONARY

 1 STUDENT    ?1
 2 TEACHER    ?3
 3 SCIENTIST  ?2
 4 THERAPIST  ?3
 5 FATHER     ?4
 6 SON        ?1


POLE 1 --DEVELOPING

 1 STUDENT     1
 6 SON         1

 3 SCIENTIST   2

 2 TEACHER     3
 4 THERAPIST   3

 5 FATHER      4


POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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THINK OF AN IMPORTANT CONSTRUCT THAT YOU AS
THERAPIST WOULD USE WHEN THINKING ABOUT THESE POSITIONS,
TYPE IN THE POLE NAMES AND THE RATINGS AS YOU AS
THERAPIST WOULD HAVE USED IT.

NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?USABLE
RIGHT POLE (RATED 5 )--?PURE

TYPE IN THE RATINGS
 1 STUDENT    ?4
 2 TEACHER    ?2
 3 SCIENTIST  ?4
 4 THERAPIST  ?1
 5 FATHER     ?3
 6 SON        ?1


POLE 1 --USABLE

 4 THERAPIST   1
 6 SON         1

 2 TEACHER     2

 5 FATHER      3

 1 STUDENT     4
 3 SCIENTIST   4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?1


POLE 1 --USABLE

 4 THERAPIST   1
 5 FATHER      1
 6 SON         1

 2 TEACHER     2


 1 STUDENT     4
 3 SCIENTIST   4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N



IMAGINE YOURSELF AS FATHER
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
FATHER WOULD DO.
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CONSTRUCT 1
RECEIVER---GIVER

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?4
 4 THERAPIST   ?4
 5 FATHER      ?4
 6 SON         ?2


POLE 1 --RECEIVER

 1 STUDENT      1

 6 SON          2


 2 TEACHER      4
 3 SCIENTIST    4
 4 THERAPIST    4
 5 FATHER       4


POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 2
FOLLOWER---LEADER

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?3
 5 FATHER      ?3
 6 SON         ?2


POLE 1 --FOLLOWER

 1 STUDENT      1

 6 SON          2

 4 THERAPIST    3
 5 FATHER       3

 2 TEACHER      4

 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 3
ACADEMIC---REAL

 1 STUDENT     ?1
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?4
 5 FATHER      ?5
 6 SON         ?5
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POLE 1 --ACADEMIC

 1 STUDENT      1

 3 SCIENTIST    2

 2 TEACHER      3

 4 THERAPIST    4

 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 4
RECEPTIVE---CLOSED

 1 STUDENT     ?2
 2 TEACHER     ?4
 3 SCIENTIST   ?2
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?2


POLE 1 --RECEPTIVE


 1 STUDENT      2
 3 SCIENTIST    2
 6 SON          2

 4 THERAPIST    3

 2 TEACHER      4
 5 FATHER       4


POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 5
DEVELOPING---STATIONARY

 1 STUDENT     ?1
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?3
 5 FATHER      ?4
 6 SON         ?1


POLE 1 --DEVELOPING

 1 STUDENT      1
 6 SON          1

 3 SCIENTIST    2

 2 TEACHER      3
 4 THERAPIST    3

 5 FATHER       4


POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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CONSTRUCT 6
USABLE---PURE

 1 STUDENT    ?3
 2 TEACHER    ?2
 3 SCIENTIST  ?4
 4 THERAPIST  ?2
 5 FATHER     ?1
 6 SON        ?1


POLE 1 --USABLE

 5 FATHER      1
 6 SON         1

 2 TEACHER     2
 4 THERAPIST   2

 1 STUDENT     3

 3 SCIENTIST   4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

THINK OF AN IMPORTANT CONSTRUCT THAT YOU AS
FATHER WOULD USE WHEN THINKING ABOUT THESE POSITIONS,
TYPE IN THE POLE NAMES AND THE RATINGS AS YOU AS
FATHER WOULD HAVE USED IT.

NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?PERS. RICH
RIGHT POLE (RATED 5 )--?PERS. POOR

TYPE IN THE RATINGS
 1 STUDENT    ?2
 2 TEACHER    ?2
 3 SCIENTIST  ?1
 4 THERAPIST  ?3
 5 FATHER     ?2
 6 SON        ?3


POLE 1 --PERS. RICH

 3 SCIENTIST   1

 1 STUDENT     2
 2 TEACHER     2
 5 FATHER      2

 4 THERAPIST   3
 6 SON         3



POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N




IMAGINE YOURSELF AS SON
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
SON WOULD DO.
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CONSTRUCT 1
RECEIVER---GIVER

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?5
 5 FATHER      ?3
 6 SON         ?3

POLE 1 --RECEIVER

 1 STUDENT      1


 5 FATHER       3
 6 SON          3

 2 TEACHER      4

 3 SCIENTIST    5
 4 THERAPIST    5

POLE 5 --GIVER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 2
FOLLOWER---LEADER

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?4
 5 FATHER      ?3
 6 SON         ?2

POLE 1 --FOLLOWER

 1 STUDENT      1

 6 SON          2

 5 FATHER       3

 2 TEACHER      4
 4 THERAPIST    4

 3 SCIENTIST    5

POLE 5 --LEADER


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 3
ACADEMIC---REAL

 1 STUDENT     ?5
 2 TEACHER     ?4
 3 SCIENTIST   ?5
 4 THERAPIST   ?3
 5 FATHER      ?3
 6 SON         ?3
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POLE 1 --ACADEMIC


 4 THERAPIST    3
 5 FATHER       3
 6 SON          3

 2 TEACHER      4

 1 STUDENT      5
 3 SCIENTIST    5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?3
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?5
ELEMENT NUMBER?5
NEW RATING FOR ELEMENT 5 ?5
ELEMENT NUMBER?6
NEW RATING FOR ELEMENT 6 ?5


POLE 1 --ACADEMIC




 2 TEACHER      4

 1 STUDENT      5
 3 SCIENTIST    5
 4 THERAPIST    5
 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?3
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?2
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?1
ELEMENT NUMBER?3
NEW RATING FOR ELEMENT 3 ?1


POLE 1 --ACADEMIC

 1 STUDENT      1
 3 SCIENTIST    1

 2 TEACHER      2



 4 THERAPIST    5
 5 FATHER       5
 6 SON          5

POLE 5 --REAL


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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CONSTRUCT 4
RECEPTIVE---CLOSED

 1 STUDENT     ?1
 2 TEACHER     ?5
 3 SCIENTIST   ?2
 4 THERAPIST   ?5
 5 FATHER      ?5
 6 SON         ?2


POLE 1 --RECEPTIVE

 1 STUDENT      1

 3 SCIENTIST    2
 6 SON          2




 2 TEACHER      5
 4 THERAPIST    5
 5 FATHER       5

POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 5
DEVELOPING---STATIONARY

 1 STUDENT     ?1
 2 TEACHER     ?4
 3 SCIENTIST   ?2
 4 THERAPIST   ?3
 5 FATHER      ?5
 6 SON         ?1


POLE 1 --DEVELOPING

 1 STUDENT      1
 6 SON          1

 3 SCIENTIST    2

 4 THERAPIST    3

 2 TEACHER      4

 5 FATHER       5

POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 6
USABLE---PURE

 1 STUDENT     ?6
 1 STUDENT     ?5
 2 TEACHER     ?5
 3 SCIENTIST   ?5
 4 THERAPIST   ?2
 5 FATHER      ?1
 6 SON         ?1
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POLE 1 --USABLE

 5 FATHER       1
 6 SON          1

 4 THERAPIST    2



 1 STUDENT      5
 2 TEACHER      5
 3 SCIENTIST    5

POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 7
PERS. RICH---PERS. POOR

 1 STUDENT     ?3
 2 TEACHER     ?4
 3 SCIENTIST   ?3
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?2


POLE 1 --PERS. RICH


 4 THERAPIST    2
 6 SON          2

 1 STUDENT      3
 3 SCIENTIST    3
 5 FATHER       3

 2 TEACHER      4


POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?2
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?1
ELEMENT NUMBER?2
NEW RATING FOR ELEMENT 2 ?3


