STAFF CONSTRUCTIONS OF THE RULE-VIOLATING BEHAVIOUR OF THE INSTITUTIONALISED DELINQUENT CHILD

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C O N T E N T S

ABSTRACT

A ranked repertory grid analysis was used to examine staff constructions of the nature of the institutionalised delinquent child in a reform school. These constructions were assessed as personality attributions made by the staff based upon the rule-violating behaviour of the delinquent boys within the instutition. In addition, the manner in which these constructions affect staff decisions with regard to the reprimands they use to manage the rule-violator and whether subgroups of staff differ in this respect, were examined.

The Ingrid 72 computer programme was used to analyse the results. It was found that the constructs, Lazy/Unmotivated and Immature/Irresponsible were the major dimensions used by the staff to differentiate between rule violators at the Reform School. Implications of the staff constructions for the management of the delinquent child showed that custodial aims are still strongly prevalent at the Reform School and that the need to recommend reprimands in a consistent manner receives more emphasis than reprimands based on the nature of the rule-violator.

PART ONE

INTRODUCTION

1.1 DELINQUENCY

Juvenile delinquency is a difficult concept to define. It cannot be seen solely in terms of deviance from specific conduct norms since these vary from country to country, city to city and even neighbourhood to neighbourhood. In order to overcome this dilemma, juvenile delinquency is usually defined in legal terms as the status conferred upon a child by a Court within his community.

Juvenile delinquency has been defined by Coleman (1972) Pg 379 as :

> "Behaviour by youths under the age of 18 which is not acceptable to society and is generally regarded as calling for some admonishment, punishment or corrective action".

Prins (1977) has viewed delinquency as what the law says it is and has suggested that this definition may change from one decade to the next.

Coleman (op cit) points out that male delinquents are commonly arrested for drug usage and crimes against property and to a lesser extent for aggravated assault and crimes against the person.

The incidence of juvenile delinquency is equally difficult to determine owing to the fact that many crimes go undetected. With the increasing use of self report studies on juvenile delinquency, Murrell and Lester (1981) report that those children in the U S A who become "official delinquents" are only a small proportion (11% to 16%) of all delinquent offenders.

Sandhu (1977) quoted estimates by the U S President's Commission on Crime that one in every nine youths in the U S A will be referred to a juvenile court in connection with a delinquent act (excluding traffic offences) before his eighteenth birthday.

Ullman (unpublished) has found that there is not much statistical evidence available on juvenile delinquency in South Africa. Using data supplied by the Department of Statistics and the office of the Commissioner of the South African Police, he has stated that a careful examination of juvenile delinquency in South Africa has revealed no great differences between South Africa and other countries. He reports that between 1969 and 1970, 8,2% of all crime committed in South Africa was by youths between the ages of seven and seventeen years. When the white population alone is considered, the figure was 3,7% during the same period.

Numerous theories have been put forward to account for the development of delinquent behaviour and explanations for delinquent behaviour have varied with time and place. It is generally considered that if the etiology of delinquency can be determined, then steps can be taken to correct those causal factors. Researchers from various fields, ie medical doctors, anthropologists, sociologists, psychologists and social workers have made attempts to explain delinquent behaviour. Their theories were influenced by the dominant philosophies of their times, historical events eg wars (depression) and by social changes, ie urbanisation and migration.

There appear to be two broad approaches to the study of the etiology of delinquency, ie a sociological perspective highlighting the

delinquency generating sources in society and a physical and psychogenic perspective highlighting sources of delinquency in the individual. (Sandhu 1977, Haskell and Yablonsky 1978, Coleman 1972). These approaches view delinquency from different perspectives but overlap to a certain extent.

Studies emphasising the individual are primarily psychological in nature and focus on individual personality and the factors prevalent during the stages of development which have led to this particular person deviating into delinquency. There are many theories which attempt to describe and explain the delinquent or criminal personality and only a brief summary of the more significant will be presented here.

One of the first studies to examine individual traits which have etiological significance was that carried out by Burt (1925). By comparing a group of delinquents with non-delinquents, he sought to identify significant differences between the two groups on the assumption that any differences found would represent the causes of delinquency. His study has subsequently been questioned on methodological grounds and yet represents one of the first attempts to isolate individual personality components on traits which could be indicative of a delinquent personality type.

West (1977) has maintained that the criminal type of personality is not entirely a myth and quoted a study by West and Farrington which shows that by the age of eight to ten years many of the boys, who later became official delinquents, were already distinguishable from their peers by their trouble seeking conduct which was apparent to both teachers and classmates. The kind of behaviour that was seen

in pre-delinquents was disobedience, truancy and quarrelsomeness. In addition, what distinguished these pre-delinquents from other boys who exhibited similar behaviour was that they had been deviant as children, remained deviant as adolescents and into adulthood. They tended to be heavy drinkers, smokers and gamblers, were sexually promiscuous, opted for unskilled jobs that yield high pay in the short term, were aggressive and in many ways anti-authoritarian.

Numerous attempts have been made to ascribe etiological significance to factors which might lead to the emergence of the delinquent or criminal personality type as described above.

There has been some support for Sheldon's original linking of the mesomorphic (muscular) somatotype with delinquency. Glueck and Glueck (1956) found that 60,1% of delinquents were mesomorphic as compared with only 30,7% of non-delinquents. This is not taken to imply a direct relationship between mesomorphy and delinquency but through interaction with the environment, body build becomes significant in that a person born with an athletic body is more likely to engage in adventurous, aggressive type activities. Society often expects him to play the role of the tough person.

Other physiologically based theories emphasise mental retardation or brain damage. Coleman (1972) estimated that 5% of delinquent behaviour in the U S A has etiological association with low intelligence. The individual is usually unable to foresee the probable consequences of his actions or to understand their significance. Delinquent male retardates typically commit impulse offences often against the person. Occasionally delinquents of low intelligence fall prey to brighter psychopaths or delinquent gangs that exploit and dominate them.

Coleman (op cit) maintained that less than 1% of delinquents have demonstrable brain pathology which results in lowered inhibitory controls and tendency towards violent behaviour. This is often associated with hyperactivity, impulsivity and emotional instability and usually improves with age.

Studies of chromosomal abnormalities have attempted to show a correlation between criminal behaviour and males possessing an extra male chromosome, ie they are XYY rather than the normal XY. Haskell and Yablonsky (1978) have stated that among criminals they assessed, the chance of possessing an extra Y chromosome is up to sixty times greater than it is among the general population and there appears to be a higher frequency of aggressive and disturbed behaviour with higher rates of violent crime amongst this group.

Psychoanalytic theory has been applied to the field of delinquency with Friedlander and Aichhorn as the main proponents. Reckless (1976) in a summary of this approach, has suggested that faulty development in the first few years of life makes it difficult for the child to control his id impulses. The child remains infantile in his pursuits of drive fulfilment, living in terms of the pleasure principle and failing to develop an adherence to the reality principle. Haskell and Yablonsky (1978) have pointed out that psychoanalytic theory attributes delinquency to a number of causes. Amongst these would be the person who has an inability to control id drives because of a deficiency in ego or superego development. The delinquent is seen as having little capacity for repressing instinctual impulses and may use illegitimate means of satisfying these drives. Anti-social

character formation is seen as resulting from disturbed ego development which occurs during the first three years of life. On the other hand, an overdeveloped superego which allows no provision for the satisfaction of the demands of the id, may force the ego to compromise by allowing sporadic lapses in which illegitimate means may be used to satisfy these demands.

Miller and Treacher (1981), using a personal construct theory approach to examine delinquency, have found that the delinquents in their study had "poor social anchorage" which indicated that they had difficulty in understanding and identifying with real adults because they possessed poorly differentiated interpersonal construct systems. The delinquent group perceived the adults around them to be less adequate role models but saw themselves as very much like them. This resulted in the delinquents showing a preference for identifying with television heroes who use direct action and masculine behaviour as their main methods of problem solving.

A number of investigators have pointed to a high incidence of broken homes and multiple parental figures in the backgrounds of delinquent youths. With regard to the lack of a significant mother figure, the pioneer work of Bowlby (cited in West - 1967) has relevance. He showed that the lack of a mother figure for six months or longer during the first five years of life may lead to what he called the "affectionless character" which corresponds to what most people call the psychopathic or sociopathic personality. Anderson (cited in Coleman 1972) has indicated that the lack of a father figure is of crucial importance in the socialisation failure of some delinquent youths. These youths

were particularly vulnerable to paternal loss from ages four to seven years.

When reviewing theories which concentrate on individual personality characteristics which are pertinent to delinquency, it is clear that some theories contribute more than others to the understanding of particular types of crimes and criminal personalities. It is here that the narrowness of scope associated with individually oriented theories presents a problem.

Miller and Treacher (1981) have stated that most psychological investigations have failed to specify features which differentiate delinquent individuals from their non-delinquent peers who come from apparently similar backgrounds. It appears, therefore, that individually oriented theories offer guidelines for the understanding of delinquency but remain limited in their potential to provide a broad enough model to account for the many sub-types of the delinquent personality which exist.

A sociological perspective asserts that the sources of delinquency originate in the social process. A society may exert pressure on some individuals to be delinquent or drive others away from the mainstream of society and thereby force them to seek associations with subcultural groups.

The concept of "anomie" originally developed by Durkheim in the explanation of suicide has been adopted by Merton (1968) to explain deviancy. Anomie in this regard is taken to mean a social state lacking organisation and structure ie a state of relative normlessness.

As an explanation of how the state of "anomie" could occur, Merton (op cit) has proposed that a society may hold up desirable goals but may not define, regulate and control the acceptable means of attaining these goals. This may result in some members of a society trying expedient but illegitimate routes to the goal. Merton's (op cit) approach to deviance does not focus on individual characteristics but on positions occupied by individuals in the social system. He has suggested that a pressure exists within sub groups of society towards the attainment of exalted goals by whatever means is available. The separation between desired goals and the legitimate opportunities to reach those goals forces people to use illegitimate opportunities. A disjunction of goals and institutional means may lead to a weakened commitment to culturally prescribed goals or institutionalised means, ie a state of "anomie". Merton (op cit) has specified four ways in which a youth can adapt to this disjunction.

(a) Conformity, linked with innovation. The person adheres to the desired goals or ends but rejects the prescribed normative means. This group consists of professional thieves and white collar criminals.

(b) Ritualism. Here, there is an over conformity to institutionalised norms without regard for the goals for which these norms were designed, ie a slavish following of rules without understanding their relevance.

(c) Retreatism. An abandonment of both the goal and the normative means. This group consists of society's vagrants, chronic alcoholics and drug addicts.

(d) Rebellion. Here there is a rejection of a culture or social system which is seen as unjust. There is an attempt to restructure the society with new goals and means of attaining them, ie members of revolutionary movements.

The "Theory of Differential Association" developed by Sutherland and Cressy (1974) has suggested that criminal behaviour is learned in interaction with intimate personal groups. A person becomes delinquent because of an excess of definitions favourable to violation of law over definitions unfavourable to violation of law. A person who becomes criminal does so because of contacts with criminal patterns and because of his isolation from anti-criminal patterns. The behaviour, attitudes and beliefs of a person are seen not only as products of his intimate group contacts but also to contain properties of these groups. A person in intimate contact with groups which advocate and adhere to criminal behaviour is most likely to develop similar beliefs, attitudes and behaviour.

Another sociological theory of note is that of Cohen (1956) which asserted that delinquency arises from affiliations with sub cultures. Working class children find themselves at a disadvantage in a world dominated by middle class standards. Judged by values which are foreign to them, working class children feel defeated and degraded in status and may find something to compensate for the loss of status.

Cohen (op cit) suggests that they may find this status in boys gangs which flourish in "delinquent neighbourhoods". The delinquent subculture is seen to take its norms from the larger culture but to turn these upside down. Middle class norms such as ambition and individual responsibility are opposed and their activities reflect almost the exact opposite of these norms.

Cloward and Ohlin (1961) have a similar theory to that of Cohen and have suggested that urban slum boys gravitate to a delinquent sub culture when they discover they do not have access to legitimate avenues of success. Cloward and Ohlin (op cit) have identified three fairly distinct types of delinquent sub-culture among male adolescents in the lower class areas of large urban centres. These subgroups are similar to those suggested by Merton (1968).

(a) A criminal sub-culture which directs its activities towards material gain through theft, housebreaking and other illegal activities.

(b) A conflict sub-culture which uses physical aggression and violence as the chief means of achieving status in the group.

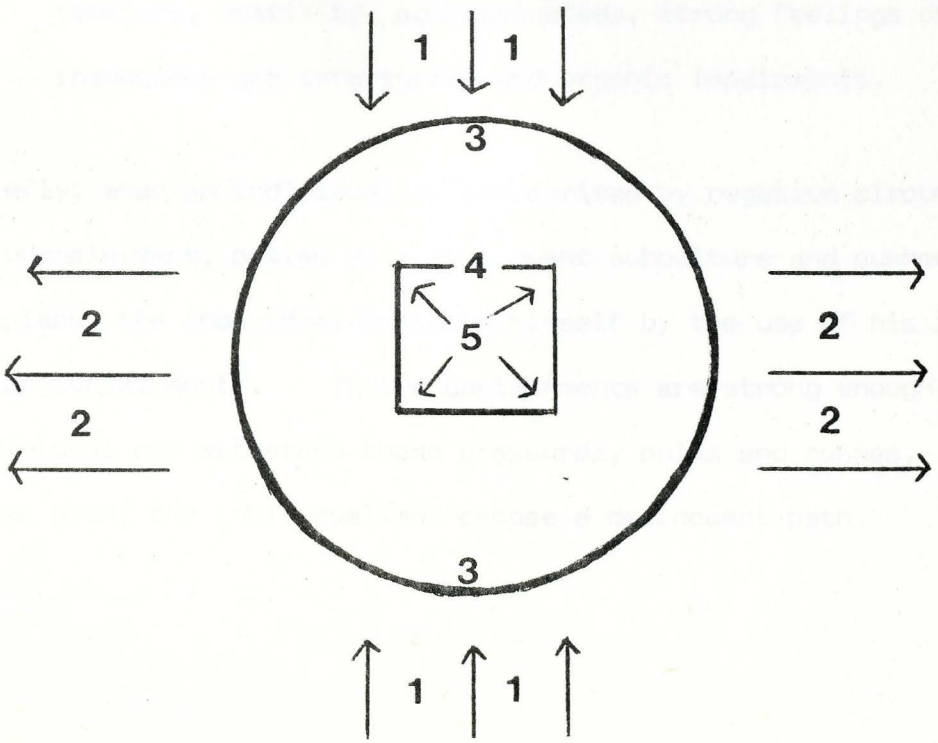
(c) A retreatist sub-culture in which drugs, promiscuous sex and other experiences are used as a means of escaping life's pattern.

Sociological theories, in the main, concentrate on social processes as sources of delinquency and help to explain delinquency acts as though they are integral elements of social life rather than manifestations of individual psychopathology. Sociology has allowed the

analysis of delinquency to expand well beyond the narrower individual centred theories that once prevailed. One major impediment of sociological theories does not lie in the nature of the theories themselves, but in the failure of attempts to translate their ideas into practical solutions for the treatment of delinquency which, at present, still retains a strongly individualistic orientation.

Tangri and Schwartz (1976) have pointed out the necessity for a multi-level analysis of the variables contributing to delinquency. Such an analysis should include a psychological as well as a sociological perspective. The"Theory of Containment" proposed by Reckless (cited by Sandhu (1977) and Haskell and Yablonsky (1978) is an attempt to do this. Sandhu calls this theory a most useful one which explains the largest amount of criminal and delinquent behaviour. It not only combines both psychological and sociological theories but also fills in the gap between the two.

It will be useful to provide a brief summary of Reckless's Theory of Containment as it represents the first major attempt to provide a comprehensive view of delinquency.



1. These are the "pressures" in society which may include adverse living conditions, economic conditions, lack of opportunities.

2. These are the "pull" factors which draw the individual away from accepted norms. These include deviant groups, gangs and delinquent sub-cultures.

3. Immediately surrounding the individual is his external containment consisting of effective family groups and other supportive groups.

4. The next layer is the inner containment of the individual represented by his internalized concepts of accepted norms, ie his conscience.
When external containment is weak, internal containment must be additionally strong to withdraw the pushes from within and the pulls and pressures from without.

5. The bottom layer consists of the pushes which include inner tensions, hostility, aggressiveness, strong feelings of inadequacy and inferiority and organic impairments.

Briefly, when an individual is pressurised by negative circumstances, eg unemployment, pulled by a delinquent subculture and pushed by inner impulses, the individual protects himself by the use of his inner and outer containments. If the containments are strong enough, the individual can withstand these pressures, pulls and pushes. If they break down, the individual may choose a delinquent path.

1.2 TREATMENT OF DELINQUENCY AND INSTITUTIONALISATION

The treatment and prevention of juvenile delinquency is a complex and difficult process. For Giallombardo (1976) the difficulty stems from the fact that there is no consensus about what to prevent and treat or how to accomplish these objectives. Equally, the difficulties and confusion in determining the causes of delinquency originate in the often ambiguous use of the concept itself based on the contrasting views of different agencies, bodies and individuals who deal with delinquents.

Tappan (1976) feels that in the modern juvenile court in America there is a compromising of the legal and casework approaches, ie there is an effort towards the sociolegal handling of the child. This appears also to be the case in South Africa where the child is handled according to the Children's Act of 1960. Side by side with the legal approach, which has the responsibility of defining the crime committed, the preservation of procedural regularity and protection of the youthful offender, is the emphasis on the need to find the underlying social and psychological maladjustments of the child, ie to see the total problem in context and to treat it by the best means available to the Courts.

In South Africa, a child found guilty of a delinquent act in a Juvenile Criminal Court may be handled in a number of ways. He may receive a suspended or postponed sentence, be given corporal punishment, be placed on probation under the supervision of a welfare officer or institutionalised in a reform school.

Traditionally, there has been much support for the institutionalisation of juvenile delinquents as a form of treatment. Haskell and Yablonsky (1978) have seen the basic objective of institutions to be the prevention of crime and delinquency and the ultimate resocialisation of offenders. When a juvenile has been found to be delinquent by a Court, he is turned over to a correctional system, society has decided that his behaviour will be closely supervised for a time period, that changes in his values, attitudes and behaviour are expected and that his time in the correctional system will result in less likelihood of his violating the law. Haskell and Yablonsky (1978) have assigned four basic functions to the correctional system:

(1) The protection of society

(2) The punitive

(3) The reformative

(4) The rehabilitative.

Some reliance will be placed on the text of Sandhu (1977) who has provided a comprehensive study of delinquency calling on the major theorists presently working in this field.

In discussing the history of institutional treatment for delinquents, Sandhu (1977) describes houses of refuge in the late 19th century where the primary task was to teach discipline and respect for authority. Soon after, the emphasis shifted from repressive correction to mere custodianship when the number of juvenile inmates exceeded the available facilities. Since then, the houses of refuge have been

replaced by industrial schools and training schools. Sandhu (op cit) felt that the labels have changed but there has been little change in the programme content of these institutions. Making exception of some of the more recently created therapeutic and experimental communities, Sandhu (op cit) stated that there is a growing disenchantment in the U S A with juvenile correctional institutions after 150 years of existence. He quoted the 1973 National Advisory Commission report "Corrections" which says that it is no surprise that institutions have not been successful in reducing crime, but that the mystery lies in the fact that they have not contributed even more to increasing crime. The Commission went on to say that institutions do succeed in punishing but they do not deter. They protect the community temporarily but that protection does not last. The community is relieved of responsibility by removing the young offender, but institutionalisation makes successful reintegration unlikely. The committed offender is changed but the change is more likely to be negative than positive.

Sandhu (op cit) stated that the average length of stay of inmates in juvenile correction facilities in the year 1971 in the U S A was 7,8 months. Time spent institutionalised varied from state to state within the range from 4,8 months to 17,5 months. In South Africa the average stay of a youth in the reform school is 24 months with a range of plus minus 17 months to 36 months.

In discussing the negative effects of institutionalisation, Sandhu (op cit) explained that the inmate's world shrinks to a small area where all the activities of daily life, working, playing and sleeping, are

confined to one place, are carried out according to a strict routine in the company of many others all required to do the same thing together. Goffman's (1961) concept of the "total institution" can be used to explain how inmates are subjected to constant supervision and surveillance resulting in the mortification of self. They are forced to wear institutional clothes and have to part with valuables. They are no longer children who belong to a family, but are inmates in an imprisoned world. They are dispossessed of their previous roles. The territory of the self is invaded by being forced to supply a case history, by having correspondence monitored, being subject to search and being forced to live with undesirable room mates.

Sandhu (1977) feels that none of the institutional activities prepares the inmate for his return to society but that rather he develops doubts about his own identity and ability to face the outside world. The disculturation and stigmatisation resulting from institutionalisation creates several grave problems for re-integration into society.