POLE 1 --PERS. RICH

 4 THERAPIST    1

 6 SON          2

 1 STUDENT      3
 2 TEACHER      3
 3 SCIENTIST    3
 5 FATHER       3


POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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THINK OF AN IMPORTANT CONSTRUCT THAT YOU AS
SON WOULD USE WHEN THINKING ABOUT THESE POSITIONS,
TYPE IN THE POLE NAMES AND THE RATINGS AS YOU AS
SON WOULD HAVE USED IT.

NAME THE POLES OF THE CONSTRUCT
LEFT POLE (RATED 1 ) --?INTERESTING
RIGHT POLE (RATED 5 )--?BORING

TYPE IN THE RATINGS
 1 STUDENT     ?1
 2 TEACHER     ?3
 3 SCIENTIST   ?1
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?1


POLE 1 --INTERESTING

 1 STUDENT      1
 3 SCIENTIST    1
 6 SON          1

 4 THERAPIST    2

 2 TEACHER      3
 5 FATHER       3


POLE 5 --BORING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
DO YOU WANT TO CHANGE THE POLE NAMES?N



NOW BEFORE YOU FINISH I WANT YOU TO GO BACK AND USE EACH OF THESE NEW
CONSTRUCTS IN EACH GRID IN TURN, SO THAT EVERY GRID HAS IN IT THE SAME
CONSTRUCTS AND ELEMENTS, BUT NOT NECESSARILY RATED IN THE SAME WAY.



IMAGINE YOURSELF AS FATHER
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
FATHER WOULD DO.


CONSTRUCT 8
INTERESTING---BORING

 1 STUDENT     ?1
 2 TEACHER     ?1
 3 SCIENTIST   ?2
 4 THERAPIST   ?1
 5 FATHER      ?3
 6 SON         ?2


POLE 1 --INTERESTING

 1 STUDENT      1
 2 TEACHER      1
 4 THERAPIST    1

 3 SCIENTIST    2
 6 SON          2

 5 FATHER       3


POLE 5 --BORING
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DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


IMAGINE YOURSELF AS THERAPIST
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
THERAPIST WOULD DO.


CONSTRUCT 7
PERS. RICH---PERS. POOR

 1 STUDENT     ?3
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?2
 5 FATHER      ?2
 6 SON         ?4


POLE 1 --PERS. RICH


 3 SCIENTIST    2
 4 THERAPIST    2
 5 FATHER       2

 1 STUDENT      3
 2 TEACHER      3

 6 SON          4


POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 8
INTERESTING---BORING

 1 STUDENT     ?2
 2 TEACHER     ?2
 3 SCIENTIST   ?1
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?3


POLE 1 --INTERESTING

 3 SCIENTIST    1

 1 STUDENT      2
 2 TEACHER      2
 4 THERAPIST    2

 5 FATHER       3
 6 SON          3


POLE 5 --BORING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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IMAGINE YOURSELF AS SCIENTIST
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
SCIENTIST WOULD DO.


CONSTRUCT 6
USABLE---PURE

 1 STUDENT     ?4
 2 TEACHER     ?2
 3 SCIENTIST   ?3
 4 THERAPIST   ?2
 5 FATHER      ?1
 6 SON         ?1


POLE 1 --USABLE

 5 FATHER       1
 6 SON          1

 2 TEACHER      2
 4 THERAPIST    2

 3 SCIENTIST    3

 1 STUDENT      4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 7
PERS. RICH---PERS. POOR

 1 STUDENT     ?3
 2 TEACHER     ?2
 3 SCIENTIST   ?2
 4 THERAPIST   ?1
 5 FATHER      ?2
 6 SON         ?2


POLE 1 --PERS. RICH

 4 THERAPIST    1

 2 TEACHER      2
 3 SCIENTIST    2
 5 FATHER       2
 6 SON          2

 1 STUDENT      3



POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 8
INTERESTING---BORING

 1 STUDENT     ?2
 2 TEACHER     ?2
 3 SCIENTIST   ?1
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?3
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POLE 1 --INTERESTING

 3 SCIENTIST   1

 1 STUDENT     2
 2 TEACHER     2
 4 THERAPIST   2

 5 FATHER      3
 6 SON         3


POLE 5 --BORING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N



IMAGINE YOURSELF AS TEACHER
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
TEACHER WOULD DO.