The child who has been institutionalised for delinquency carries that label for the rest of his life. Research has been done on the effects of labelling with particular reference to the persistence of these effects when a child is labelled as "delinquent" (Farrington et al 1978, Chassin et al 1981, Murrell and Lester 1981).

Haskell and Yablonsky (1978) quoted Becker, a leading exponent of labelling theory who said that social groups create deviance by setting norms or rules whose infraction is constituted as deviance. The deviant is seen as a person to whom the label has been successfully applied and deviant behaviour is behaviour that people so label.

Once given the stigmatising label, the individual may be subjected to isolation, segregation, degradation, incarceration and chemical or psychological treatment.

Labelling theory raises serious questions about the advisability of stigmatising people with labels like "criminal" and "delinquent" when the aim is principally to deter the behaviour. Tannenbaum (cited by Haskell and Yablonsky 1978) stated that the young deliquent becomes bad because he is not believed if he is good. He becomes the thing he is described as being and it does not seem to matter whether the evaluation is made by those who would punish or those who would reform.

The child who enters a reform school has been officially labelled as delinquent. The act of incarceration is usually the final step in a labelling process which began much earlier when the first signs of asocial behaviour were displayed.

The psycho-analytic theorist Erikson (1950) has seen the prime psycho-social task during adolescence as that of identity formation. The child in this stage of development is primarily concerned with what he appears to be in the eyes of others as compared with what he feels he is. Zober (1981) has seen adolescence as a period during which youths acquire a sense of themselves. A young offender institutionalised during the stage of adolescence has been labelled by society as deviant and is forced to live within the restricted parameters of this label. These individuals, during their period of incarceration, become so aware of these limitations that they become participants in the acceptance of society's delinquent label.

Of direct relevance to this concept is the research on self concept and deviancy begun by Reckless, Dinitz and Murray in 1956 (cited in Tangri and Schwartz 1976). They proposed that a socially appropriate concept of self and other is the basic component which moves youth away from or towards delinquency. Norris (1977) has cited a number of studies which argue that people with high self esteem are less likely to indulge in deviant behaviour and that a self concept of not deviant nor delinquent assists in insulating against deviant behaviour. In addition Norris (1977) has pointed out that the explicit goals of a detention centre would be achieved if an inmate left with:

(1) High self esteem
(2) Regarding himself as less law breaking than when he arrived and aspiring to remain so
(3) Seeing himself as more independent and aspiring to remain so.

Using a grid technique based on Personal Construct Theory, Norris (1977) has found that the "trainees" in the detention centre she studied, after a period of two months, had lowered aspirations and self esteem and increased self perceptions as rebellious. She saw this evidence as being in accordance with the considerable body of evidence that custodial sentences are detrimental to individuals and fail to achieve the intended goals.

Chassin et al (1981) in a study of the self concepts of institutionalised adolescents, arrived at similar findings. One of the questions addressed by their study was the way that subjects view themselves within the

institution compared with their global self concepts. They found, as a group, delinquents self concepts within the institutions were less positive than their general global selves. Within the correctional facility they saw their behaviour as improved in some ways (more obedient, more good) but saw their feelings or internal state as worsened (more abnormal, more sad, more nervous, more weak, more passive). They concluded that any positive behavioural changes might have been attributed to external control of the institution rather than to any improvement in self control or internal well being. They felt that this distinction predicts that behavioural benefits would be lost upon release from the institution.

In an analysis carried out by this author, on outcome data based on Social Welfare reports for boys who left the Reform School between 1977 and 1979, the following figures were obtained:

(1)	Favourable adjustment	23,2%
(2)	Poor adjustment without criminal involvement	11,6%
(3)	Recidivists - criminal involvement or imprisonment	27,9%
(4)	Cases with no reports or available information	37,3%

This approximately 30% non-recidivism rate is similar to that reported in other countires (Lipton 1975).

Coleman (1972) cites the California Community Treatment Project which questioned the effectiveness of institutionalisation. This was a five year experiment in which delinquents - other than those involved

in such crimes as murder, rape and arson, were granted probation and supervised and assisted within their own communities. This group showed a 72% rehabilitation success rate in a 15 month follow up period. In contrast, a comparable group of delinquents who were institutionalised and then released on probation, showed a rehabilitation success rate of only 48%.

The child who enters a reform school is dependent on his peer group and the staff to form impressions of himself as a social person. In a study of boy's accounts of their untoward behaviour given to a mixed committee of boys and staff at a List D school in Scotland, Walter (1978) pointed out the dilemma facing the boy because of his divergent identity when in the presence of staff or pupils. He usually has different accounts for different audiences but when compelled to relate an explanation in front of a committee comprising both staff and pupils, many boys chose the only alternative of saying nothing.

Sandhu (1977) in discussing treatment programmes for institutions, said that, ideally, a treatment programme should be a cordinated effort on the part of all members of staff. Staff members should act as a team, playing their roles with a unity of purpose. He felt that this was easier said than done as staff members usually differ widely in their views on correctional strategies and in their disciplinary orientations.

Haskell and Yablonsky (1978) have pointed out that a common problem in juvenile institutions is conflict and mutual hostility between treatment staff and those concerned with custody and discipline. They have called this problem one of "parental value conflict" and have suggested that it often emerges most sharply in an insitution changing over from a "juvenile prison" emphasising custody and discipline to a rehabilitation approach.

Weber (cited in Haskell and Yablonsky 1978) carried out a study that revealed conflict that occurs in a training school where two divergent systems of resocialisation exist. It was noted that the approach in the training school was shifting from the tight control of behaviour to a permissiveness which allowed acting out. This pattern was preferred by members of the treatment staff who felt that this allowed them to see the child as he really was. The following effects on staff were noted:

(1) Disciplinary power was gradually removed from the cottage parents with the result that instead of controlling the boy through fear and punishment, the cottage parent was forced to establish a relationship based on friendship.

(2) The cottage parents were given a subordinate and confusing role in the organisation. Their frustrations and anger were often displaced onto the boys.

(3) The boys were also noted to play one authority figure (the cottage parent) against another (the therapist).

Street et al (cited in Sandhu 1977) felt that the belief system (that delinquents are treatable or untreatable) and the institutional goals (custodial or treatment) are the two main elements which are responsible for outcome in the treatment of delinquents. He identified three dominant philosophies or beliefs which characterised different types of institutions.

(1) Authority and obedience where inmates must learn to obey authorities. It is felt that the experience of incarceration and deprivation will make them change their deviant behaviour.

(2) Learning and socialisation where delinquents, who have not yet learned accepted norms because of a lack of proper schooling, can learn these norms if they are involved in a learning process, ie academic and vocational programmes. Children who come from a disorganised family should be socialised in the secure and supportive environment of the institution.

(3) Therapy where, on account of deep seated deviance, rehabilitation should take place through extensive changes in character and personality. The methods employed are individual group and milieu therapies.

In all three of the above approaches, the staff play a major role as agents for rehabilitation of the institutionalised delinquent child. In order to manage or treat the child in their care, staff members make implicit assumptions about his personality. The considerable

body of research built up in the last decade in Attribution Theory (Antaki 1981) can be usefully employed to understand how staff members of an institution approach their respective roles. Attribution theory is based upon attempts to understand how individuals perceive and explain the actions of their fellow human beings. Harris and Harvey (in Antaki 1981) explained that the social perceptions of untrained observers have become known as "attributions" and are used to describe processes involved in impression formation, labelling interpersonal perception and personality assessment. An attributional approach has developed from an emphasis on the everyday ordinary explanation of interpersonal events made by persons experiencing those social events. Harris and Harvey (pg 62), using Heider's (1944) Theory of Phenomenal Causality, have pointed out that :

> "In understanding an event in the social environment, attributing changes to a person's characteristics, is simpler than looking for a physical cause which might interact with a multitude of other physical forces or itself be the product of complex forces".

This is based on Heider's hypothesis that locating the final (personal) cause for an event would be preferred to a more complex environmental explanation.

Harris and Harvey (1981) have cited a study by Jones, Davis and Gergen done in 1961 which provides evidence that behaviour which is inconsistent with desired norms will be more informative to a perceiver than will behaviour which is consistent. Harris and Harvey have interpreted

this to mean that behaviour that is socially acceptable does not allow many strong inferences to be drawn about the actor ie a behaviour's degree of social desirability in terms of social norms is inversely related to the number of inferences or attributions that it elicits.

An example to illustrate this would be the child who attempts to abscond from a reform school. This behaviour is inconsistent with the desired norms or rules of the school and is considered by the staff to be in need of immediate intervention. According to attribution theory, the child may attribute reasons for his attempt to abscond to environmental factors, ie he hates being "locked up" or something is happening at his home about which he is worried. On the other hand, staff members who view the same act are, in terms of the theory, more likely to make attributions about the personal characteristics of the absconder as explanations for his attempting to run away, ie he is impulsive, irresponsible, untrustworthy and needs closer supervision.

1.3 RULE VIOLATIONS AND REPRIMANDS

In an institution for delinquents, the major task facing staff members is to change the anti-social values, attitudes and behaviour of its inmates. Reprimands for unacceptable behaviour in the institution occur frequently in striving to achieve this aim.

In a study comparing reprimand effectiveness in a group of child care workers, Mancuso and Handin (1980) studied how different workers bring different observational schemes to their work. Each child care worker, through his unique life experiences builds up his own implicit personality theories which ultimately guide his actions towards the children with whom he interacts. Mancuso and Handin (op cit) felt that there would be gain from developing a clearer understanding of the implicit personality theories of child care workers, particularly those aspects of implicit theories which workers take to be the parameters that effect change in behaviour. More specifically in their attempts to bring about behaviour alteration, Mancuso and Handin (op cit) pointed out that workers would have to give particular thought to the matter of how direct reprimand of transgression brings about change.

Mancuso (1979) has developed the hypothesis that a rule violator will comply with a reprimand when the reprimand situation provides a choice by which the transgressor or rule violator can expect the greater possibility for extending and defining his construing system. He explained that in a reprimand situation, there are two or more actors and each has his own constructions. The very fact that one person construes the other as a rule-violator indicates that the judge (potential reprimander) has observed a person who behaves in ways

which invalidate the constructions which the potential reprimander would apply in that event. In other words the reprimander tries to emphasise his rule or his construction of the event to which the rule applies and his reprimand (which may take many forms) will be an attempt to get the rule violator to agree with the construction which he would have applied to the situation. Rules in this context are seen as prescriptions for construing events. Mancuso (op cit) has pointed out that in order to play the role of reprimander, the person must construe the construction processes of the transgressor.

In support of this theory, Mancuso and Handin (1980) have reported clinical observations in child care settings. It was assumed that a child care worker's perceptions of the total reprimand context would include the child's trangression as well as the perceived views of supervisors and peers and these factors would determine the behaviour of the child care worker when he assumes his role as reprimander. They proposed further that effective workers take the child's cognitions to be a part of the reprimand context and recognise that the reprimand style evolves from the total context.

Mancuso and Handin (op cit) found that restitutive reprimand in which the child is forced to make restitution for his rule breaking activity (eg paying for a broken window) was the most favoured reprimand with child care workers when compared with explanatory and retributive (punishment) reprimands. In addition, they found that where the explanatory reprimand was endorsed, it was endorsed most often by high peer-rated workers. The possibility was entertained that explanatory reprimand does more effectively change behaviour when used by high rated workers. They suggested that perhaps high peer-ratings

by fellow child care workers and success with explanatory reprimand are inter-related through a third "moderator" variable.

In advocating a personal construct approach to rule following and reprimand, Mancuso (1979) has suggested that the relationships between attributions about reprimands and the outcomes of the reprimand situation should be explored. He has indicated that there would be value in studying the relationships between a reprimander's casual attributions, the types of reprimand he uses and the outcomes of the reprimands in varied transgression situations.

PART TWO

RATIONALE

2.1 THEORETICAL BASIS

A review of the recent literature provides a strong theoretical rationale for this study. Regardless of specific theories of delinquency, there appears to be considerable agreement that outcome success rate for delinquents who are institutionalised as a form of treatment, remains particularly low. The 30% non-recidivism rate recorded at the Reform School in this study is in agreement with similar figures in other countries. In this regard, the 1973 National Advisory Commission of the U S A (cited in Sandhu 1977) has stated that, although the objective of institutionalised treatment for delinquency is aimed at prevention of crime and resocialisation of delinquents, it appears to be failing dismally in this attempt.

By institutionalising a child, society expects changes in his values, attitudes and behaviour towards socially more acceptable standards. What appears to be actually taking place is a labelling and stigmatising of the child during the critical adolescent stage of identity formation resulting in lowered feelings of self-esteem, diminished aspirations and increased self-perceptions of being rebellious (Norris 1977 and Chassin et al 1981).

The effects of what Goffman (1961) referred to as the "total institution" concept seem to be inherent to most custodial types of institutions. The disculturation effects and the "mortification of Self" which takes place seriously inhibits the child's potential for making a successful re-entry into society. The removal of the child from his social environment and his incarceration in an institution for delinquents, usually results in the child identifying himself with a delinquent

sub group and in society identifying this child with the label of delinquent. A considerable amount of research has shown that the label of delinquent applied to a person remains particularly persistent over time - Farrington et al (1978), Chassin et al (1981), Murrell and Lester (1981), Slabbert (1980).

Although the process of labelling a child as delinquent may have begun a long time before he is placed in a Reform School, it is important to examine and analyse in what way the child is perceived within the institution and in what way the labelling effects may be perpetuated. The inmates, while they are in the institution, are largely dependant on the staff and their peers to form impressions of themselves as social persons. The study by Walter (1978) highlights the dilemma facing the boy who has a divergent identity when in the presence of either staff or pupils. Although it would be informative to elicit the perceptions of the nature of the "delinquent" child from both staff and pupils and compare these, the intended size of this study limits the present assessment to that of staff perceptions of the delinquent child.

In a series of studies on reprimand effectiveness by Mancuso and his co-workers (1979, 1980) they found that child care workers, employed in agencies for children in need of care who had experienced very unstable living conditions, used the most severe forms of reprimand for behaviour which was considered to be socially undesirable. These workers appeared to be unconcerned about the reprimands immediate effectiveness in altering unwanted behaviour. This implies that the child-care workers were more concerned about changing socially undesirable behaviour than changing other types of unwanted behaviour

manifested at the time. The primary aim, therefore, of these child care workers appears to be an attempt to change socially unacceptable behaviour by reprimanding such behaviour severely.

It would be important to examine whether the same primary aim is prevalent in an institution such as a Reform School where the chief function may be more custodial than rehabilitative and aimed more at maintaining day to day order in the institution, than changing basic values attitudes and behaviour of the boys.
Mancuso (1979) has indicated that in order to successfully play the role of reprimander, a person must construe the transgressor's construction system. In other words, the reprimander must make implicit personality assumptions about the other person before he can successfully apply an effective reprimand which he hopes will change the rule violator's behaviour.

Attribution Theory (Antaki 1981) provides a model to assess staff members attributions or constructions about the personality characteristics of the inmates of a reform school. Attribution theory suggests that an observer of an event will make personality attributions about the person causing the event, particularly when he is involved in behaviour which is inconsistent with desired norms, ie when he becomes a rule-violator.

A repertory grid technique based on Personal Construct Theory (P C T) developed by Kelly (1955) will be used to assess staff members constructions of the nature of the delinquent child. The implications which these constructions have for the social identity of the child while in the institution will also be examined. A major advantage

of the repertory grid technique is that it allows the generation of constructions which will be a valid reflection of those applied to the boys by staff members in a Reform School. In addition a repertory grid allows a rank ordering of rule-violating elements in terms of these constructs in order to provide a statistical relationship between them. Miller and Treacher (1981) in support of a P C T approach to delinquency have stated that it potentially allows a researcher to examine the complexity of another person's construct system, without forcing them into preconceived categories. Construct theory enables the researcher to take account of complexity and at the same time provides guidelines which prevent an overwhelming tide of inexplicable diversity.

The second phase of this study will use the same rule-violation elements applied in the first repertory grid to rank reprimands according to their level of effectiveness. The implications which these reprimands have for the management of the child and their relevance to the custodial or rehabilitative aims of the institution will also be examined.

2.2 THE RESEARCH SETTING

The research setting chosen for this study is the only white male reform school in South Africa. Pupils are admitted from all areas of the country either directly through the Juvenile Criminal Courts or through transfer from a school of Industry.

All the children in the school are basically viewed as "children in need of care" in terms of the Children's Act of 1960.

Approximately half the population of pupils at the school is transferred from Schools of Industry by order of the Minister of National Education. Reasons for these transferrals may be persistent absconding, uncontrollable behaviour and abuse of dagga while at the School of Industry. The remainder of the pupils at the reform school are committed directly from magisterial juvenile criminal courts for offences such as housebreaking, theft, motor car theft, possession of drugs and assault offences.

The existence of a reform school as defined by the Children's Act of 1960 allows the youthful offender to be admitted to a reformatory rather than a prison. The pupil enters an educationally oriented environment where he is viewed as a "pedagogically deprived child" in need of education and also re-education.

The child admitted to a reform school stays, on average, for a 24 month period, after which he is "released on licence" in the care of parents or parental substitutes under the supervision of a welfare officer.

Ullman (unpublished thesis), in describing this Reform School, has seen its main aims as education and correction. The child, placed in this Reform School, receives both an academic and a practical education. The school has classes in both English and Afrikaans from Std 6 to Std 10, and offers courses on a practical and standard grade level. There is also a special class for children of low intelligence. It is possible for a boy to write the National Senior Certificate examination

at the end of Std 10. All boys in the school must take at least one practical subject from the following:

Woodwork, Metalwork, Painting, Motor Mechanics and Bricklaying.

Extramural activities include a variety of summer and winter sports as well as cadet training, hobby-art and singing.

On entering the Reform School each boy receives a black badge and is placed in a "secure" hostel according to his age or physical size. The privilege of going home on holiday in June or December of each year and of moving to a less "secure" hostel depends on his behaviour within the institution. A hierarchical badge system based on good behaviour in clearly defined categories such as:

Adaptation, Attitude, Perseverence, Relationships, Schoolwork etc. is in operation with regular evaluations carried out on each boy by all staff members who have interactions with him.

Each boy, on arrival, is assigned to a psychologist who takes a background history from him, administers IQ, personality and scholastic tests, and places him in an appropriate standard. Each boy is seen at regular intervals for individual counselling and each boy may request to see his psychologist if he so wishes. Besides academic and practical education, the boys are offered vocational guidance and guided group interactions under the supervision of the psychologist. A system has recently been introduced by which all staff members are encouraged to become more involved with the hostel life and extra-mural activities of the boys by visiting the school over the weekend at least once a month.

The child who is committed to a reform school often comes from a social environment characterised by disharmony, familial discord and strife, experimentation with drugs and involvement with sub-cultural group or gang activities. The social forces which structure his new custodial environment are largely the result of the ideas, values and opinions of the people who staff the school and are based on their constructions of the nature of the delinquent child and what he needs. The personality attributions made by staff members about the reform school boy affect their decisions when responding to him, managing his rule-violations and planning the mode of his treatment.

Duck (1981) has stated that one of the most important omissions of the last thirty years of work in personal construct psychology has been the failure to develop its implications in the social setting. In addition, he pointed out that people are influenced by their knowledge of social forces and norms, by their own self esteem and various processes of a ritual formal nature which affect their actions.

These statements have relevance for the reform school used in this study which appears to be undergoing a change in treatment policy similar to that described by Weber (cited in Haskell and Yablonsky 1978) in which he described a movement from a custodial oriented policy to one where a treatment model predominates. As noted by Weber, the shift in the emphasis of treatment has implications for staff roles, values, own feelings of self esteem and their actions towards the inmates in their care.

The reform school in this study has a diverse staff group characterized by differing levels of education training and experience which manifest as different personal theories amongst the staff about delinquency and its treatment. As a psychologist employed on the staff of this Reform School, it has been my observation that this diversity results in widely differing views and recommendations during staff group discussions and often presents difficulties in arriving at a shared solution for a particular problem. Further, this diversity in staff produces differing reactions towards changes taking place in the mode of treatment at the institution.

In the light of the changes presently taking place in the reform school and with a view towards planning in-service training for staff members, a study of staff group perspectives of the nature of the delinquent child and differences amongst staff sub groups certainly seems to be indicated.

2.3 AIMS OF THIS RESEARCH

This study aims to use a construct theory approach to examine staff constructions of the nature of the institutionalised delinquent child in a reform school. These constructions will be assessed as personality characteristic attributions based upon the rule-violating behaviour within the institution. In addition, implications of such staff perceptions or attributions for the management of the delinquent child will be considered.