CONSTRUCT 5
DEVELOPING---STATIONARY

 1 STUDENT    ?1
 2 TEACHER    ?3
 3 SCIENTIST  ?2
 4 THERAPIST  ?3
 5 FATHER     ?4
 6 SON        ?2

POLE 1 --DEVELOPING

 1 STUDENT     1

 3 SCIENTIST   2
 6 SON         2

 2 TEACHER     3
 4 THERAPIST   3

 5 FATHER      4

POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 6
USABLE---PURE

 1 STUDENT    ?4
 2 TEACHER    ?2
 3 SCIENTIST  ?3
 4 THERAPIST  ?1
 5 FATHER     ?1
 6 SON        ?1
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POLE 1 --USABLE

 4 THERAPIST   1
 5 FATHER      1
 6 SON         1

 2 TEACHER     2

 3 SCIENTIST   3

 1 STUDENT     4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 7
PERS. RICH---PERS. POOR

 1 STUDENT    ?3
 2 TEACHER    ?2
 3 SCIENTIST  ?2
 4 THERAPIST  ?1
 5 FATHER     ?2
 6 SON        ?3


POLE 1 --PERS. RICH

 4 THERAPIST   1

 2 TEACHER     2
 3 SCIENTIST   2
 5 FATHER      2

 1 STUDENT     3
 6 SON         3


POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 8
INTERESTING---BORING

 1 STUDENT    ?3
 2 TEACHER    ?3
 3 SCIENTIST  ?1
 4 THERAPIST  ?2
 5 FATHER     ?3
 6 SON        ?3


POLE 1 --INTERESTING

 3 SCIENTIST   1

 4 THERAPIST   2

 1 STUDENT     3
 2 TEACHER     3
 5 FATHER      3
 6 SON         3


POLE 5 --BORING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N
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IMAGINE YOURSELF AS STUDENT
PLEASE RATE ALL THE ELEMENTS
ON THESE CONSTRUCTS AS YOU THINK YOU AS
STUDENT WOULD DO.


CONSTRUCT 4
RECEPTIVE---CLOSED

 1 STUDENT     ?1
 2 TEACHER     ?3
 3 SCIENTIST   ?3
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?2


POLE 1 --RECEPTIVE

 1 STUDENT      1

 4 THERAPIST    2
 6 SON          2

 2 TEACHER      3
 3 SCIENTIST    3
 5 FATHER       3



POLE 5 --CLOSED


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 5
DEVELOPING---STATIONARY

 1 STUDENT     ?1
 2 TEACHER     ?3
 3 SCIENTIST   ?2
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?2


POLE 1 --DEVELOPING

 1 STUDENT      1

 3 SCIENTIST    2
 4 THERAPIST    2
 6 SON          2

 2 TEACHER      3
 5 FATHER       3



POLE 5 --STATIONARY


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 6
USABLE---PURE

 1 STUDENT     ?53\
 2 TEACHER     ?3
 3 SCIENTIST   ?4
 4 THERAPIST   ?2
 5 FATHER      ?1
 6 SON         ?1
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POLE 1 --USABLE

 5 FATHER       1
 6 SON          1

 4 THERAPIST    2

 2 TEACHER      3

 3 SCIENTIST    4

 1 STUDENT      5

POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?4
NEW RATING FOR ELEMENT 4 ?2