2.4 RESEARCH QUESTIONS

In order to facilitate the above aims, the following two questions will be addressed by this study:

(1) How do personality attributions of staff members towards reform school boys affect their decisions with regard to the reprimands they use to manage the rule violator and do staff groups differ in this respect? (Phase 1)

(2) How are boys in a reform school construed in relation to the rules they violate in the school and do subgroups of staff differ in their constructions? (Phase 2)

PART THREE

METHODS OF RESEARCH

3.1 SUBJECTS

The staff of the Reform School used in this study can be clearly differentiated into subgroups based upon differences in role function, education level and post school training. The following groupings are relevant:

3.1.1. SUPERVISORY STAFF

There are 28 in this group and it is made up of male supervisors and female hostel matrons who are most often the wives of the male supervisors. The male supervisor performs a chiefly custodial role which may include escorting boys to different activities, intra and extramurally, supervising hostel duty, general administrative tasks and responsibility for reading incoming and outgoing mail of the boys. The female matron is responsible for providing clothes and bedding and preparation of food for the boys in her hostel. Qualifications for these positions do not require any post school formal training.

3.1.2. TECHNICAL SUBJECT TEACHERS

There are 11 in this group, all males, who teach practical trade subjects. Most of them are qualified artisans in their trades and in addition have taken a teaching diploma in the technical direction.

3.1.3. ACADEMIC SUBJECT TEACHERS

These are 16 in number, five of whom are female. They teach the usual high school subjects on a higher practical or standard grade level.

They have formal qualifications, ie a university degree and a qualification in education or at least a three year teacher's diploma from a training college.

All teaching staff members are required to assist with extra mural activities which include art, sports and cadet training. They are also encouraged to visit the hostels during the evenings and over weekends. Some of the teaching staff serve as hostel fathers who take responsibility for the administration and supervision of the four hostels at the school.

All staff members who had been at the school for less than one year were excluded from the group who completed the grids as it was felt that it takes a certain period to become accustomed to the routine and demands of the school environment and to form personal opinions about the nature of the pupils within the institution.

The administrative staff were excluded from the study as they have little direct contact with the pupils. The four psychologists were also excluded as two of them had been at the Reform School for less than a year and were asked to assist in the administration of the grids to the rest of the staff.

One hostel matron, one technical subject teacher and one academic subject teacher did not participate in the study. The first two did not attend either of the two grid administration sessions and the academic teacher refused to hand in his assessment as he did not like being part of an "experiment" and could see no sense in the study.

He declined an opportunity to discuss the study in depth with the researcher.

After the exclusion of staff who had been at the school less than one year and those who refused to participate, the following group emerged:

SUPERVISORY STAFF: 11 - 8 males, 3 females

TECHNICAL SUBJECT TEACHERS: 8 males -

ACADEMIC SUBJECT TEACHERS: 10 - 6 males, 4 females -

3.2 PHASE 1
RANKING OF REPRIMANDS IN RELATION TO RULE-VIOLATION ACTS

In phase 1, each staff member of the selected cohort was required to rank 8 reprimands in terms of their effectiveness in responding to 10 rule violations.

3.2.1. APPARATUS

3.2.1.1. Choosing representive rule-violation acts:

Kelly (1955) pg 230

> "If a test is to indicate how the subject develops his role in the light of his understanding of other people, it is necessary that the other people appearing as elements in the test be sufficiently representative of all the people with whom the subject must relate in his self-construed role".

In order to comply with these requirements for representativeness and in accordance with Attribution theory, which suggests that acts which are inconsistent with desired norms will attract personality attributions about the person committing the act, the following question was asked of all staff members in the school:

"List at least ten problems you come into contact with in your daily interactions with the Children's Act School Child".

From the list of problems supplied, those most frequently mentioned were selected as rule-violation acts. As a further measure of representativeness, the punishment book, which is the official record of punishment given to pupils who violate rules in the institution, was consulted for the most frequently punished offences over a six month period, ie November 1981 to April 1982.

The two most frequently punished offences in the punishment book were:

a. Absconding

b. Dagga smoking within the institution.

From the list supplied by the staff the following problems were the most frequently mentioned :

The boy who:

a. Refuses to do his schoolwork.

b. Has slovenly habits, ie dress and table manners.

c. Has no perseverence.

d. Is cheeky, discourteous and swears.

e. Is rebellious and negative.

f. Seeks attention continually.

g. Attempts to abscond.

The following two rule-violations were added by the researcher as they occur less often than the abovementioned acts, but tend to evoke strong emotional reactions from the staff when they do occur. In addition it was hypothesized that the elicited reprimands to these acts would highlight differences between subgroups.

a. The boy who cuts his wrists with a blade

b. The boy who has unacceptable sexual habits such as committing sodomy or exposing himself to a female teacher.

The 10 rule-violation acts taken from the three abovementioned sources then became:

The boy who:

A. Absconds.

B. Smokes dagga in the school.

C. Refuses to do his schoolwork.

D. Is rebellious and negative.

E. Has no perserverence.

F. Has slovenly personal habits.

G. Swears and backchats.

H. Seeks attention.

I. Cuts his wrists with a blade.

J. Has unacceptable sexual habits.

3.2.1.2 Choosing appropriate reprimands

Firstly a list of direct reprimands was obtained from those suggested as guidelines for handling the pedagogically deprived child in the "Departement van Nationale Opvoeding - 'n Professionele Handleiding vir al die Opvoeders van Pedagogies Verwaardloosde Kinders aan Kinderwetsole" pg 111-124. In addition "being sent to a psychologist" was included as this is often seen as a reprimand by both staff and pupils in the Reform School. Also included was the possibility of transfer to prison which happens occasionally with a boy who is obviously not benefitting from the school environment and whose behaviour and actions are seriously influencing those of his peer group.

The list of direct reprimands then became:

1. Verbal warning.
2. Withdrawing privileges such as weekend leave, outings etc.
3. Extra work on the grounds in order to make up for the rule violations.
4. Personal suffering or discomfort has already occurred and is seen as punishment enough, eg the boy who absconds and returns hungry and wet.
5. Isolation and locking up in a cell.
6. Corporal punishment.
7. Transfer to prison.
8. Being sent to a psychologist.

3.2.2 PROCEDURE FOR PHASE 1

The cohort of staff members was divided into two groups, ie supervisory staff and teaching staff, as it was apparent that more explanation of instructions and a longer time period would be necessary with the supervisory staff group, some of whom had difficulty reading and understanding the concepts and following the instructions.

At the outset, staff members were assured that their evaluations would remain anonymous and all that was required was that they indicate if they were supervisors, academic or technical subject teachers. The instructions were printed on a separate sheet in English and Afrikaans and each staff member received a copy. The reprimands and rule-violation acts were presented in English and Afrikaans:

1. The first rule violation act was randomly selected from the 10 possibles and shown on an overhead projector.

2. Staff members were requested to copy down the rule-violation act at the top of the first page of the supplied booklet.

3. The eight possible reprimands were shown in a randomly selected order on the overhead projector.

4. The staff members were asked to rank the eight reprimands according to their appropriateness on the first rule-violation act as presented. They were asked to choose the most appropriate reprimand and write this down directly beneath the rule-violation act. From the remaining seven they were again asked to choose the most appropriate reprimand for the rule-violation and to write this under the first. This process continued until all eight reprimands had been written down in order of appropriateness.

5. The staff members were then asked to supply a brief description of the type of child who commits this rule-violation act.

6. A second rule-violation was selected from the remaining nine and the staff member was again requested to rank the same eight reprimands (shown on the screen in a different randomly selected order), according to appropriateness for handling the second rule-violation, and then to supply a description of the type of boy who commits this offence.

7. The same process was repeated until all ten rule-violations had been presented.

The completed assessments were collected and transcribed onto a table with reprimands as columns and rule-violations as rows.

3.3 PHASE 2

CONSTRUING THE NATURE OF THE RULE-VIOLATOR USING A REPERTORY GRID TECHNIQUE.

3.3.1. APPARATUS

3.3.1.1. Repertory Grid Technique

Fransella and Bannister (1977), in advocating the repertory grid technique as a research tool, have indicated that it is not a set of rigid prescriptive rules, but is a highly flexible device to enable one to elicit constructs, and quantify them in some way. They have

explained that, without the use of Construct Theory, the technique tends to become rigid but when starting off with the premise that all living creatures derive meaning from their world by seeing similarities and differences between events and construing their replications, then we have a truly flexible instrument at our disposal.

The Repertory grid technique appears to be well suited to the aims of this study which are to elicit constructions on the nature of the child which are as representative as possible of the present opinions of the staff of the Reform School. The Repertory grid technique enables the researcher to elicit constructs which are a valid reflection of staff perspectives and are not unnecessarily constrained by extraneous theoretical variables usually present in survey and questionnaire type investigations.

A repertory grid requiring ranking of the elements was chosen since Slater (1977) has indicated that ranking is as reliable as more elaborate methods of comparison, informants are glad to survey all the elements before beginning to rank them, find the task simple, do it quickly and feel satisfied with the results. Ranking of the elements was preferred to rating since rating would require a separate evaluation of each element, would greatly increase the complexity of the task required and the time taken to perform it, particularly when carried out in a group setting.

Shaw (1981), in comparing the ranking and rating methods in repertory grid techniques, has warned that, although ranking methods provide very much greater discrimination, this may force subjects to indicate differences between elements where he really sees no difference. She has also indicated that there is a tendency for the rankings to be made in

relation to the explicit pole of the construct without taking much account of the contrasting implicit pole.

3.3.1.2 Eliciting the Constructs

Shaw (1981) has described four distinct methods of generating constructs in a grid. These are:

a. Supplying them

b. Eliciting them by triadic sort

c. Non-verbal construct concepts

d. Laddering.

In discussing supplied constructs, she has indicated that this is the quickest way to generate constructs and that this approach can be useful provided that the constructs supplied are known to be representative of the ones that the subjects would have spontaneously produced and that there is already an adequate understanding of what they mean. Fransella and Bannister (1977) have stated that in clinical and educational fields,from a practical point of view, providing constructs can be vital. They have also indicated that it is impossible to "supply" a construct. A construct is not a verbal label but is the actual discrimination which the subject makes between the elements. The verbal label serves merely as a reference point. Thus, all that can be supplied is the verbal label to which people attach their own constructs.

In this study, constructs were supplied as it was essential that all staff members use the same constructs to assess the nature of the delinquent child and thereby make sub-group comparisons possible. In order to

comply with requirements that the constructs be representative of the ones that the staff would have spontaneously produced, the descriptions of the type of child who commits a particular rule violation act which were supplied in Phase 1, were analysed. Descriptions which were similar were combined and those most frequently used were selected to represent the explicit pole of the construct. The eight most frequently used constructs were:

1. Lazy/unmotivated.
2. Aggressive/short tempered.
3. Neglected/needy
4. Attention seeking.
5. Rebellious/undisciplined
6. Anxious/insecure
7. Immature/irresponsible
8. Unhappy/depressed.

The elements to be ranked according to each construct in the repertory grid were the same 10 rule violation acts used in Phase 1.

3.3.2 PROCEDURE FOR PHASE 2

In Phase 2 staff members were required to rank the 10 rule-violation acts according to the explicit pole of each construct and to do this for all 8 constructs.

Permission to administer the grids in group sessions as in Phase 1 was refused by the Principal owing to the shortage of time available before the end of the school term. In order to overcome this problem, a list of the 10 rule-violation acts was printed and pasted onto the front page of a booklet. A separate sheet containing the 8 constructs (presented in a randomly selected order) was also supplied to each staff member.

Each staff member was approached individually and in his home language, asked to write each of the 8 constructs at the top of a separate page and then to rank the same 10 elements under the construct according to their applicability to that construct.

3.4 MISSING DATA

In Phase 1, where the grid assessments were done in a group setting, it was discovered that some people had left out one of the constructs to be assessed and others had left out one of the elements to be ranked. Since the assessments were submitted anonymously, it was impossible to trace the persons concerned.

In discussing the assessments of individual grids using the principle components analysis, Slater (1977) has warned that where one entry in a grid is missing, either the construct or the element is lost. The clinician is free to choose which may most easily be spared.

This is not entirely applicable to this study which only analysed combined grids. Where an element had been left out in the order of ranking, it was given the ranking of 8, ie the least applicable to that

particular construct. In accordance with Slater (op cit), however, where a whole construct had not been assessed, this was left out in the calculation of the total rankings for that sub-group.

In Phase 2, this problem did not arise as the assessment booklets were given out and received back individually. Each booklet was checked as it was handed in. In this way, it was discovered that two persons had not ranked the elements according to each construct but had chosen one element in each case as most appropriate to each construct. These two persons were requested to complete the assessment in the prescribed way.

3.5 ANALYSIS

The rankings obtained from Phase 1 and Phase 2 were transcribed onto grid tables by writing down the rank place assigned to each element under each construct. A separate grid was drawn up for each staff member's rankings. For both Phase 1 and Phase 2, the total summation of rankings for each element construct intersection was obtained by the addition of all individual staff members' rankings for that element/construct intersection. In this way, two grids were drawn up which contained the totals of the summed rankings and represented the assessments of the whole staff for Phase 1 and for Phase 2.

In addition, the data for Phase 1 and for Phase 2 were separated into the three different sub-groups and the total summation of rankings for each element/construct intersection was obtained. These totals then represented the views of each of the sub-groups of staff, ie supervisors, technical subject teachers and academic subject teachers.

In other words, all the individual staff members' grid assessments were summarised into four grids for Phase 1 and four grids for Phase 2.

a. A grid for the staff group as a whole.

b. A grid for the supervisory staff.

c. A grid for the technical subject teachers.

d. A grid for the academic subject teachers.

In order to comply with the data requirements of the Ingrid 72 computor programme, the 8 combined grids were ranked. In Phase 1 the elements in each construct were ranked from 8 to 1, according to their totals, with the highest value being ranked 8. In Phase 2, where there were 10 elements, the highest total was assigned to the rank of 10 and so on. Where ties occurred in the totals, the prescribed rankings were added and each total assigned half of the summed rankings.

3.5.1 STATISTICAL ANALYSIS

The eight combined grids were then analysed by a Univac computer using the Ingrid 72 computer programme based on principle components analysis developed by Slater (1972). The full rationale and mathematical basis of this programme has been set out in Slater (1977).

The Ingrid 72 programme provides a large output of data which includes correlations between constructs, distances between elements and measures of variation. In addition it searches out the greatest variation in the grid and imposes mathematical axes on these.

The Ingrid 72 programme enables a visual mapping of the elements and constructs to be made and also demonstrates the linkages between the constructs and elements.

Rathod (1981) has described the Principal Components Analysis as a method which transforms an original set of variables to a set of hypothetical variables or components which have the property of being uncorrelated. The hypothetical components are selected in such a manner that the first component accounts for maximum variance, the second component for maximum variance subject to being uncorrelated to the first and so on.

It is usual for the first three components which emerge from the analysis to account for 80% or 90% of the total variation of the grid (Slater 1977). When this is so, much of the information concerning the relationships of the constructs and the elements with one another can be shown by mapping the dispersion on the axes of the major components.

A number of methods have been suggested for graphically representing the principal components generated by Ingrid 72 (Slater 1977, Rathod 1981, Kelly and Taylor 1981). The graphical representation employed in this study was the method suggested by Kelly and Taylor (op cit) in their study:

Kelly and Taylor (op cit) have described their graphical figure as the best fitting two dimensional approximation to the distribution of all the elements in terms of the constructs.

The first and second components generated by Ingrid 72 formed horizontal and vertical axes respectively. The elements were located on these axes by their loadings. Their dispersion was enclosed in a circle with a large enough radius. The constructs were represented by their loadings as lines on the circumference of the circle. Opposite poles of a construct were shown diametrically opposite one another on the circumference connected by an imaginary line across the circle. Perpendiculars from the points for the elements onto this line show the best approximation of their positions on a scale for the construct. The location of the constructs on the circumference is obtained by projecting a line from the centre through the co-ordinate points provided by their respective loadings on each of component 1 and component 2.

In addition to the graphical representation, the table containing the relations between constructs and elements expressed as cosines was consulted. Slater (1977) has indicated that cosines are the mathematical equivalent of correlations and can be used in this manner. The table of cosines was employed to express the degree of association between the constructs and elements in both Phase 1 and Phase 2.

PART FOUR

RESULTS

4.1 PHASE 1

RANKING OF REPRIMANDS IN RELATION TO RULE-VIOLATION ACTS

TABLE 1 The rule violation acts and reprimands concerned with Phase 1

CONSTRUCTS	ELEMENTS
The boy who:	
A Absconds	1 Warning
B Smokes dagga	2 Withhold privileges
C Refuses to do his homework	3 Extra work
D Rebellious and negative	4 Personal suffering
E No perseverence	5 Lock up in cells
F Slovenly personal habits	6 Corporal punishment
G Swears and backchats	7 Transfer to prison
H Seeks attention	8 Send to Psychologist
I Cuts his wrists	
J Unacceptable sexual habits	

4.1.1 Ranking by the whole staff group of the reprimands according to the rule-violators

TABLE 2 The ranking of the elements in terms of the constructs by staff group as a whole.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	5.5	2	5.5	7	3	1	8	4
B	1	5	6	7	4	2	8	3
C	1	4.5	3	6	7	2	8	4.5
D	1	2	5	6	7	3	8	4
E	1	3	4	5	7	6	8	2
F	1	2	3	6	7	5	8	4
G	1	3	4	6	7	2	8	5
H	1	4	3	5	7	6	8	2
I	2	3	6.5	4	5	6.5	8	1
J	1	3	5	6	8	4	7	2

TABLE 3 Latent roots of the principal components of the variation recorded in Table 2.

COMPONENT	ROOT	AS PERCENTAGE
1	299.80	71.38
2	59.86	14.25
3	32.46	7.73
4	14.25	3.39
5	6.93	1.65
6	3.39	.81
7	1.80	.43

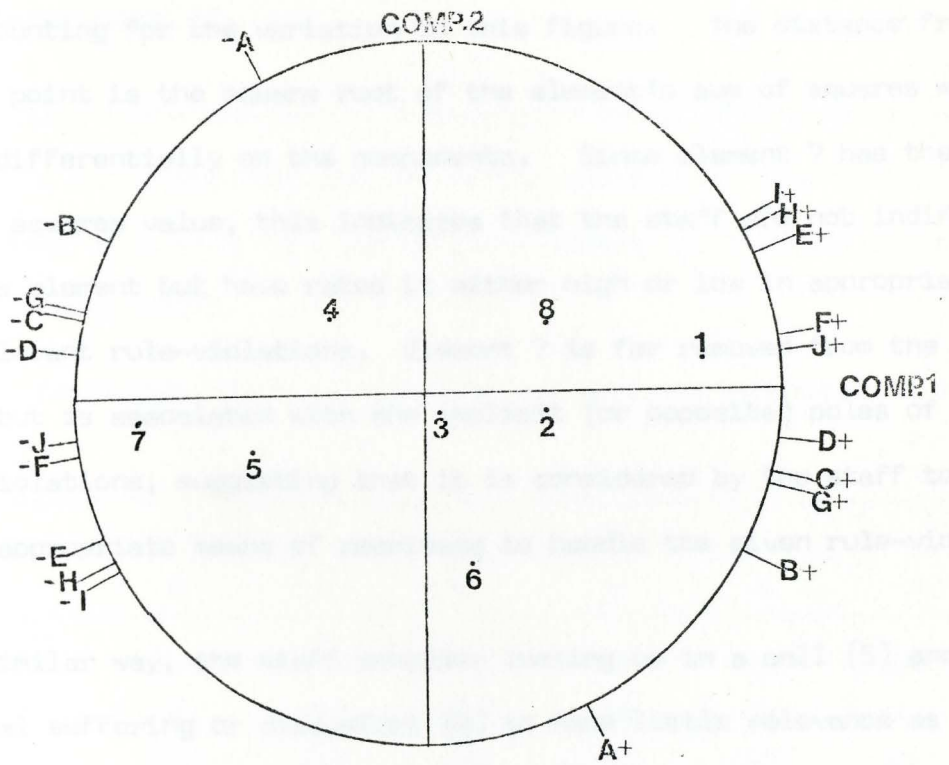
As can be seen from the above table, Component 1 and Component 2 account for a large percentage (86%) of the total variation for this grid. These two components are used to form a graphical representation, (Fig 1) based upon the loadings of the constructs and elements on Components 1 and 2 as given in Table 4.

TABLE 4 Loadings of the constructs and elements on first two components

CONSTRUCT	COMPONENTS 1	2
A	2.67	-4.96
B	5.00	-2.61
C	5.66	-1.53
D	6.22	-1.00
E	5.93	2.52
F	6.04	.80
G	5.88	-1.90
H	5.71	2.71
I	4.56	2.52
J	6.10	.93

ELEMENT	COMPONENTS	
1	9.91	1.42
2	4.12	- .54
3	.38	.92
4	-3.90	2.79
5	-6.10	-2.23
6	1.94	-6.04
7	-10.51	1.26
8	4.18	2.41

The construction of Figure 1 is explained in 3.5.1. This figure represents the best fitting two dimensional approximation to the distribution of all the lements in construct space. The elements are plotted as points on the surface by their loadings given in Table 4. The constructs are plotted as lines on the circumference of the circle by their loadings on components 1 and 2, given in Table 4.



Key:

CONSTRUCTS		ELEMENTS	
The boy who:			
A	Absconds	1	Warning
B	Smokes dagga	2	Withhold privileges
C	Refuses to do his homework	3	Extra work
D	Rebellious and negative	4	Personal suffering
E	No perseverence	5	Lock up in cells
F	Slovenly personal habits	6	Corporal punishment
G	Swears and backchats	7	Transfer to prison
H	Seeks attention	8	Send to Psychologist
I	Cuts his wrists		
J	Unacceptable sexual habits		

FIGURE 1 Composite diagram for Components 1 and 2 for staff group as a whole.

Figure 1 shows that all the constructs are aligned with their explicit poles in the same direction indicating that they are positively correlated with each other (See Appendix 1 for table of construct correlations) and that each reprimand element is rated in a similar way on each of the rule-violation constructs.

Send to prison (7) as a reprimand is relatively far removed from the centre point indicating that this element has a large degree of salience in accounting for the variation in this figure. The distance from the centre point is the square root of the element's sum of squares which loads differentially on the components. Since element 7 has the highest sum of squares value, this indicates that the staff are not indifferent to this element but have rated it either high or low in appropriateness to the relevant rule-violations. Element 7 is far removed from the centre point but is associated with the implicit (or opposite) poles of all the rule violations, suggesting that it is considered by the staff to be the least appropriate means of reprimand to handle the given rule-violations.

In a similar way, the staff consider locking up in a cell (5) and personal suffering or discomfort (4) to have little relevance as appropriate reprimands for these rule violations. This is shown by their alignment with the implicit (or opposite) poles of the rule violations.

Making the boy do extra work (3) is seen to have little salience owing to its position in Figure 1 close to the centre of the axes. This suggests that the staff are indifferent to this form of reprimand and have rated it neither high nor low in appropriateness.

Reprimands - Warning (1), Corporal Punishment (6), Removal of privileges (2) and Send to Psychologist (8) are all relatively more closely associated with the explicit poles of the rule-violation constructs. This indicates that these reprimands are consistently considered the most appropriate by the staff to manage the rule-violations which they encounter most often. The degree of appropriateness or association between rule-violation and reprimand is given in Table 6 and the most appropriate reprimands for each rule-violation have been extracted and presented in Table 10.

The following table provides a statistical measure of the association between all the constructs and all of the elements. The cosine is a mathematical equivalent of a correlation between a construct and an element (Slater 1977).

TABLE 5 Relations between constructs and elements expressed as cosines

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	.197	.596	-.348	-.762	.022	.751	-.562	.165
B	.736	.441	-.288	-.858	-.388	.598	-.818	.549
C	.866	.537	.342	-.814	-.782	.547	-.840	.367
D	.906	.848	.039	-.827	-.813	.434	-.933	.562
E	.917	.707	.158	-.506	-.857	-.109	-.864	.851
F	.906	.815	.347	-.680	-.883	.145	-.887	.583
G	.869	.711	.211	-.856	-.788	.585	-.880	.364
H	.906	.582	.305	-.474	-.857	-.126	-.825	.805
I	.676	.602	-.337	-.304	-.489	-.234	-.719	.941
J	.930	.722	.039	-.684	-.893	.180	-.864	.766

From Table 5 it can be seen that the staff consider the most appropriate reprimand for the boy who absconds to be corporal punishment since this has the highest cosine value. The reprimand considered to be the most appropriate for dagga smoking within the institution is a warning. Each rule violation has an associated reprimand and these are summarised together with the other sub-groups assessments in Table 10.

4.1.2 Rankings of reprimands according to rule-violations by different sub-groups of staff.

TABLE 6 (a) The rankings by the supervisory staff

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	4	3	7	5	2	1	8	6
B	3	5	6	7	2	1	8	4
C	1	4	5	6	7	2	8	3
D	2	3.5	5	6	7	3.5	8	1
E	2	3	4	6	7	5	8	1
F	1	2.5	2.5	6	7	5	8	4
G	1	2	4	6	7	3	8	5
H	1.5	4	3	5	7	6	8	1.5
I	2	5	7	6	4	3	8	1
J	2	4	7	6	5	3	8	1

TABLE 6 (b) Rankings by Technical subject teachers.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	6	3	4	7	5	2	8	1
B	2	6	5	7	4	3	8	1
C	1	5	4	6	7	3	8	2
D	1	3	5	6	7	2	8	4
E	1	2	4	5	7	6	8	3
F	1	2	5.5	4	7	5.5	8	3
G	1	3	4	5	7	2	8	6
H	1	4	3	5	7	6	8	2
I	3	2	6.5	4	5	6.5	8	1
J	2.5	4.5	4.5	6	7	2.5	8	1

TABLE 6 (c) Rankings by Academic subject teachers.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	4.5	2	4.5	7	3	1	8	6
B	1	5	6	8	2	4	7	3
C	1	4	3	6	7	2	8	5
D	1	2	5	6	7	3	8	4
E	1	3	4	5	7	6	8	2
F	1	2	3	6	7	4	8	5
G	1	3	4	6	7	2	8	5
H	1	4	5	3	7	6	8	2
I	2	3	5	4	6	7	8	1
J	1	3	4.5	4.5	7	6	8	2

TABLE 7 (a) Latent roots of the principal components of the variation recorded in Table 6 (a) by Supervisors

COMPONENTS	ROOT	AS PERCENTAGE
1	283.85	67.58
2	84.76	20.18
3	34.37	8.18
4	7.02	1.67
5	5.41	1.29
6	1.90	.45
7	1.19	.28

TABLE 7 (b) Latent roots of the principal components of the variation recorded in Table 6 (b) by Technical Subject Teachers.

COMPONENTS	ROOT	AS PERCENTAGE
1	293.33	69.84
2	52.21	12.43
3	40.49	9.64
4	18.35	4.37
5	9.20	2.19
6	3.52	.84
7	.89	.21

TABLE 7 (c) Latent roots of the principal components of the variation recorded in Table 6 (c) by Academic Subject Teachers

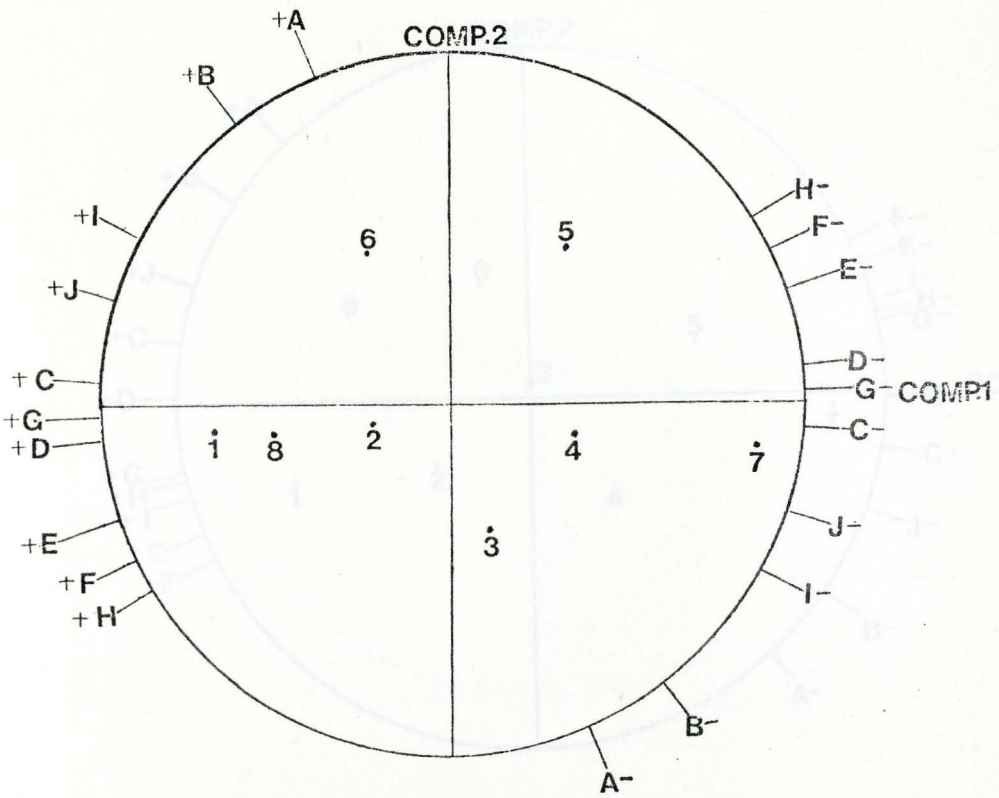
COMPONENTS	ROOT	AS PERCENTAGE
1	284.76	67.80
2	80.83	19.25
3	33.60	8.00
4	11.83	2.82
5	4.40	1.05
6	2.74	.65
7	.83	.20

In Tables 7(a), 7 (b) and 7 (c) the first two components account for more than 80% of variation for their respective grids. Components 1 and 2 will therefore be used in each case to plot a graphical representation for each grid. The loadings on Components 1 and 2 for the constructs and elements are set out in Table 8.

TABLE 8 Loadings of the constructs and elements of first two components for the three sub-groups of staff

CONSTRUCT	SUPERVISORS		TECHNICAL		ACADEMIC	
	Comp 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
A	-2.61	5.36	-4.01	4.10	2.61	-5.29
B	-3.96	4.80	-4.97	3.24	3.49	-1.62
C	-6.17	.16	-6.13	1.00	5.56	-2.44
D	-6.20	-.95	-5.87	.01	6.17	-1.36
E	-5.90	-2.32	-5.80	-2.57	6.05	2.18
F	-5.25	-2.71	-5.68	-2.79	6.00	1.33
G	-5.48	- .74	-4.92	-1.17	5.79	-2.50
H	-5.26	-3.35	-5.79	-1.42	5.43	3.27
I	-5.48	2.25	-4.64	-1.35	5.08	3.60
J	-5.89	1.56	-5.92	2.07	5.95	2.44
ELEMENT	Comp 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
1	-8.34	-1.12	-8.46	-2.80	9.97	.48
2	-2.80	- .87	-3.21	-2.60	4.44	-1.12
3	1.36	-4.53	.07	.33	.57	- .68
4	4.41	- .96	3.06	-3.11	-2.75	4.00
5	4.12	5.49	5.97	1.72	-5.77	-2.01
6	-3.35	5.12	-1.94	4.06	.75	-6.14
7	10.84	-1.54	10.99	- .55	-10.60	1.00
8	-6.23	-1.58	-6.48	2.89	3.38	4.48

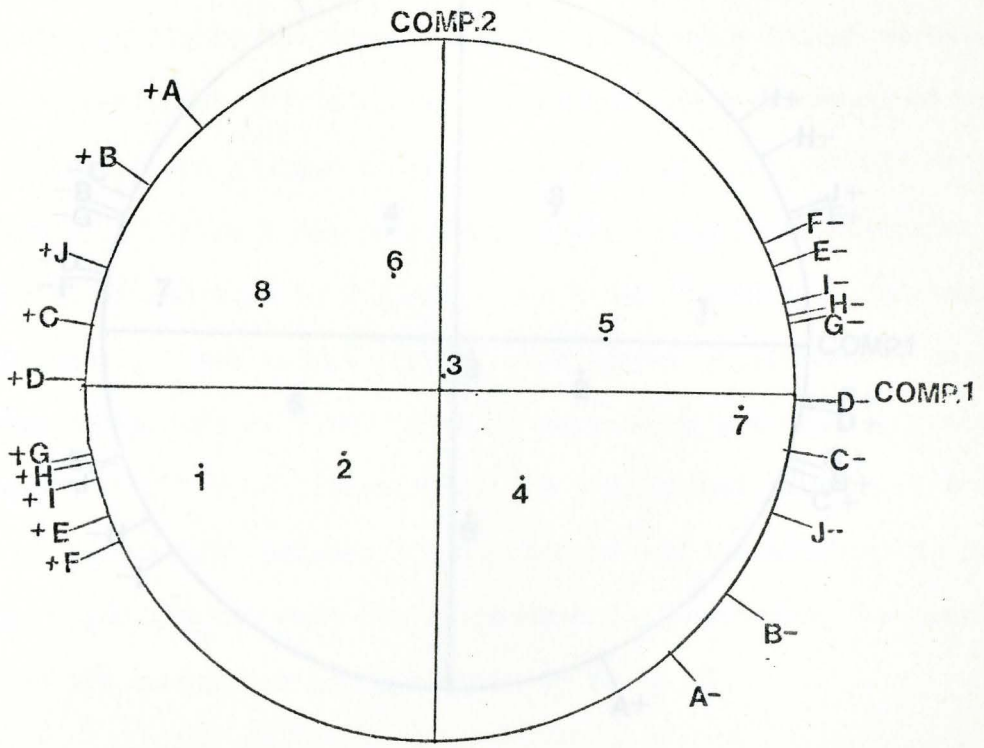
The component loadings set out in Table 8 are used to plot a graphical representation of the associations between the constructs and elements for each of the three sub-groups.



Key:

CONSTRUCTS		ELEMENTS	
The boy who:			
A	Absconds	1	Warning
B	Smokes dagga	2	Withhold privileges
C	Refuses to do his homework	3	Extra work
D	Rebellious and negative	4	Personal suffering
E	No perseverence	5	Lock up in cells
F	Slovenly personal habits	6	Corporal punishment
G	Swears and backchats	7	Transfer to prison
H	Seeks attention	8	Send to Psychologist
I	Cuts his wrists		
J	Unacceptable sexual habits		

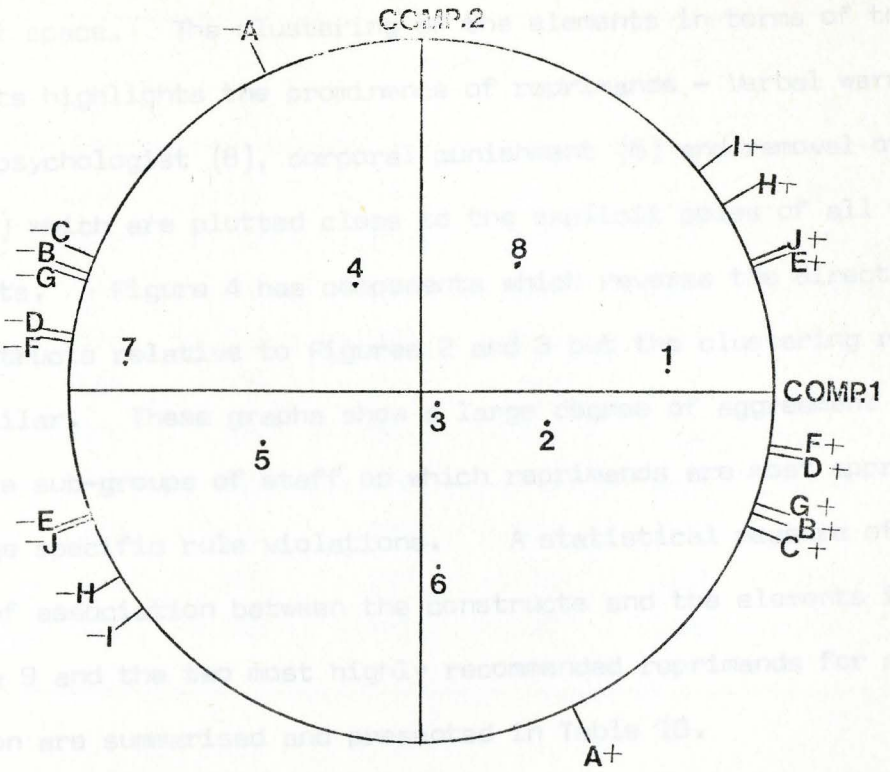
FIGURE 2 Composite diagram for Components 1 and 2 for the Supervisors



Key:

CONSTRUCTS		ELEMENTS	
The boy who:			
A	Absconds	1	Warning
B	Smokes dagga	2	Withhold privileges
C	Refuses to do his homework	3	Extra work
D	Rebellious and negative	4	Personal suffering
E	No perseverence	5	Lock up in cells
F	Slovenly personal habits	6	Corporal punishment
G	Swears and backchats	7	Transfer to prison
H	Seeks attention	8	Send to Psychologist
I	Cuts his wrists		
J	Unacceptable sexual habits		

FIGURE 3 Composite diagram for Components 1 and 2 for Technical subject teachers



Key:

CONSTRUCTS		ELEMENTS	
The boy who:			
A	Absconds	1	Warning
B	Smokes dagga	2	Withhold privileges
C	Refuses to do his homework	3	Extra work
D	Rebellious and negative	4	Personal suffering
E	No perseverence	5	Lock up in cells
F	Slovenly personal habits	6	Corporal punishment
G	Swears and backchats	7	Transfer to prison
H	Seeks attention	8	Send to Psychologist
I	Cuts his wrists		
J	Unacceptable sexual habits		

FIGURE 4 Composite diagram for Components 1 and 2 for Academic subject teachers

Figure 2, 3 and 4 show a remarkable degree of similarity in the dispersion of the reprimand elements in terms of the rule-violation construct space. The clustering of the elements in terms of the constructs highlights the prominence of reprimands - Verbal warnings (1), send to psychologist (8), corporal punishment (6) and removal of privileges (2) which are plotted close to the explicit poles of all of the constructs. Figure 4 has components which reverse the direction of the constructs relative to Figures 2 and 3 but the clustering remains very similar. These graphs show a large degree of aggreement among the three sub-groups of staff on which reprimands are most appropriate to manage specific rule violations. A statistical measure of the degree of association between the constructs and the elements is given in Table 9 and the two most highly recommended reprimands for each rule violation are summarised and presented in Table 10.

Table 9 provides a statistical measure of the association between the elements and constructs in each of the three sub-groups as represented in the graphical figures above. These associations are expressed as cosines which are the mathematical equivalent of correlations.

TABLE 9 (a) Relations between constructs and elements for the supervisors expressed as cosines.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	.302	.353	-.720	-.505	.387	.903	-.553	-.031
B	.511	.202	-.701	-.786	.252	.910	-.711	.312
C	.955	.649	-.242	-.896	-.600	.599	-.920	.665
D	.923	.609	-.199	-.850	-.680	.376	-.895	.881
E	.905	.664	.028	-.775	-.778	.147	-.841	.871
F	.890	.834	.308	-.703	-.791	.130	-.776	.506
G	.899	.902	.029	-.779	-.649	.463	-.842	.388
H	.851	.575	.231	-.630	0.817	-.047	-.738	.802
I	.749	.263	-.651	-.839	-.176	.630	-.847	.820
J	.821	.425	-.585	-.865	-.327	.606	-.893	.849

TABLE 9 (b) Relations between constructs and elements for the Technical Subject Teachers expressed as cosines.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	.230	.346	.025	-.832	-.383	.568	-.681	.766
B	.613	.062	-.078	-.866	-.453	.467	-.780	.833
C	.881	.333	.134	-.766	-.858	.458	-.920	.744
D	.871	.564	-.014	-.663	-.885	.564	-.892	.509
E	.890	.775	.006	-.350	-.888	-.060	-.874	.610
F	.882	.805	-.230	-.262	-.864	-.050	-.858	.588
G	.822	.544	.147	-.465	-.850	.525	-.744	.216
H	.881	.515	.188	-.462	-.855	-.024	-.864	.717
I	.571	.722	-.497	-.231	-.518	-.238	-.740	.773
J	.728	.365	.032	-.812	-.781	.510	-.909	.843

TABLE 9 (c) Relations between constructs and elements for the Academic Subject Teachers expressed as cosines.

CONSTRUCTS	ELEMENTS							
	1	2	3	4	5	6	7	8
A	.296	.624	.124	-.804	.024	.802	-.530	-.306
B	.617	.280	-.403	-.791	.059	.203	-.583	.373
C	.839	.706	.497	-.623	-.702	.517	-.848	.120
D	.910	.889	,205	-.597	-.738	.334	-.942	.357
E	.923	.722	.145	-.249	-.810	-.234	-.886	.780
F	.879	.886	.487	-.556	-.783	.297	-.905	.271
G	.859	.805	.349	-.648	-.709	.523	-.889	.148
H	.842	.557	.010	.000	-.800	-.356	-.786	.837
I	.765	.589	-.125	-.039	-.647	-.480	-.756	.928
J	.908	.705	.084	-.193	-.809	-.263	-.871	.801

The reprimands which are considered to be most appropriate to each of the rule violations are those with the highest correlation (or cosine) value. The reprimand elements which are most closely associated with each rule-violation construct for the staff as a whole and for each of the sub-groups, are set out below in Table 10.