POLE 1 --USABLE

 5 FATHER       1
 6 SON          1

 4 THERAPIST    2

 2 TEACHER      3

 3 SCIENTIST    4

 1 STUDENT      5

POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?Y
HOW MANY?1
ELEMENT NUMBER?1
NEW RATING FOR ELEMENT 1 ?4


POLE 1 --USABLE

 5 FATHER       1
 6 SON          1

 4 THERAPIST    2

 2 TEACHER      3

 1 STUDENT      4
 3 SCIENTIST    4


POLE 5 --PURE


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 7
PERS. RICH---PERS. POOR

 1 STUDENT     ?2
 2 TEACHER     ?1
 3 SCIENTIST   ?1
 4 THERAPIST   ?1
 5 FATHER      ?2
 6 SON         ?3
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POLE 1 --PERS. RICH

 2 TEACHER      1
 3 SCIENTIST    1
 4 THERAPIST    1

 1 STUDENT      2
 5 FATHER       2

 6 SON          3


POLE 5 --PERS. POOR


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N


CONSTRUCT 8
INTERESTING---BORING

 1 STUDENT     ?2
 2 TEACHER     ?3
 3 SCIENTIST   ?1
 4 THERAPIST   ?2
 5 FATHER      ?3
 6 SON         ?3

POLE 1 --INTERESTING

 3 SCIENTIST    1

 1 STUDENT      2
 4 THERAPIST    2

 2 TEACHER      3
 5 FATHER       3
 6 SON          3


POLE 5 --BORING


DO YOU WANT TO CHANGE ANY OF THESE VALUES?N

IF YOU WANT YOUR GRIDS FOCUSED INDIVIDUALLY AND/OR YOU WANT TO EXAMINE
THE SIMILARITY OF CONSTRUING BETWEEN THEM USE THE SOCIOGRIDS PROGRAM.
YOUR GRIDS ARE BEING PUT IN A FILE SO THAT YOU CAN USE THEM AGAIN IF
YOU NEED TO. IT WILL BE CALLED:

FILE NAME: JAME
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CONSTRUCTS
****

RECEIVER	GIVER
FOLLOWER	LEADER
ACADEMIC	REAL
RECEPTIVE	CLOSED
DEVELOPING	STATIONARY
USABLE	PURE
PERS. RICH	PERS. POOR
INTERESTING	BORING

ELEMENTS
****

STUDENT

TEACHER

SCIENTIST

THERAPIST

FATHER

SON

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Computers and People Series

edited by B.R. Gaines

The series is concerned with all aspects of man-computer relationships, including interaction, interfacing, modelling and artificial intelligence. Books are interdisciplinary, communicating results derived in one area of study to workers in another. Applied, experimental, theoretical and tutorial studies are included.

Personal construct psychology was developed by George Kelly in the early fifties to explain how similar events could produce different behaviour in different people. Central to his theory was a view of man as a *personal scientist* forming theories about the world, testing and revising them against personal experience, and acting on the basis of them. He devised the repertory grid technique to elicit the unique dimensions along which each individual classifies his world. Using the basic philosophy of personal construct theory and the repertory grid, the author of this book has developed novel computer techniques which interact with the individual's ideas to produce, objectively and explicitly, a model of his view of the world and his attitudes towards it.

The author describes these techniques and discusses how they help the individual to explore his own state of mind and attitudes towards a particular topic, as well as allowing comparisons between his own view of the world and those of other people. These psychological tools have been applied in a wide variety of situations – in industrial training, quality control, management development, self-organized learning, self-counselling and psychotherapy – and examples are given of actual projects that have been carried out. In each case, these highly innovative tools are used to shed new light on potentially difficult problems. The chapters describing specific programs give sufficient information, in the form of algorithms, flowcharts and computer runs, to enable the reader to develop programs for his own use to meet his particular problem.

This book provides more than just new techniques for the analysis of repertory grid data: it represents an extension of the concepts of personal construct psychology to whole new areas of great practical importance. It will be welcomed not only by those already concerned with personal construct theory, such as psychologists and psychiatrists, but also by the wide range of people for whom it provides new and powerful tools, in management training and personnel, cybernetics and systems research, counselling, youth and social work, and education, as well as by computer hobbyists.

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