TABLE 10. Reprimand elements most closely associated with each rule-violation construct.

RULE VIOLATIONS	REPRIMANDS			
The boy who:	Staff as a whole	Supervisors	Technical subject teachers	Academic subject teachers
A Absconds	a Corporal punishment b Remove privileges	a Corporal punishment b Remove privileges	a Send to Psychologist b Corporal punishment	a Corporal punishment b Remove privileges
B Smokes dagga	a Warning b Corporal punishment	a Corporal punishment b Warning	a Send to psychologist b Warning	a Warning b Send to Psychologist
C Refuses to do his schoolwork	a Warning b Corporal punishment	a Warning b Send to psychologist	a Warning b Send to psychologist	a Warning b Remove privileges
D Rebellious and negative	a Warning b Remove privileges	a Warning b Send to Psychologist	a Warning b Remove privileges Corporal punishment	a Warning b Remove privileges
E No perseverence	a Warning b Send to Psychologist	a Warning b Send to Psychologist	a Warning b Remove privileges	a Warning b Send to psychologist
F Slovenly habits	a Warning b Remove privileges	a Warning b Remove privileges	a Warning b Remove privileges	a Remove privileges b Warning
G Swears and backchats	a Warning b Remove privileges	a Remove privileges b Warning	a Warning b Remove privileges	a Warning b Remove privileges
H Seeks attention	a Warning b Send to psychologist	a Warning b Send to psychologist	a Warning b Send to psychologist	a Warning b Send to psychologist
I Cuts his wrists	a Send to psychologist b Warning	a Send to psychologist b Warning	a Send to psychologist b Remove privileges	a Send to psychologist b Warning
J Unacceptable sex habits	a Warning b Send to psychologist	a Send to psychologist b Warning	a Send to psychologist b Warning	a Warning b Send to psychologist

Table 10 represents a summary of the two most appropriate reprimands suggested for each of the rule-violations by the staff as a whole and for each of the sub-groups of staff. The degree of association of each element with each construct is presented in Table 5 and 9 and expressed as cosines which are the mathematical equivalent of correlations.

From Table 10 it can be seen that the same four reprimands (ie 1, 6, 2 and 8) which enjoyed prominence in the graphical figures are represented here as the most highly correlated reprimands with the list of rule-violations.

When examining the assessments made by the whole staff group, the following features emerge as significant:

WARNING (1) is the reprimand most often suggested as appropriate for the boy who smokes dagga, refuses to do his schoolwork, is rebellious and negative, has no perseverence, has slovenly personal habits, swears, seeks attention and who has unacceptable sexual habits.

CORPORAL PUNISHMENT (6) is seen as appropriate for the boy who absconds and is suggested as the second most appropriate reprimand for the boy who smokes dagga and who refuses to do his schoolwork.

SEND TO THE PSYCHOLOGIST (8) is seen as the most appropriate way of managing the boy who cuts his wrists and second most appropriate for the boy with no perseverence and the boy with unacceptable sexual habits.

REMOVAL OF PRIVILEGES (2) is not ranked most appropriate for any of these rule-violations but is seen as second most appropriate for the boy who absconds, who is rebellious and negative, has slovenly habits and who swears.

The data in Table 10 suggests that transfer to prison (7), lock up in cells (5), personal suffering as reprimand enough (4) and to a lesser extent, extra work (3) are not perceived as appropriate for these rule-violations. The most frequently suggested reprimand is a verbal warning with the removal of privileges as the most popular in a secondary sense. The prominent use of a verbal warning as the most appropriate reprimand evokes a number of hypotheses. These will need further elucidation by comparison with the way in which the same rule-violations are described in Phase 2. In addition, it should be noted that corporal punishment is suggested relatively infrequently as an appropriate reprimand. Similarly, sending to a psychologist is only seen as appropriate for the boy who cuts his wrists. The boy who has no perseverence and who is attention seeking or has unacceptable sexual habits would be sent to a psychologist after a verbal warning as the most appropriate means of handling his actions.

As evidenced by the graphical figures, Table 10 confirms the significant degree of agreement between the 3 sub-groups on how rule-violations should be managed. The types of reprimands suggested are similar to those presented by the whole staff. However, some differences are worthy of note:

The Technical subject teachers suggest sending the boy who absconds to the psychologist whereas the Supervisors and Academic subject teachers recommend corporal punishment. The Technical subject teachers also see sending the boy to a psychologist as most appropriate for the boy who smokes dagga in the institution, whereas Supervisors recommend corporal punishment, and Academic subject teachers a verbal warning. The Technical subject teachers recommend sending a boy who violates the rules to the psychologist in four out of ten rule-violations assessed. This contrasts with the same method of management being recommended twice by the Supervisors and twice by the Academic subject teachers. The Academic subject teachers differ from the Supervisors and Technical subject teachers by suggesting that the boy with slovenly personal habits should be reprimanded by removing privileges from him whereas the other two groups recommend a verbal warning as the most appropriate reprimand. The Academic subject teachers differ from the other sub-groups by suggesting that a verbal warning is an appropriate way of managing the boy with unacceptable sexual habits, while the Supervisors and Technical subject teachers agree that sending this boy to the psychologist is the most appropriate. It is important to point out, from the above picture, that the major sources of difference between the sub-groups seem to be associated with the relative prominence given to sending a rule-violator to the psychologist as a means of handling the problem he presents. These trends may be further highlighted by an examination of how the same rule-violations are described in terms of the constructs supplied in Phase 2.

4.2 PHASE 2

CONSTRUING THE NATURE OF THE RULE-VIOLATOR

TABLE 11 The rule violation acts and personality constructs concerned with Phase 2.

CONSTRUCTS		ELEMENTS	
			The boy who:
1	Lazy/Unmotivated	A	Absconds
2	Aggressive/Short tempered	B	Smokes dagga
3	Neglected/Needy	C	Refuses to do his schoolwork
4	Attention seeking	D	Rebellious and negative
5	Rebellious/Undisciplined	E	No perseverence
6	Anxious/Insecure	F	Slovenly personal habits
7	Immature/Irresponsible	G	Swears and backchats
8	Unhappy/Depressed	H	Seeks attention
		I	Cuts his wrists
		J	Unacceptable sexual habits

4.1.1 Ranking by the whole staff group of the rule violation elements according to the descriptive constructs.

TABLE 12 The ranking of the elements in terms of the constructs by the staff group as a whole.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	5	6	6	5	5	1	3	1
B	7	5	7	8	6	5	5	3
C	1	3	5	2	3	6	1	4
D	3	1	4	4	1	7	7	7
E	2	4	1	7	7	3	2	5
F	4	7	3	9	4	4	4	8
G	6	2	8	6	2	9	6	9
H	8	8	2	1	9	2	8	6
I	9	9	9	3	8	8	9	2
J	10	10	10	10	10	10	10	10

TABLE 13 Latent roots of the principal components of the variation recorded in Table 12.

COMPONENT	ROOT	AS PERCENTAGE
1	302.29	45.80
2	158.03	23.94
3	92.24	13.98
4	65.80	9.97
5	21.23	3.22
6	11.43	1.73
7	7.59	1.15
8	1.38	.21

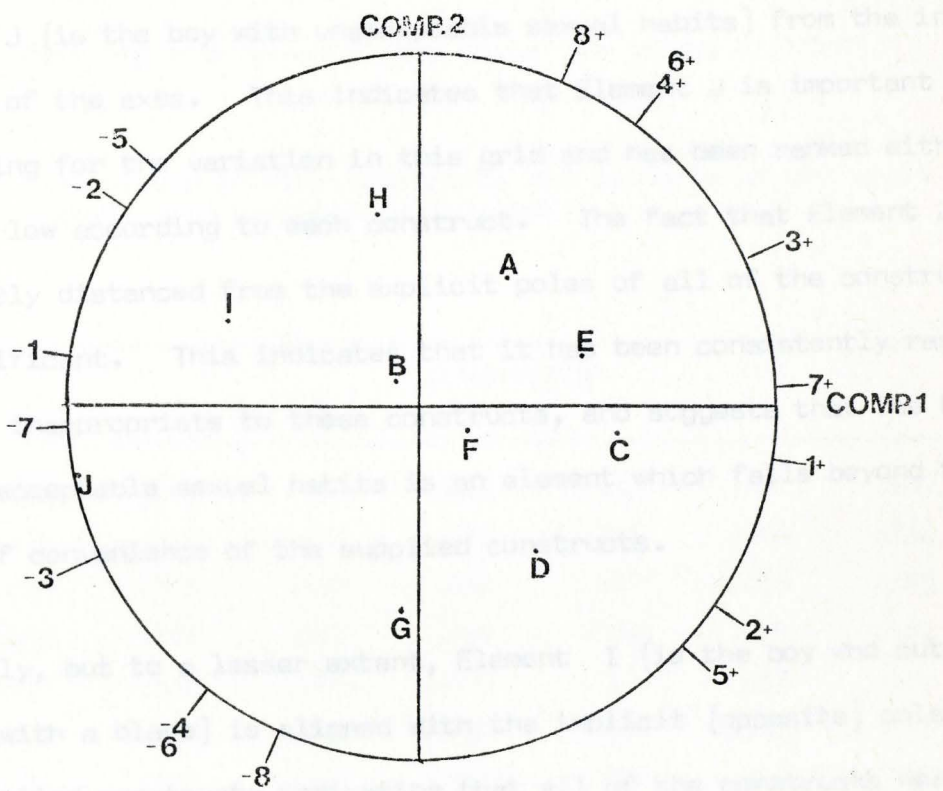
This table shows that Component 1 and 2 account for 69% of the total variation in this grid. This percentage accounted for by the two components is relatively smaller than the percentage recorded in Phase 1 and indicates that the elements are more widely dispersed within the construct space and that the remaining components account for a larger proportion of the variation than was the case in Phase 1. Components 1 and 2 will be used to plot a graphical representation of the dispersal of the elements in construct space (Figure 5) since they account individually for the largest amount of the variation. The loadings of the constructs and elements on components 1 and 2 are given in Table 14.

TABLE 14 Loadings of the constructs and elements on the first two components of the grid for the staff group as a whole.

CONSTRUCT	COMPONENTS 1	2
1	8.52	-1.75
2	6.84	-4.98
3	6.42	2.85
4	2.93	3.20
5	6.13	-5.64
6	5.07	6.62
7	7.87	.69
8	2.82	5.97

ELEMENT	COMPONENTS 1	2
A	3.30	4.57
B	- .91	.74
C	6.98	-1.04
D	4.03	-5.01
E	5.58	1.97
F	1.72	- .93
G	- .46	-7.11
H	-1.58	6.32
I	-6.59	2.99
J	-12.06	-2.50

The construction of Figure 5 is explained in 3.5.1. This figure represents the best two dimensional approximation of the rule-violation elements in construct space. The elements are plotted as points on the surface by their loadings given in Table 14 and the constructs as lines on the circumference of the circle also by their loadings on components 1 and 2 in Table 14.



Key:

CONSTRUCTS		ELEMENTS	
		The boy who:	
1	Lazy/Unmotivated	A	Absconds
2	Aggressive/Short tempered	B	Smokes dagga
3	Neglected/Needy	C	Refuses to do his homework
4	Attention seeking	D	Rebellious and negative
5	Rebellious/Undisciplined	E	No perseverence
6	Anxious/Insecure	F	Slovenly personal habits
7	Immature/Irresponsible	G	Swears and backchats
8	Unhappy/Depressed	H	Seeks attention
		I	Cuts his wrists
		J	Unacceptable sexual habits

FIGURE 5 Composite diagram for Component 1 and 2 for whole staff group grid.

Figure 5 shows very little clustering of the elements. They are fairly well dispersed in construct space according to these two components, suggesting that they were assigned rank values across a broad range in accordance with the constructs.

A prominent feature of Figure 5 is the relatively great distance of Element J (ie the boy with unacceptable sexual habits) from the intersection of the axes. This indicates that Element J is important in accounting for the variation in this grid and has been ranked either high or low according to each construct. The fact that Element J is greatly distanced from the explicit poles of all of the constructs is significant. This indicates that it has been consistently ranked high or inappropriate to these constructs, and suggests that the boy with unacceptable sexual habits is an element which falls beyond the range of convenience of the supplied constructs.

Similarly, but to a lesser extent, Element I (ie the boy who cuts his wrists with a blade) is aligned with the implicit (opposite) poles of the supplied constructs indicating that all of the constructs were considered relatively inappropriate for construing the nature of this type of boy. In contrast, Element C (ie the boy who refuses to do his schoolwork) is also distanced from the centre point indicating its importance but it is plotted close to Component 1 which is described by the associated constructs 1 and 7 (ie lazy /unmotivated and immature/ irresponsible). Figure 5, therefore, shows graphically that the boy who refuses his schoolwork is considered to be lazy, unmotivated, immature and irresponsible by the staff of the reform school.

In the same way, each rule-violation element is closely associated with one or more of the constructs which describe the personality attributions made by the staff towards the boy who commits these rule violations. The degree of association between the rule-violation elements and descriptive constructs is represented by cosines and presented in Table 15. The most prominently associated constructs with each rule violation have been extracted from Table 15 and presented in Table 20 along with those of the three sub-groups of staff.

TABLE 15 Relations between constructs and elements of the whole staff grid expressed as cosines.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	.268	.008	.240	.244	.040	.784	.585	.860
B	-.306	-.168	-.440	-.480	-.204	.066	.054	.471
C	.860	.706	.363	.492	.661	.206	.784	.342
D	.565	.859	.260	.264	.849	-.215	.147	-.278
E	.737	.336	.835	-.068	.113	.668	.774	.166
F	.392	.038	.497	-.591	.186	.302	.382	-.428
G	.053	.545	-.415	-.183	.609	-.733	-.172	-.595
H	-.358	-.490	.388	.512	-.586	.464	-.344	.110
I	-.780	-.654	-.668	.238	-.580	-.351	-.680	.312
J	-.803	.663	-.661	-.541	-.595	-.636	-.761	-.522

4.2.2 Ranking by the different sub-groups of the rule-violation elements according to the descriptive constructs.

TABLE 16 (a) Rankings by the Supervisory staff.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	7	6	7	5	4	1	2	1,5
B	8	8	6	6	6	4,5	6	4
C	1	3	5	4	3	4,5	1	7
D	3	1	4	2	1	6,5	9	5
E	2	4	1	8	7	3	4,5	6
F	4	5	2	9	5	8	3	8
G	6	2	8	7	2	9	4,5	9
H	5	9	3	3	8	2	8	3
I	9	7	9	1	10	6,5	7	1,5
J	10	10	10	10	9	10	10	10

TABLE 16 (b) Rankings by the Technical subject teachers.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	5	7	6	8	7	4	8	1
B	8	6	7,5	9	6	7	7	6
C	2	2	3	1	3,5	5	1	2
D	3	1	5	6	3,5	6	3	3
E	1	4	2	3,5	5	2	2	5
F	4	8	4	5	1	1	5,5	7
G	6	3	7,5	3,5	2	9	5,5	8
H	7	5	1	2	9	3	4	9
I	10	9	9	7	8	8	9	4
J	9	10	10	10	10	10	10	10

TABLE 16 (c)

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	5	5	5	6	5	3	1	1
B	6	4	6,5	9	4	4	2	2
C	2	3	4	3	2	7	3,5	4
D	3	2	6,5	4	1	6	7,5	8
E	1	6	2	10	7	3	3,5	3
F	4	7	3	8	6	5	7,5	10
G	7	1	8	7	3	8	5	9
H	8	8	1	1	8	1	6	6
I	10	9	2	2	10	9	9	5
J	9	10	10	5	9	10	10	7

TABLE 17 (a) Latent roots of the principal components of the variation recorded in Table 16 (a) by Supervisors.

COMPONENT	ROOT	AS PERCENTAGE
1	257.66	39.04
2	188.99	28.63
3	99.66	15.10
4	67.77	10.27
5	23.90	3.62
6	12.27	1.86
7	7.40	1.12
8	.36	.05

TABLE 17 (b) Latent roots of the principal components of the variation recorded in Table 16 (b) by Technical subject teachers.

COMPONENT	ROOT	AS PERCENTAGE
1	396.36	60.05
2	94.78	14.36
3	78.80	11.95
4	53.26	8.07
5	22.12	3.35
6	9.88	1.50
7	2.58	.39

TABLE 17 (c) Latent roots of the principal components of the variation recorded in Table 16 (c) by the Academic subject teachers.

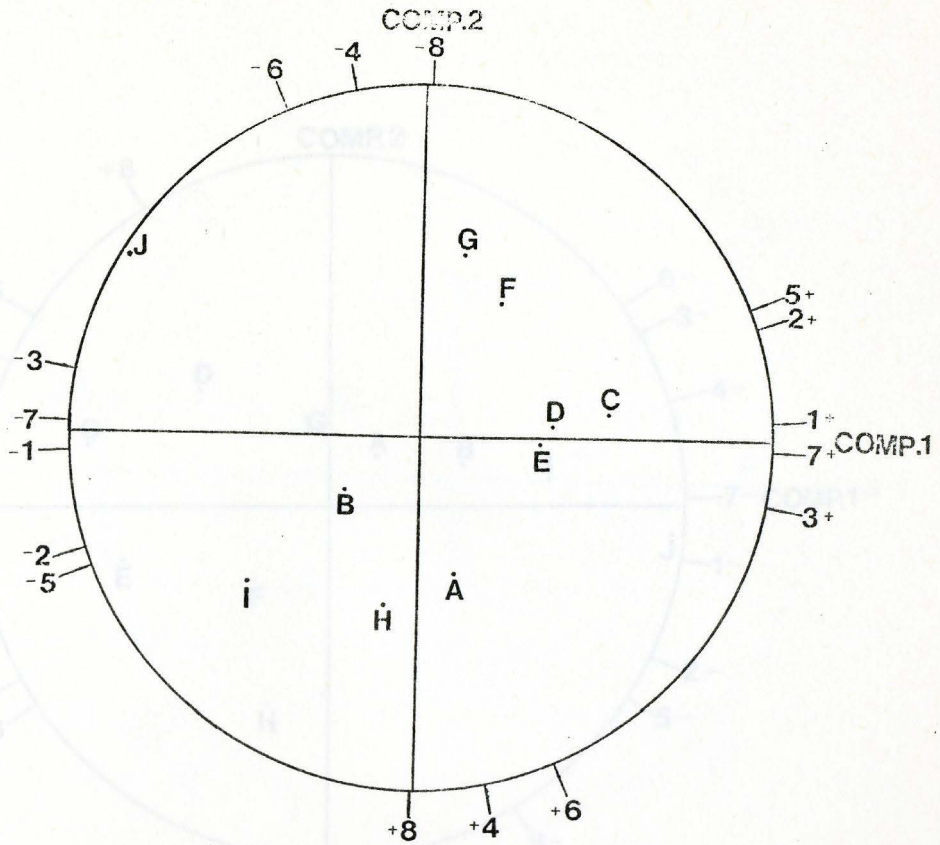
COMPONENT	ROOT	AS PERCENTAGE
1	293.42	44.46
2	156.89	23.77
3	90.90	13.77
4	72.90	11.05
5	32.76	4.96
6	7.75	1.17
7	2.98	.45
8	.88	.13

In Table 17 (a) the first two components account for 67% of the variance in the grid, in Table 17 (b) 74% and in Table 17 (c) for 68%. This shows that the elements have proportionally higher loadings on Component 1 and Component 2 for the Technical subject teachers (Table 17 (b). In all three of the sub-groups, Component 1 and 2 are used to plot the axes of the graphical figures since they account individually for the greatest variation in the grids. The loadings on these components are set out in Table 18 and their graphical representation in Figures 6, 7 and 8.

TABLE 18 Loadings of the constructs and elements on the first two components for the three sub-groups of staff.

CONSTRUCT	SUPERVISORS		TECHNICAL		ACADEMIC	
	Comp 1	Comp 2	Comp 1	Comp 2	Comp 1	Comp 2
1	8.38	.43	-8.23	1.37	-7.34	1.55
2	7.44	2.53	-7.17	3.33	-6.02	6.23
3	6.30	-1.21	-7.88	-4.11	-5.59	-4.52
4	1.42	-6.58	-7.45	-2.11	4.36	.85
5	6.83	2.71	-5.72	3.55	-5.97	6.32
6	3.28	-7.35	-6.28	-4.20	-6.16	-5.51
7	5.75	- .13	-8.69	- .01	-7.93	-1.53
8	- .09	-8.73	-3.46	5.50	-4.07	4.69
ELEMENT	Comp 1	Comp 2	comp 1	Comp 2	Comp 1	Comp 2
A	1.23	-4.93	1.73	1.66	-5.27	-3.36
B	-2.90	-1.84	4.67	1.26	-4.39	- .36
C	6.73	.71	-8.69	2.15	-4.20	2.59
D	4.74	.24	-4.61	4.14	-1.46	5.98
E	4.30	- .14	-7.40	-1.81	-5.94	-3.68
F	2.70	4.50	-2.95	-2.53	.42	.16
G	1.40	6.34	- .12	2.57	.12	6.66
H	-1.42	-5.97	-2.48	-7.03	1.23	-6.47
I	-6.18	-5.11	7.84	.99	9.52	-1.76
J	-10.60	6.20	11.99	-1.40	9.96	.24

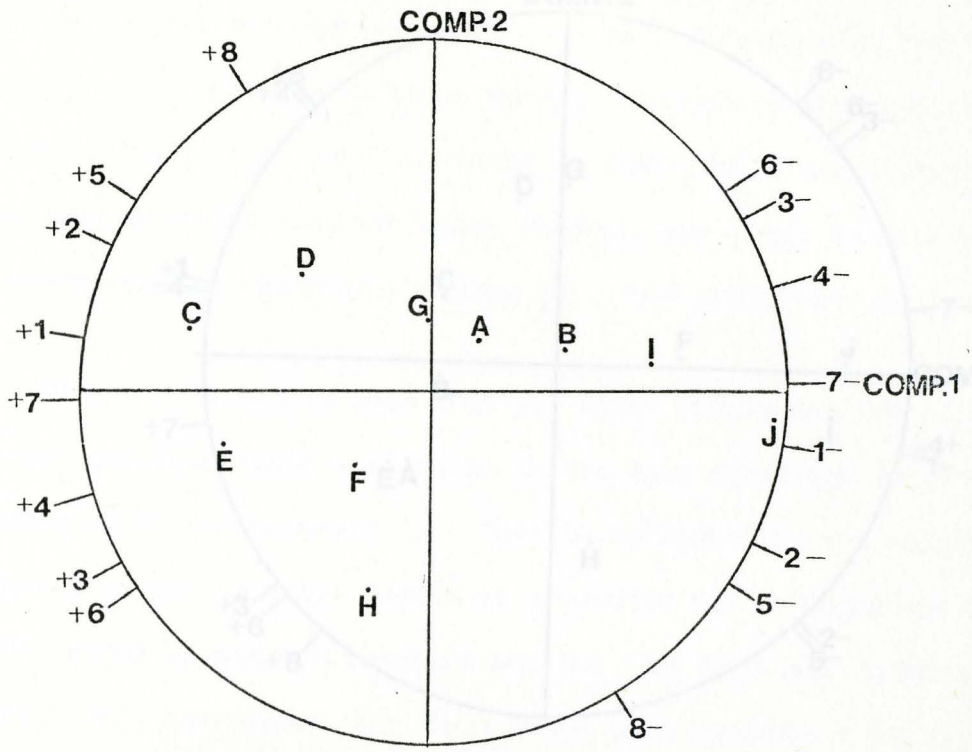
The component loadings set out in Table 18 are used to plot a graphical representation of the associations between the constructs and elements for each of the three sub-groups of staff.



Key:

CONSTRUCTS	ELEMENTS
	The boy who:
1 Lazy/Unmotivated	A Absconds
2 Aggressive/Short tempered	B Smokes dagga
3 Neglected/Needy	C Refuses to do his homework
4 Attention seeking	D Rebellious and negative
5 Rebellious/Undisciplined	E No perseverence
6 Anxious/Insecure	F Slovenly personal habits
7 Immature/Irresponsible	G Swears and backchats
8 Unhappy/Depressed	H Seeks attention
	I Cuts his wrists
	J Unacceptable sexual habits

FIGURE 6 Composite diagram for Components 1 and 2 for Supervisors.



Key:

CONSTRUCTS	ELEMENTS
	The boy who:
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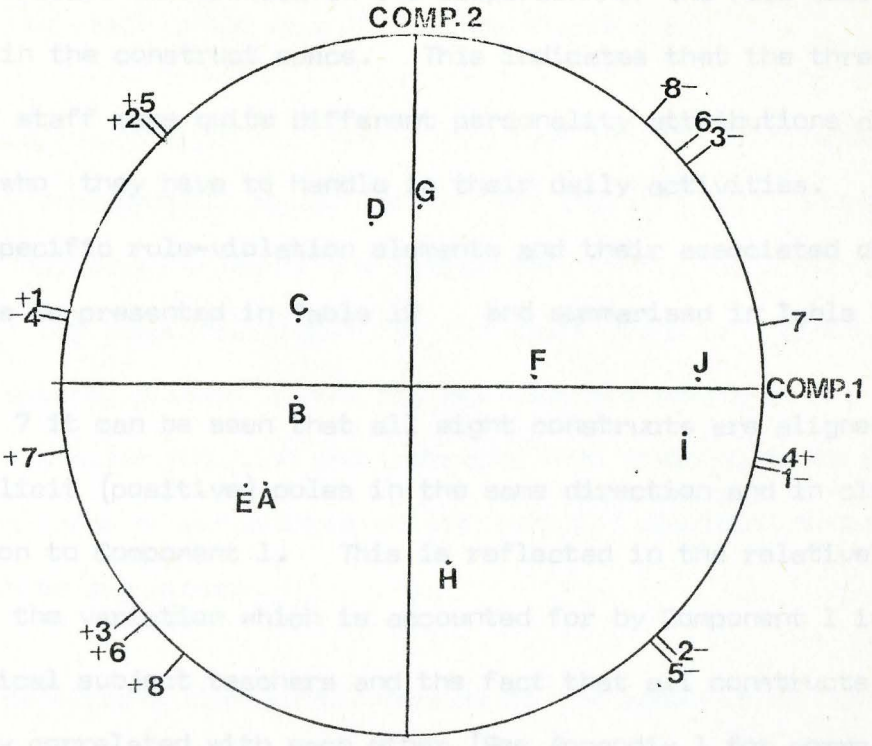
5 Rebellious/Undisciplined	E No perseverence
6 Anxious/Insecure	F Slovenly personal habits
7 Immature/Irresponsible	G Swears and backchats
8 Unhappy/Depressed	H Seeks attention
	I Cuts his wrists
	J Unacceptable sexual habits

FIGURE 7 Composite diagram for Component 1 and 2 for Technical subject teachers.



Key:

CONSTRUCTS	ELEMENTS
	The boy who:
1 Lazy/Unmotivated	A Absconds
2 Aggressive/Short tempered	B Smokes dagga
3 Neglected/Needy	C Refuses to do his homework
4 Attention seeking	D Rebellious and negative
5 Rebellious/Undisciplined	E No perseverence
6 Anxious/Insecure	F Slovenly personal habits
7 Immature/Irresponsible	G Swears and backchats
8 Unhappy/Depressed	H Seeks attention
	I Cuts his wrists
	J Unacceptable sexual habits

FIGURE 8 Composite diagram for Components 1 and 2 for Academic subject teachers.

In contrast to Phase 1, the graphical figures for the three sub-groups show significant differences in the dispersion of the rule violation elements in the construct space. This indicates that the three sub-groups of staff make quite different personality attributions about the boys who they have to handle in their daily activities. The link between specific rule-violation elements and their associated descriptive constructs is presented in Table 19 and summarised in Table 20.

In Figure 7 it can be seen that all eight constructs are aligned with their explicit (positive) poles in the same direction and in close association to Component 1. This is reflected in the relatively large amount of the variation which is accounted for by Component 1 in the grid for Technical subject teachers and the fact that all constructs are positively correlated with each other (See Appendix 1 for correlations of constructs). This tendency shows that most of the elements were ranked similarly, either high or low, on all of the constructs. The relatively high positive correlations between the constructs suggests that the Technical subject teachers found that the supplied descriptive constructs did not effectively differentiate between the rule-violation elements to the same degree as found in the other two sub-groups.

Despite the differences between sub-groups presented by the graphical figures, there are some similarities:

In all three graphical figures, Component 1 is defined to a greater or lesser extent by Constructs 1 and 7, ie lazy/unmotivated and immature/irresponsible. This indicates that these constructs are important in distinguishing between the rule-violation elements as Component 1 accounts

for the greatest amount of variation in each of the three sub-group grids. The same trend is carried through to the graphical representation for the staff group as a whole (see Figure 5).

A further similarity in all three sub-groups is the prominence of Element J (unacceptable sexual habits) and its alignment with the implicit (opposite) poles of the constructs. This was identified earlier in the graphical figure for the staff group as a whole. To a lesser extent, Element I (the boy who cuts his wrists with a blade) occupies a similar position and indicates that these elements are beyond the range of convenience of the supplied descriptive constructs for all three sub groups.

Table 19 provides a statistical measure of the association between the rule violation elements and the descriptive constructs in each of the three sub-groups as represented in the graphical figures above. These associations are expressed as cosines which are the mathematic equivalent of correlations between the constructs and elements.

TABLE 19 (a) Relations between the constructs and elements for the Supervisors expressed as cosines.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	-.099	-.076	-.090	.325	.122	.747	.525	.713
B	-.788	-.846	-.381	-.026	-.568	.255	-.293	.471
C	.828	.727	.406	.145	.671	.238	.768	-.137
D	.506	.745	.278	.501	.682	-.064	-.196	.028
E	.737	.257	.882	-.288	.056	.426	.366	-.095
F	.455	.288	.522	-.708	.241	-.325	.412	-.673
G	.058	.584	-.332	-.352	.624	-.702	.59	-.707
H	-.038	-.548	.316	.445	-.538	.643	-.345	.659
I	-.671	-.494	-.582	.561	-.628	.009	-.410	.595
J	-.726	-.609	-.606	-.544	-.524	-.664	-.575	-.504

TABLE 19 (b) Relations between constructs and elements for the Technical subject teachers expressed as cosines.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	-.082	-.397	-.241	-.550	-.297	.117	-.428	.648
B	-.791	-.554	-.855	-.903	-.427	-.681	-.830	-.243
C	.831	.845	.705	.820	.562	.444	.926	.535
D	.734	.902	.351	.348	.589	.144	.716	.586
E	.612	.898	.619	.704	.422	.308	.883	.281
F	.413	-.108	.426	.259	.602	.733	.228	-.105
G	-.062	.381	-.287	.229	.485	-.540	.103	-.342
H	.030	.102	.679	.563	-.313	.438	.359	-.427
I	-.883	-.747	-.818	-.691	-.610	-.636	-.898	-.079
J	-.847	-.758	-.805	-.767	-.665	-.692	-.885	-.539

TABLE 19 (c) Relations between constructs and elements for the Academic subject teachers expressed as cosines.

ELEMENTS	CONSTRUCTS							
	1	2	3	4	5	6	7	8
A	.302	.234	.387	-.244	.188	.719	.904	.879
B	.255	.434	.013	-.629	.343	.388	.839	.691
C	.672	.679	.269	.151	.761	.078	.473	.239
D	.412	.707	-.100	.132	.806	-.237	-.126	-.486
E	.705	.041	.666	-.673	.022	.632	.583	.468
F	.242	-.193	.381	-.322	-.121	.067	-.395	-.693
G	-.060	.676	-.500	-.196	.571	-.495	-.060	-.516
H	-.288	-.492	.567	.561	-.466	.554	-.101	.023
I	-.839	-.708	-.612	.544	-.733	-.599	-.707	-.139
J	-.730	-.677	-.704	.265	-.661	-.740	-.819	-.351

The descriptive constructs or personality attributions considered to most appropriately describe each rule-violation element are those with the highest correlation (or cosine) value. The constructs most closely associated with each rule-violation element for the staff as a whole and for each of the sub-groups are set out in Table 20 below.

TABLE 20 Descriptive constructs most closely associated with each rule-violation element

RULE VIOLATIONS	CONSTRUCTS			
The boy who:	Staff as a whole	Supervisors	Technical Subject Teachers	Academic Subject Teachers
A Absconds	(a) Unhappy/Depressed (b) Anxious/Insecure	Anxious/Insecure Unhappy/Depressed	Unhappy/Depressed Anxious/Insecure	Immature/Irresponsible Unhappy/Depressed
B Smokes dagga	(a) Unhappy/Depressed (b) Anxious/Insecure	Unhappy/Depressed Anxious/Insecure	All negative cosines	Immature/Irresponsible Unhappy/Depressed
C Refuses to do his schoolwork	(a) Lazy/Unmotivated (b) Immature/Irresponsible	Lazy/Unmotivated Immature/Irresponsible	Immature/Irresponsible Aggressive/Short Tempered	Rebellious/Undisciplined Aggressive/Short Tempered
D Rebellious and Negative	(a) Aggressive/Short tempered (b) Rebellious/Undisciplined	Aggressive/Short temper. Rebellious/Undisciplined	Aggressive/Short Tempered Lazy/Unmotivated	Rebellious/Undisciplined Aggressive/Short tempered
E No Perseverence	(a) Neglected/Needy (b) Immature/Irresponsible	Neglected/Needy Lazy/Unmotivated	Neglected/Needy Lazy/Unmotivated	Lazy/Unmotivated Anxious/Insecure
F Slovenly Habits	(a) Neglected/Needy (b) Lazy/Unmotivated	Neglected/Needy Lazy/Unmotivated	Anxious/Insecure Rebellious/Undisciplined	Neglected/Needy Anxious/Insecure
G Swears and backchats	(a) Rebellious/Undisciplined (b) Aggressive/short tempered	Rebellious/Undisciplined Aggressive/Short temper.	Rebellious/Undisciplined Aggressive/Short tempered	Aggressive/short tempered Rebellious/Undisciplined
H Seeks attention	(a) Attention seeking (b) Anxious/Insecure	Unhappy/Depressed Anxious/Insecure	Neglected/Needy Attention seeking	Neglected/Needy Attention seeking
I Cuts his wrists	(a) Unhappy/Depressed (b) Attention seeking	Unhappy/Depressed Attention seeking	All negative cosines	Attention seeking
J Unacceptable sexual habits	(a) All negative cosines (b)	All negative cosines	All negative cosines	Attention seeking

The data in Table 20 confirms the graphical trends presented in Figures 5, 6, 7 and 8. There is a wide range of constructs used to describe the different rule-violations thereby producing some distinctive differences amongst the sub-groups of staff. Before examining these differences, it is useful to note that the Supervisors' descriptions correspond highly with those of the staff group as a whole.

The differences and similarities in the way rule-violators are construed are best assessed by taking each rule-violation element in turn:

The boy who absconds is seen as unhappy, depressed, anxious and insecure by the whole staff, the Supervisors and the Technical subject teachers. The Academic subject teachers describe him as unhappy and depressed but see him as immature and irresponsible rather than anxious and insecure. The Academic subject teachers introduce the concept of responsibility for actions which is not implied in being described as unhappy, depressed, insecure and anxious. It will be important to compare these descriptions with the way in which the sub-groups recommend that this rule violation should be managed (See Table 12).

The same pattern among the sub-groups and the staff as a whole occurs with the boy who smokes dagga in the institution, except that the Technical subject teachers have no positively correlated constructs with this rule violation element. This means that a description of the boy who smokes dagga by this sub-group is beyond the range of convenience of the explicit poles of the supplied constructs. The Technical subject teachers see none of the supplied descriptive labels as being appropriate to this type of boy and since the implicit poles of the

constructs have not been specified, the actual personality attributions these teachers would make of the boy who smokes dagga are not known.

The boy who refuses to do his schoolwork is described by the whole staff and the Supervisors as being firstly lazy and unmotivated and secondly immature and irresponsible. The Technical subject teachers see this action, in addition to being immature and irresponsible, as being associated with an aggressive short tempered type of person. The Academic subject teachers add to this by describing this type of boy as being rebellious and undisciplined. The teacher sub-groups see this boy differently from the way the Supervisors describe him. A possible explanation is the fact that the Supervisors do not have to cope with this type of boy in the classroom setting.

The rebellious and negative boy is described as would be expected, ie as aggressive, short tempered, rebellious and undisciplined by all the groups. The Technical subject teachers see him also as lazy and unmotivated.

The boy who shows no perseverence in tasks is seen primarily as neglected and needy by all of the groups. This implies strongly that the behaviour is not seen as intentional and the boy would probably not be held responsible for it.

The boy who has slovenly personal habits such as dirty clothes and poor table manners is seen primarily as neglected and needy by all groups except the Technical subject teachers who see him as anxious and insecure and secondly as rebellious and undisciplined. As a secondary description

the Supervisors see him as lazy / unmotivated whereas the Academic subject teachers see him as anxious and insecure. The Supervisors sub-group have to deal mainly with this type of rule-violator in the hostels and yet describe this type of boy in relatively neutral terms which do not imply that there is much intentionality inherent in the acts.

There is almost perfect agreement by all the groups that the boy who swears and backchats is rebellious, undisciplined, aggressive and short tempered. The behaviour is seen as intentional and unacceptable.

In contrast the boy who seeks attention is seen, obviously, as attention seeking but in addition he is seen as anxious, insecure, unhappy, depressed, neglected and needy, implying the lack of intention and personal responsibility for this type of behaviour.

The boy who cuts his wrists with a blade is seen by the staff as a whole and by the Supervisors primarily as unhappy and depressed and secondarily as attention seeking. The Technical subject teachers see none of the explicit poles of the constructs as appropriate in describing this boy. The Academic subject teachers have only one positive correlation, ie attention seeking. The concept of the boy who cuts his wrists as being attention seeking is significant here and will be discussed later.

The boy with unacceptable sexual habits such masturbation in a group, sodomy or exposing himself, is described as attention seeking by the Academic subject teachers but this positive correlation is relatively low in value. The staff as a whole, the Supervisors and Technical subject teachers see the nature of this type of boy to be beyond the

range of convenience of the explicit poles of the supplied constructs. How they would describe this type of boy remains undisclosed. Unacceptable sexual habits correlates negatively on all of the constructs supplied except attention seeking in the grid by the Academic subject teachers.

It will be useful at this stage to compile a table which will combine the salient features of Phase 1 with those of Phase 2. This is done in Table 21 which links the descriptive constructs and the reprimands found appropriate for each rule violation as presented by the staff as a whole and the three sub-groups, in Table 22.

TABLE 21. Most closely associated construct and reprimand for each rule violation.

STAFF AS A WHOLE

RULE VIOLATION	DESCRIPTION AND MANAGEMENT	
	WHOLE STAFF GROUP	
The boy who:	DESCRIPTION	MANAGEMENT
A Absconds	Unhappy/Depressed	Corporal Punishment
B Smokes dagga	Unhappy/Depressed	Warning
C Refuses to do his schoolwork	Lazy/Unmotivated	Warning
D Rebellious and Negative	Aggressive/Short tempered	Warning
E No Perseverence	Neglected/Needy	Warning
F Slovenly Habits	Neglected/Needy	Warning
G Swears and Backchats	Rebellious/Undisciplined	Warning
H Attention Seeking	Attention Seeking	Warning
I Cuts his wrists	Unhappy/Depressed	Send to Psychologist
J Unacceptable sexual habits	No description	Warning

TABLE 22. Most closely associated construct and reprimand for each rule violation.

THREE SUB - GROUPS

RULE VIOLATIONS	DESCRIPTION AND MANAGEMENT					
	SUPERVISORS		TECHNICAL SUBJECT TEACHERS		ACADEMIC SUBJECT TEACHERS	
The boy who:	Description	Management	Description	Management	Description	Management
A Absconds	Anxious/Insecure	Corporal Punishment	Unhappy/ Depressed	Send to Psychologist	Immature/ Irresponsible	Corporal Punishment
B Smokes Dagga	Unhappy/ Depressed	Corporal Punishment	No Description	Send to Psychologist	Immature Irresponsible	Warning
C Refuses to do his Schoolwork	Lazy/ Unmotivated	Warning	Immature/ Irresponsible	Warning	Rebellious/ Undisciplined	Warning
D Rebellious and Negative	Aggressive/ Short tempered	Warning	Aggressive/ Short tempered	Warning	Rebellious/ Undisciplined	Warning
E No Perseverence	Neglected/ Needy	Warning	Neglected/ Needy	Warning	Lazy/ Unmotivated	Warning
F Slovenly Habits	Neglected/ Needy	Warning	Anxious/ Insecure	Warning	Neglected/ Needy	Remove Privileges
G Swears and backchats	Rebellious/ Undisciplined	Remove Privileges	Rebellious/ Undisciplined	Warning	Aggressive/ Short Tempered	Warning
H Seeks attention	Unhappy/ Depressed	Warning	Neglected/ Needy	Warning	Neglected/ needy	Warning
I Cuts his wrists	Unhappy/ Depressed	Send to Psychologist	No description	Send to Psychologist	Attention Seeking	Send to Psychologist
J Unacceptable sexual habits	No description	Send to Psychologist	No description	Send to Psychologist	Attention Seeking	Warning

PART FIVE

DISCUSSION

DISCUSSION

This study was an attempt to gain a clear perspective of Reform School staff ideas and theories concerning the nature of the delinquent child based on his rule-violation behaviour within the institution. The implications of these personality attributions for the way the child is managed when he commits these rule violations was also considered. The employment of a repertory grid analysis provided an extensive range of statistical relationships between the constructs and elements evaluated. Comment will be reserved to those areas which have direct relevance for the aims of this study.

The rule-violations used were those most often encountered by the staff of the Reform School in their daily interactions with the pupils. It would be reasonable to assume, therefore, that the constructs they most frequently suggest to describe the boy who commits these rule-violations are the same constructs the staff would use to construe the nature of the delinquent child. This is in agreement with Attribution theory where Harris and Harvey (1981) have claimed that observed behaviour which is inconsistent with desired norms will elicit attributions about the personality of the rule-violator. The child who violates rules in the institution is eliciting far more evaluations of his personality characteristics than the child who is conforming. This is supported by personal observations at the Reform School in which it has become apparent that staff members have difficulty describing the nature of the quiet, reserved child who remains in the background. The child who receives the most staff attention and thereby contributes the most to staff constructs of the delinquent child is the rule-violator, as his rule-breaking forces staff members to take action to manage his rule violations.

The social forces which structure the environment of the Reform School are largely the result of the opinions of the staff of the school and these opinions are based on their constructions of the nature of the delinquent child. The personality attributions made by staff members towards the Reform School boy affect their decisions when responding to the child, managing his rule violations and planning his mode of treatment and rehabilitation.

How then do staff members construe the nature of the delinquent child? How do these constructions affect his suggestions for management of the rule breaking activities and what implications do these have for the self concept of the adolescent inmate of a Reform School during the stage of identity formation?

In each of the four grids in Phase 2, where the rule-violation elements were ranked in terms of descriptive constructs, Component 1 accounted for the highest percentage of the variation (see Table 13, 17 (a), 17 (b) and 17 (c). This means that Component 1 is the hypothetical variable which best describes the variation in the grid and accounts for the highest loadings of the elements and constructs. Since there are many differences in the manner in which the sub-groups of staff construe rule-violators in Phase 2, it is significant that constructs 1 and 7, to a greater or lesser degree, describe Component 1 in the grid for the whole staff as well as all three sub-groups of staff (see Figures 5, 6, 7 and 8). Constructs - Lazy/Unmotivated (1) and Immature/Irresponsible (7) therefore account for most of the variation amongst the elements, and should be seen as the major constructs used to differentiate between rule-violators. These are seen by the staff to be the most useful

constructs to describe and differentiate between different types of boys who commit rule violations. Looking at Figure 5, the grid for the whole staff group, it can be seen that the boy with unacceptable sexual habits (J) has the highest negative loading on Component 1 and is therefore seen as the least lazy/unmotivated and immature/irresponsible. In contrast, the boy who refuses to do his schoolwork (C) has the highest positive loading on Component 1 and is therefore described as the most lazy/unmotivated and immature/irresponsible. This description is confirmed in Table 20. Elements such as A, B, G and F are seen neutrally in terms of these constructs as they have small loadings on Component 1 and are therefore rated neither particularly lazy/unmotivated or immature/irresponsible.

The child who refuses to do his schoolwork (C) is a common problem in the Reform School. Rutter and Yule (1977) have asserted that it has long been known that psychiatric disorder and delinquency are both frequently accompanied by severe reading difficulties. Offord et al (1978) have found that in the delinquent population which they studied, educational retardation and anti-social behaviour arose from common or co-existing influences.

The majority of the children in the Reform School suffer from educational deprivation or one or more specific learning problems. Many of them have attended five or more schools during their education, have significantly lower verbal IQ scores than non-verbal and have a strongly negative attitude towards schooling. This is probably the reason why the boy who refuses to do his schoolwork or homework was the rule-violation most frequently given as a problem by the staff.

The grid analysis shows that the dimension of lazy/unmotivated and immature/irresponsible is the major one for distinguishing between rule violators, and the boy who refuses to do his schoolwork is best described by the staff using this dimension. The implications of this are that the child who suffers from a low verbal IQ or a learning disability and defensively refuses to attempt his schoolwork is being labelled as lazy/unmotivated, immature and irresponsible. Many of the boys in the school at one time or another refuse to do their schoolwork in order to protect an already low self esteem or as an act of defiance against authority figures.

Norris (1977) found in her study of trainees in a detention centre for a two month period, that many of them left with lowered aspirations and self esteem and increased perceptions of themselves as rebellious. The child who has a learning problem and refuses to do his schoolwork and is labelled as a lazy/unmotivated, irresponsible and immature person is sure to experience similar feelings of lowered self esteem and frustration to those found by Norris (op cit).

Another significant feature to emerge from the staff grid in Phase 2 is that, although the rule violation elements were well dispersed in descriptive construct space, elements - the boy who absconds (A) and the boy who smokes dagga (B), have the least distance between them. (See Appendix 1 for table of distance between the elements - Grid 4 tick). Having a relatively small distance between elements in construct space means that these elements are described by the same constructs. This

is borne out in Table 20 which shows that they are both most appropriately construed as unhappy, depressed, anxious and insecure. When the personality attributions made about these rule-violators are compared with the reprimands suggested in Phase 1, it can be seen from Table 21 that the staff recommend that the boy who absconds should be given corporal punishment whereas the boy who smokes dagga should be warned. This is a large discrepancy in severity of reprimand recommended for rule violations which are construed in a similar way. A warning for a boy who is seen as unhappy, depressed, anxious and insecure seems to be appropriate - so why then is a much harsher reprimand being recommended for the boy who absconds? The reason may lie in Mancuso's (1979, 1980) observation that workers in a child care setting were more concerned with changing socially undesirable behaviour by reprimanding it more severely than changing other unwanted behaviour. If we assume that dagga smoking is considered more socially undesirable than absconding from the Reform School, then the reverse of what Mancuso (op cit) found seems to be happening here. The behaviour which is less socially undesirable is being recommended to need the more severe reprimand. Staff seem to be more concerned with the institutional implications of the rule-violation than the social implications. They appear to be more oriented towards custodial type aims than rehabilitative aims. This idea is further supported by the fact that the constructions of the Supervisors, who have a mainly custodial role in the Reform School, are the most similar to those of the staff group as a whole when compared to the constructions made by the other two sub-groups (see Table 20). The rule-violation of absconding, which is construed by the staff to be the behaviour of a person who is unhappy, depressed, anxious and insecure, is managed by corporal punishment. This is confirmed by an examination of the recordings in

the official punishment book between November 1981 and April 1982 which revealed that of the 72 boys who absconded during this period, 46 were given corporal punishment, 16 were warned, 4 had to spend longer time at the Reform School, 3 lost badges (and thereby privileges), 2 were placed in the cells without additional punishment and 1 was transferred to prison. After working for three years as psychologist in the Reform School, the author is of the opinion that the Reform School is undergoing a process of change from an institution with largely custodial and formal education aims to one where rehabilitation and education in a broader context are seen as aims. This is similar to what Weber (cited in Haskell and Yablonsky 1978) identified in a training school which he described as having two divergent systems of resocialisation. He noted that the approach at the training school was shifting from the tight control of behaviour to a relative permissiveness which allowed acting out. Under the guidance of the present principal of the Reform School in this study, a similar change of approach seems to be taking place. One of the consequences of less custodial care and containment is more acting out which is often manifested as absconding. The staff of the school seem to construe the nature of the absconder in a realistic and concerned manner, reflecting their attempts to understand the reasons behind his behaviour and yet their recommendations for management of the absconder still retain a punitive element consistent with custodial type aims.

With reference to Figure 5, it was noted that element J (ie the boy with unacceptable sexual habits) was consistently ranked high or inappropriate to all of the descriptive constructs and in Table 15 it was noted that all the cosine values were negative indicating that this element was

beyond the range of convenience of the constructs supplied. The same trend was apparent in each of the sub-groups. The Academic subject teachers had a low correlation (cosine) value with attention seeking for this element (see Table 19 (c) indicating that this was the most appropriate of the supplied descriptive labels. During the administration of the repertory grids, a significant number of subjects were heard to comment that it was difficult to describe the nature of the boy with unacceptable sexual habits and all the reprimands seemed inappropriate. This seems to suggest that, rather than a description being beyond the range of convenience of the supplied constructs, that the staff are having difficulty understanding and construing this child in any manner at all. Warning, as a reprimand suggested by the staff, also appears to be inappropriate in this context. Unacceptable sexual acts, such as group masturbation, sodomy or exposure to a female teacher occur occasionally at the Reform School and members of staff, particularly hostel staff, are usually aware of which boys have committed these rule-violations in the past. In this light, therefore, it is significant that there is difficulty in ascribing personality characteristics to this type of boy. Element I (the boy who cuts his wrists with a blade) shows similar trends, although to a lesser extent than Element J, indicating that the staff are having difficulty construing the nature of this type of boy. The secondary descriptions of this act as attention seeking, particularly with the Academic subject teachers who use this as the only appropriate construct (see Table 20),is also worthy of note since the psychological sequelae of a suicide attempt may be missed if the act is defined solely as attention seeking and dismissed in this way. The staff recommended sending the boy who cuts his wrists to the psychologist which seems to be the most appropriate way of handling this behaviour.

For the purposes of in-service training, it would certainly seem indicated to educate the staff about the nature of the child with unacceptable sexual habits and the boy who cuts his wrists with a blade.

Table 10 and Figure 1, 2, 3 and 4 show that the reprimands considered by staff to be the most appropriate were corporal punishment (6), removal of privileges (2), warning (1) and send to a psychologist. The prominent use of a verbal warning as the most appropriate reprimand in the majority of rule violations deserves some comment.

Mancuso (1980) found that an explanatory reprimand was most often used by high peer-rated child care workers in his study. A verbal warning is the most similar of the eight reprimands to Mancuso's description of an explanatory reprimand provided that, when a verbal warning is given, it indicates clearly what behaviour is being reprimanded and for what purpose. Another possible explanation for the popularity of warning as a reprimand is that the staff were not evaluating it as the most appropriate but as the reprimand to be used initially in each rule-violation.

During the administration of the grids, all groups were continuously reminded not to evaluate the reprimands in terms of what they would try first but in terms of which reprimand was the most appropriate. Nevertheless, it is possible that they may have evaluated it in this way.

Reprimands - transfer to prison(7), lock in cells (5), personal suffering (4) and extra work (3) were not rated as appropriate to handle the rule violations used in this study. Transfer to prison is rated highly

inappropriate in the majority of rule-violations and this is understandable as this is a severe reprimand and only occurs once or twice a year. It is significant that locking up in the cells is not seen as more appropriate, particularly in association with absconding, as this occurs almost routinely when a boy returns from absconding and before he is punished. This may not be perceived as punishment by the staff as the policy of the school is to isolate the boy who returns from running away before the events leading up to his escape have been investigated. A boy is occasionally returned to the cells after being corporally punished and this is again not seen as further punishment, but as an opportunity for the boy to consider the consequences and implications of his absconding.

Reprimanding by making the boy do extra work (3) was not seen as particularly appropriate by the staff of the Reform School although this reprimand is the most restitutive of the reprimands in nature and corresponds most closely with the restitutive reprimand described by Mancuso (1979, 1980) which was the most popular with child care workers in his study.

As a psychologist employed at the Reform School for three years, the author has observed that having a large and diverse staff group often results in widely differing views on the nature of the child under discussion and recommendations for his management. This study aimed to examine whether differences in roles performed at the school, levels of education and experience amongst the three sub-groups of staff would be reflected in the way they construe the nature of the rule-violator and recommendations they make for his management.

The results of Phase 2 show that there are significant differences amongst the three sub-groups of staff in the dispersion of rule-violation elements in construct space (see Figures 6, 7 and 8). This indicates that there are differences in the way sub-groups of staff construe the nature of rule-violators in the Reform School. A summary of the constructs used to describe the rule-violations is presented in Table 20.

It should be noted that the Technical subject teachers ranked most of the elements similarly on all the constructs, ie the same element was ranked either high, low or in the middle on most of the constructs (see Figure 7). This indicates that the Technical subject teachers found that the supplied descriptive constructs did not effectively differentiate between the rule-violation elements to the same degree as found by the other two sub-groups. In addition, the Technical subject teachers found that elements - the boy who smokes dagga (B), the boy who cuts his wrists (I) and the boy who has unacceptable sexual habits (J) were all beyond the range of convenience of the constructs supplied. This seems to suggest that the Technical subject teachers, as a group, do not have as well formed ideas or constructions about the nature of rule-violators in the school as the other two sub-groups, and see each of the eight supplied constructs as being appropriate in the same way to each rule-violation element. This is confirmed in Table 19 (b) where each element is given consistently high or low cosine values on all of the constructs.

With reference to Table 20, the boy who refuses to do his schoolwork (C), in addition to being seen as immature and irresponsible by the staff as a whole and by the Supervisors, the Technical subject teachers

see him as aggressive and short-tempered and the Academic subject teachers add rebellious and undisciplined. The difference in the way the nature of this boy is construed probably reflects differences in roles performed by staff members at the school. As teachers, the latter sub-groups have to manage the child who refuses to do his schoolwork in the classroom setting and this area is often the source of conflict between the reluctant child and the teacher.

A difficulty may arise when the reluctance of the boy to do his school work is not a manifestation of his frustration towards authority figures but is the result of educational retardation or specific learning problems. Most of the boys at the Reform School have demonstrated their inability to cope with conventional schooling by truanting, changing schools and finally "dropping out". The labelling of the learning disabled child who refuses to do his schoolwork as aggressive, rebellious and undisciplined will certainly increase perceptions of himself as this type of person.

In Phase 1, where the reprimand elements were ranked in terms of the rule-violation constructs, the dispersion of elements in construct space for all three sub groups is remarkably similar (see Figures 2, 3 and 4). This indicates that there is a large degree of agreement amongst the sub groups of staff on how rule violations should be managed, despite differences in the way they are construed. All three sub-groups rank reprimands - Warning(1), Corporal Punishment (6), Send to a Psychologist (8) and Removal of Privileges (2) as the most appropriate by aligning these with the positive poles of the rule-violation constructs (Figure 2, 3 and 4).

The major source of difference amongst the three sub-groups (see Table 10) is that the Technical subject teachers recommend sending a boy who violates rules to the psychologist as the most appropriate in four of the ten rule-violations whereas the Supervisors and Academic subject teachers recommend this only twice each. This may reflect an attitude amongst the Technical subject teachers that there are underlying reasons behind a boy's rule violation which need further investigation. In all three of the rule-violations which were beyond the range of convenience of the supplied construct for the Technical subject teachers, they recommend sending the boy to the psychologist. This seems to suggest that the psychologist is seen by this sub-group as a person to handle a rule violation when the nature of the child committing the rule-violation is uncertain.

It therefore appears that, although there are differences in the way the sub-groups of staff construe the nature of the rule-violator, there seems to be greater agreement amongst them to manage the rule-violator in the same way. This seems to indicate that the nature of the rule-violator plus the possibility of underlying factors of a psychological nature playing an etiological role receive less emphasis than the need to manage rule-violations in a consistent manner.

PART SIX

CONCLUSIONS

CONCLUSIONS

The aims of this study were to use a Personal Construct Theory approach to assess staff constructions of the nature of the institutionalised delinquent child in a reform school. These constructions were assessed as personality characteristic attributions based upon the rule-violating behaviour within the institution. In addition, implications of such staff perceptions or attributions for the management of the delinquent child were considered.

A repertory grid analysis using a ranking format and analysis by the Ingrid 72 computer programme were used.

The results enabled the following conclusions to be reached:

(a) That the repertory grid technique provides a valid means of assessing staff group constructions or personality attributions about the nature of the delinquent child.

(b) The staff of the reform school use the constructions Lazy/Unmotivated and Immature/Irresponsible as the major variables to distinguish between rule-violation within the institution.

(c) The labelling of the child who refuses to do his schoolwork as lazy, irresponsible, rebellious and undisciplined may be damaging to an already low self esteem, particularly where the child suffers from educational deprivation or a specific learning disability.

(d) There are differences in the way that sub-groups of staff at the Reform School construe the nature of rule-violators but there is greater agreement amongst them to manage the rule violations

in a similar way. This indicates that the need to manage rule violations in a consistent, objective manner receives more emphasis than taking the nature of the child and possible underlying psychological factors into account.

(e) Where the boy who absconds and the boy who smokes dagga are both contrued as unhappy, anxious and insecure, the staff recommend that the boy who absconds should receive a far more severe reprimand indicating that custodial aims are still strongly prevalent at the reform school.

(f) One of the aims of in-service training for the staff should be to educate them on the nature, etiology and ways of managing the boy who cuts his wrists or who has unacceptable sexual habits.

6.1 IMPLICATIONS FOR FURTHER RESEARCH

Since the development of Ingrid 72 computer programme in 1972, Shaw (1981) has indicated that a new programme called Series has been developed which does an analysis of commonality in two or more grids which are aligned by the same elements and constructs. Slater (1977) has indicated that the Series programme extracts a consensus grid from the individual grids. This can then be analysed by Ingrid and compared with the individual grids by a new programme called Sequel.

The analysis of the data obtained in this study by Series, Ingrid and Sequel would remove the necessity of adding individual rankings together

to form a group grid and thereby possibly losing some of the characteristics of the individual grid.

Further research in this area could use rating of the elements rather than ranking as was used in this study. Rating of the elements on a scale means that each element is rated individually and assigned a value. This method is far more time consuming, particularly when working with a large group, but it allows finer discriminations between the elements to emerge and does not force the subject to discriminate between two elements to which he might normally assign the same value.

It would be useful to assess and compare the constructions of the inmates themselves on the nature of the boy who commits rule-violations in the institution with those obtained by the staff in this study. The child who enters a Reform School is dependant on his peer group and the staff of the school in order to form impressions of himself as a social person, and Walter (1978) has pointed out the dilemma facing the boy in a reform school because of his divergent identity when in the presence of staff and pupils together. The boy who is labelled by the staff with personality attributions which are not consonant with his self image, may well gain recognition and acceptance by turning to a peer group whose ideas are more similar to his own.

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PART SEVEN

APPENDIX 1

FULL COMPUTER PRINT OUT OF DATA ASSESSED BY

INGRID 72.

KEY:

P H A S E 1

GRID 1 cross - Supervisors.

GRID 2 cross - Technical Subject Teachers.

GRID 3 cross - Academic Subject Teachers.

GRID 4 cross - Staff as a whole.

P H A S E 2

GRID 1 tick - Supervisors.

GRID 2 tick - Technical Subject Teachers.

GRID 3 tick - Academic Subject Teachers.

GRID 4 tick - Staff as a whole.

*** GRID1-TICK

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.697	45.62	3	.794	37.44	4	.103	84.09	5	.552	56.53	6	.303	72.36
7	.467	62.18	8	-.139	98.01									
CONSTRUCT 2														
3	.321	71.26	4	.176	79.68	5	.830	33.87	6	-.065	94.87	7	.394	66.80
8	-.194	101.18												
CONSTRUCT 3														
4	-.042	92.43	5	.212	77.75	6	.430	64.51	7	.267	74.53	8	.042	87.57
CONSTRUCT 4														
5	.079	85.48	6	.388	67.18	7	-.109	96.26	8	.733	42.83			
CONSTRUCT 5														
6	-.018	91.04	7	.400	66.42	8	-.212	102.25						
CONSTRUCT 6														
7	.352	69.42	8	.724	43.59									
CONSTRUCT 7														
8	.030	88.26												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	10.500	99.750	8.45
2	-4.500	16.750	2.54
3	15.500	58.750	8.90
4	12.500	74.750	11.33
5	8.500	50.750	7.69
6	.000	46.000	6.97
7	-3.500	58.750	8.90
8	3.000	56.000	8.48
9	-7.000	86.500	13.11
10	-35.000	154.000	23.33

TOTAL VARIATION ABOUT CONSTRUCT MEANS 660.0000

TOTAL PER CONSTRUCT 82.5000

UNIT OF EXPECTED DISTANCE 12.1106

DISTANCES BETWEEN ELEMENTS

ELEMENT 1																
2	.557	3	.803	4	1.043	5	.880	6	.992	7	1.020	8	.776	9	.890	10 1.433
ELEMENT 2																
3	.912	4	.952	5	.786	6	.776	7	.860	8	.543	9	.657	10	.946	
ELEMENT 3																
4	.779	5	.668	6	.682	7	.745	8	1.022	9	1.237	10	1.539			

ELEMENT 4
5 .921 6 .953 7 .803 8 .992 9 1.154 10 1.505

ELEMENT 5
6 .537 7 .977 8 .767 9 1.221 10 1.392

ELEMENT 6
7 .672 8 1.008 9 1.245 10 1.165

ELEMENT 7
8 1.237 9 1.179 10 1.090

ELEMENT 8
9 .772 10 1.285

ELEMENT 9
10 1.128

SUMS OF PRODUCTS

ELEMENT 1
2 13.500 3 10.000 4 -14.500 5 -3.500 6 -21.250 7 -19.000 8 11.750 9 13.000 10 -45.750

ELEMENT 2
3 -23.250 4 -20.750 5 -11.500 6 -12.750 7 -16.500 8 14.750 9 20.000 10 19.750

ELEMENT 3
4 22.250 5 22.000 6 18.250 7 18.000 8 -19.250 9 -39.500 10 -67.250

ELEMENT 4
5 .500 6 -6.250 7 19.500 8 -6.750 9 -17.000 10 -51.750

ELEMENT 5
6 27.250 7 -15.250 8 10.250 9 -40.750 10 -39.750

ELEMENT 6
7 19.250 8 -23.500 9 -47.500 10 .500

ELEMENT 7
8 -54.750 9 -29.250 10 19.250

ELEMENT 8
9 27.500 10 -16.000

ELEMENT 9
10 27.000

THE COMPONENT-SPACE IS LIMITED TO 8 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	257.6556	39.04
2	188.9910	28.63
3	99.6559	15.10
4	67.7728	10.27
5	23.9009	3.62
6	12.2666	1.86
7	7.3983	1.12
8	.3567	.05

BARTLETT TEST

EXCLUDING 6. MAJOR COMPONENTS

CHI SQUARED 2.6023 D.F. 2

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 4.7926 D.F. 5

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 8.2956 D.F. 9

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 16.3057 D.F. 14

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 24.5662 D.F. 20

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 36.7743 D.F. 27

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	-1.5000	-2.5000	4.5000	2.5000	3.5000	1.5000	-.5000	.5000	-3.5000	-4.5000
CONSTRUCT 2	-.5000	-2.5000	2.5000	4.5000	1.5000	.5000	3.5000	-3.5000	-1.5000	-4.5000
CONSTRUCT 3	-1.5000	-.5000	.5000	1.5000	4.5000	3.5000	-2.5000	2.5000	-3.5000	-4.5000
CONSTRUCT 4	.5000	-.5000	1.5000	3.5000	-2.5000	-3.5000	-1.5000	2.5000	4.5000	-4.5000
CONSTRUCT 5	1.5000	-.5000	2.5000	4.5000	-1.5000	.5000	3.5000	-2.5000	-4.5000	-3.5000
CONSTRUCT 6	4.5000	1.0000	1.0000	-1.0000	2.5000	-2.5000	-3.5000	3.5000	-1.0000	-4.5000
CONSTRUCT 7	3.5000	-.5000	4.5000	-3.5000	1.0000	2.5000	1.0000	-2.5000	-1.5000	-4.5000
CONSTRUCT 8	4.0000	1.5000	-1.5000	.5000	-.5000	-2.5000	-3.5000	2.5000	4.0000	-4.5000

COMPON 1 COMPON 2 COMPON 3

ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	.0765	1.2264	54.2410	-.3507	-4.9314	29.9227	.0200	.1992	29.8830
2	-.1807	-2.9002	8.3366	-.1336	-1.8372	4.9634	-.0819	-.8179	4.2945
3	.4190	6.7252	13.5219	.0515	.7079	13.0208	.0503	.5025	12.7683
4	.2954	4.7419	52.2643	.0174	.2395	52.2069	.3373	5.3636	23.4388
5	.2678	4.2990	32.2685	-.0101	-.1389	32.2492	-.5055	-5.0463	6.7839
6	.1676	2.6910	38.7585	.3277	4.5049	18.4645	-.3549	-3.5427	5.9135
7	.0873	1.4016	56.7856	.4614	6.3427	16.5554	.3592	3.5863	3.6942
8	-.0884	-1.4190	53.9865	-.4346	-5.9741	18.2967	-.2491	-2.4867	12.1130
9	-.3848	-6.1772	48.3420	-.3717	-5.1099	22.2313	.3402	3.3961	10.6975
10	-.6598	-10.5907	41.8375	.4507	6.1964	3.4425	-.1156	-1.1540	2.1107
CONSTRUCT									
1	.5219	8.3778	12.3129	.0312	.4283	12.1294	-.1534	-1.5316	9.7835
2	.4633	7.4371	27.1896	.1843	2.5343	20.7669	.3949	3.9419	5.2285
3	.3923	6.2968	42.8503	-.0879	-1.2090	41.3887	-.4874	-4.8661	17.7099
4	.0885	1.4200	80.4836	-.4783	-6.5754	37.2481	.5412	5.4023	8.0635
5	.4256	6.8316	35.8268	.1972	2.7112	28.4782	.3956	3.9491	12.6827
6	.2041	3.2766	71.7641	-.5347	-7.3506	17.7323	-.2810	-2.8048	9.8652
7	.3583	5.7512	49.4241	-.0096	-.1318	49.4068	-.1947	-1.9440	45.6276
8	-.0060	-.0956	82.4909	-.6353	-8.7343	6.2029	.1293	1.2909	4.5364

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	-135.00	-35.26	.29
2	45.00	35.26	.75
3	-135.00	-35.26	.93
4	45.00	35.26	1.03
5	45.00	35.26	.75
6	-135.00	-35.26	.53
7	-135.00	-35.26	.37
8	45.00	35.26	.25

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	-76.01	2.24	.68
2	-147.65	-13.40	.86
3	6.01	4.25	.88
4	2.89	48.48	.83
5	-1.85	-49.56	.93
6	59.15	-34.02	.93
7	77.54	28.90	.97
8	-103.36	-22.05	.89
9	-140.40	22.96	.94
10	149.67	-5.37	.99

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1									
-2.1412	-.9863	.9900	.0251	1.2562	.0955	-1.2315	1.2406	-.2760	1.0275
CONSTRUCT 2									
-1.0692	-1.1562	-.6159	2.3030	-.4918	-.7468	2.8506	-2.8426	1.3620	.4069
CONSTRUCT 3									
-1.9819	.6377	-2.1382	-.3602	2.8136	2.4444	-3.0498	3.0566	-1.0768	-.3455
CONSTRUCT 4									

.3913	-.2434	.9051	3.0805	-2.8803	-3.7381	-1.6240	2.6255	5.0465	-3.5631
CONSTRUCT 5									
.9772	.7344	-.3623	2.4818	-3.3297	-.6453	2.9035	-1.8961	-1.8710	1.0074
CONSTRUCT 6									
4.2492	1.5920	-.3728	-1.9679	1.6225	-3.0493	-3.7861	3.7897	.2609	-2.3382
CONSTRUCT 7									
3.0599	.5391	2.0904	-5.1990	-.5403	1.5358	.4978	-1.9916	.7132	-.7055
CONSTRUCT 8									
4.0073	1.4827	-1.4600	.5282	-.4744	-2.4840	-3.4917	2.4916	3.9632	-4.5631

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1									
-1.9875	-.9291	.9679	.0176	1.2606	-.0449	-1.4291	1.4267	-.1168	.8345
CONSTRUCT 2									
-.1601	-.8176	-.7464	2.2588	-.4662	-1.5773	1.6814	-1.7412	2.3040	-.7354
CONSTRUCT 3									
-2.4156	.4762	-2.0759	-.3391	2.8014	2.8405	-2.4920	2.5313	-1.5262	.1995
CONSTRUCT 4									
-1.9673	-1.1221	1.2436	3.1951	-2.9468	-1.5834	1.4097	-.2319	2.6024	-.5994
CONSTRUCT 5									
1.9497	1.0967	-.5019	2.4346	-3.3023	-1.5337	1.6526	-.7179	-.8632	-.2146
CONSTRUCT 6									
1.6125	.6097	.0057	-1.8399	1.5482	-.6406	-.3947	.5953	-2.4713	.9750
CONSTRUCT 7									
3.0126	.5215	2.0972	-5.1967	-.5416	1.5790	.5586	-2.0489	.6643	-.6461
CONSTRUCT 8									
.8742	.3155	-1.0102	.6804	-.5627	.3782	.5381	-1.3040	.7167	-.6262

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1									
-1.9570	-1.0545	1.0450	.8405	.4863	-.5884	-.8789	1.0452	.4043	.6575
CONSTRUCT 2									
-.2387	-.4946	-.9448	.1409	1.5264	-.1784	.2653	-.7593	.9630	-.2797
CONSTRUCT 3									
-2.3185	.0775	-1.8310	2.2754	.3415	1.1136	-.7439	1.3191	.1293	-.3631
CONSTRUCT 4									
-2.0751	-.6795	.9717	.2925	-.2159	.3338	-.5310	1.1138	.7646	.0251
CONSTRUCT 5									
1.8709	1.4202	-.7006	.3128	-1.3060	-.1322	.2339	.2658	-2.2067	.2419
CONSTRUCT 6									

1.6684	.3799	.1469	-.3329	.1303	-1.6360	.6129	-.1033	-1.5171	.6508

CONSTRUCT 7

3.0514	.3623	2.1951	-4.1522	-1.5243	.8891	1.2570	-2.5331	1.3256	-.8708

CONSTRUCT 8

.8485	.4213	-1.0752	-.0132	.0899	.8363	.0744	-.9825	.2775	-.4770

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4

.6154	.1231	.2344	-.5581	-.2022	.0074	.2195	-.3812	.0125	-.0708

COMPONENT 5

-.4086	-.3263	.4073	-.3022	.0871	.1876	-.0572	-.1058	.6318	-.1136

COMPONENT 6

.0689	.1398	-.6323	.0918	.1472	.4902	.0581	-.3318	.2935	-.3255

COMPONENT 7

-.1372	.2537	.1497	-.0062	-.6941	.5340	-.1396	.2605	-.1094	-.1314

COMPONENT 8

-.2664	.1470	-.1760	-.3352	.0390	-.1694	.6754	.4225	-.0228	-.3141

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT

1	-.099	2	-.788	3	.828	4	.506	5	.737	6	.455	7	.058	8	-.038	9	-.671	10	-.726

CONSTRUCT 2 WITH ELEMENT

1	-.076	2	-.846	3	.727	4	.745	5	.257	6	.288	7	.584	8	-.548	9	-.494	10	-.609

CONSTRUCT 3 WITH ELEMENT

1	-.090	2	-.381	3	.406	4	.278	5	.882	6	.522	7	-.332	8	.316	9	-.582	10	-.606

CONSTRUCT 4 WITH ELEMENT

1	.325	2	-.026	3	.145	4	.501	5	-.288	6	-.708	7	-.352	8	.445	9	.561	10	-.544

CONSTRUCT 5 WITH ELEMENT

1	.112	2	-.568	3	.671	4	.682	5	.056	6	.241	7	.624	8	-.538	9	-.628	10	-.524

CONSTRUCT 6 WITH ELEMENT

1	.747	2	.255	3	.238	4	-.064	5	.426	6	-.325	7	-.702	8	.643	9	.009	10	-.664

CONSTRUCT 7 WITH ELEMENT

1	.525	2	-.293	3	.768	4	-.196	5	.366	6	.412	7	.159	8	-.345	9	-.410	10	-.575

CONSTRUCT 8 WITH ELEMENT

1 .713 2 .471 3 -.137 4 .028 5 -.095 6 -.673 7 -.707 8 .659 9 .595 10 -.504

INTER-ELEMENT RELATIONS EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT
2 .442 3 .175 4 -.225 5 -.066 6 -.420 7 -.332 8 .210 9 .187 10 -.494

ELEMENT 2 WITH ELEMENT
3 -.741 4 -.586 5 -.394 6 -.459 7 -.526 8 .482 9 .525 10 .389

ELEMENT 3 WITH ELEMENT
4 .336 5 .403 6 .351 7 .306 8 -.336 9 -.554 10 -.707

ELEMENT 4 WITH ELEMENT
5 .008 6 -.107 7 .294 8 -.104 9 -.211 10 -.482

ELEMENT 5 WITH ELEMENT
6 .564 7 -.279 8 .192 9 -.615 10 -.450

ELEMENT 6 WITH ELEMENT
7 .370 8 -.463 9 -.753 10 .006

ELEMENT 7 WITH ELEMENT
8 -.955 9 -.410 10 .202

ELEMENT 8 WITH ELEMENT
9 .395 10 -.172

ELEMENT 9 WITH ELEMENT
10 .234

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT
1 95.7 2 142.0 3 34.2 4 59.6 5 42.5 6 62.9 7 86.7 8 92.2 9 132.2 10 136.5

CONSTRUCT 2 WITH ELEMENT
1 94.3 2 147.7 3 43.4 4 41.8 5 75.1 6 73.2 7 54.3 8 123.2 9 119.6 10 127.5

CONSTRUCT 3 WITH ELEMENT
1 95.2 2 112.4 3 66.1 4 73.9 5 28.1 6 58.5 7 109.4 8 71.6 9 125.6 10 127.3

CONSTRUCT 4 WITH ELEMENT
1 71.1 2 91.5 3 81.7 4 60.0 5 106.7 6 135.1 7 110.6 8 63.6 9 55.8 10 123.0

CONSTRUCT 5 WITH ELEMENT
1 83.6 2 124.6 3 47.9 4 47.0 5 86.8 6 76.0 7 51.4 8 122.5 9 128.9 10 121.6

CONSTRUCT 6 WITH ELEMENT
1 41.6 2 75.2 3 76.3 4 93.7 5 64.8 6 109.0 7 134.6 8 50.0 9 89.5 10 131.6

CONSTRUCT 7 WITH ELEMENT

1	56.3	2	107.0	3	39.9	4	101.3	5	68.5	6	65.7	7	80.8	8	110.2	9	114.2	10	125.1

CONSTRUCT 8 WITH ELEMENT

1	44.5	2	61.9	3	97.9	4	88.4	5	95.5	6	132.3	7	135.0	8	48.8	9	53.5	10	120.2

INTER-ELEMENT RELATIONS EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2	63.8	3	79.9	4	103.0	5	93.8	6	114.8	7	109.4	8	77.9	9	79.2	10	119.6		

ELEMENT 2 WITH ELEMENT

3	137.8	4	125.9	5	113.2	6	117.3	7	121.7	8	61.2	9	58.3	10	67.1				

ELEMENT 3 WITH ELEMENT

4	70.4	5	66.2	6	69.4	7	72.2	8	109.6	9	123.6	10	135.0						

ELEMENT 4 WITH ELEMENT

5	89.5	6	96.1	7	72.9	8	96.0	9	102.2	10	118.8								

ELEMENT 5 WITH ELEMENT

6	55.7	7	106.2	8	78.9	9	128.0	10	116.7										

ELEMENT 6 WITH ELEMENT

7	68.3	8	117.6	9	138.9	10	89.7												

ELEMENT 7 WITH ELEMENT

8	162.7	9	114.2	10	78.3														

ELEMENT 8 WITH ELEMENT

9	66.7	10	99.9																

ELEMENT 9 WITH ELEMENT

10	76.5																		

*** GRID2-TICK

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.685	46.78	3	.709	44.84	4	.582	54.42	5	.630	50.93	6	.636	50.48
7	.842	32.60	8	.455	62.96									
CONSTRUCT 2														
3	.533	57.77	4	.642	50.03	5	.533	57.77	6	.164	80.58	7	.848	31.95
8	.345	69.79												
CONSTRUCT 3														
4	.779	38.85	5	.273	74.17	6	.842	32.60	7	.827	34.18	8	.152	81.29
CONSTRUCT 4														
5	.430	64.51	6	.473	61.79	7	.827	34.18	8	.073	85.83			
CONSTRUCT 5														
6	.315	71.63	7	.533	57.77	8	.230	76.69						
CONSTRUCT 6														
7	.539	57.36	8	.236	76.33									
CONSTRUCT 7														
8	.279	73.81												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	-2.000	40.000	6.06
2	-12.500	27.750	4.20
3	24.500	87.750	13.30
4	13.500	43.750	6.63
5	19.500	63.750	9.66
6	8.500	53.750	8.14
7	-.500	45.250	6.86
8	4.000	68.000	10.30
9	-20.000	74.000	11.21
10	-35.000	154.000	23.33

TOTAL VARIATION ABOUT CONSTRUCT MEANS 660.0000

TOTAL PER CONSTRUCT 82.5000

UNIT OF EXPECTED DISTANCE 12.1106

DISTANCES BETWEEN ELEMENTS

ELEMENT 1																
2	.579	3	1.029	4	.784	5	.909	6	.835	7	.993	8	1.025	9	.671	10	1.092
ELEMENT 2																
3	1.163	4	.815	5	1.062	6	.876	7	.688	8	.964	9	.469	10	.712		
ELEMENT 3																
4	.502	5	.478	6	.921	7	.897	8	.946	9	1.387	10	1.762				

ELEMENT 4
5 .593 6 .848 7 .681 8 .978 9 1.142 10 1.464

ELEMENT 5
6 .663 7 .961 8 .726 9 1.337 10 1.619

ELEMENT 6
7 .864 8 .867 9 1.124 10 1.385

ELEMENT 7
8 .969 9 .948 10 1.155

ELEMENT 8
9 1.138 10 1.334

ELEMENT 9
10 .623

SUMS OF PRODUCTS

ELEMENT 1
2 9.250 3 -13.750 4 -3.250 5 -8.750 6 -4.250 7 -29.750 8 -23.000 9 24.000 10 9.500

ELEMENT 2
3 -41.500 4 -13.000 5 -37.000 6 -15.500 7 1.750 8 -20.250 9 34.750 10 53.750

ELEMENT 3
4 47.250 5 59.000 6 8.500 7 7.500 8 12.250 9 -60.250 10 -106.750

ELEMENT 4
5 28.000 6 -4.000 7 10.500 8 -14.250 9 -36.750 10 -58.250

ELEMENT 5
6 26.500 7 -13.250 8 27.250 9 -62.250 10 -83.250

ELEMENT 6
7 -5.250 8 5.750 9 -28.750 10 -36.750

ELEMENT 7
8 -12.250 9 -6.250 10 1.750

ELEMENT 8
9 -24.000 10 -19.500

ELEMENT 9
10 85.500

THE COMPONENT-SPACE IS LIMITED TO 8 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	396.3552	60.05
2	94.7626	14.36
3	78.8974	11.95
4	53.2566	8.07
5	22.1195	3.35
6	9.8811	1.50
7	2.5835	.39
8	.1241	.02

BARTLETT TEST

EXCLUDING 6. MAJOR COMPONENTS

CHI SQUARED 2.6156 D.F. 2

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 6.8246 D.F. 5

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 12.4484 D.F. 9

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 21.3962 D.F. 14

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 30.6667 D.F. 20

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 39.6503 D.F. 27

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	.5000	-2.5000	3.5000	2.5000	4.5000	1.5000	-.5000	-1.5000	-4.5000	-3.5000
CONSTRUCT 2	-1.5000	-.5000	3.5000	4.5000	1.5000	-2.5000	2.5000	.5000	-3.5000	-4.5000
CONSTRUCT 3	-.5000	-2.0000	2.5000	.5000	3.5000	1.5000	-2.0000	4.5000	-3.5000	-4.5000
CONSTRUCT 4	-2.5000	-3.5000	4.5000	-.5000	2.0000	.5000	2.0000	3.5000	-1.5000	-4.5000
CONSTRUCT 5	-1.5000	-.5000	2.0000	2.0000	.5000	4.5000	3.5000	-3.5000	-2.5000	-4.5000
CONSTRUCT 6	1.5000	-1.5000	.5000	-.5000	3.5000	4.5000	-3.5000	2.5000	-2.5000	-4.5000
CONSTRUCT 7	-2.5000	-1.5000	4.5000	2.5000	3.5000	.0000	.0000	1.5000	-3.5000	-4.5000
CONSTRUCT 8	4.5000	-.5000	3.5000	2.5000	.5000	-1.5000	-2.5000	-3.5000	1.5000	-4.5000

COMPON 1 COMPON 2 COMPON 3

ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	.0870	1.7328	36.9973	.1707	1.6621	34.2348	-.6426	-5.7078	1.6553
2	.2348	4.6738	5.9057	.1296	1.2621	4.3129	.0012	.0107	4.3128
3	-.4363	-8.6862	12.2993	.2207	2.1485	7.6835	.0673	.5975	7.3261
4	-.2314	-4.6074	22.5217	.4256	4.1432	5.3556	.0530	.4706	5.1342
5	-.3715	-7.3965	9.0420	-.1860	-1.8110	5.7622	-.1455	-1.2925	4.0916
6	-.1462	-2.9507	45.0432	-.2599	-2.5306	38.6390	-.1965	-1.7456	35.5919
7	-.0059	-.1169	45.2363	.2637	2.5671	38.6461	.6556	5.8234	4.7338
8	-.1246	-2.4800	61.8495	-.7222	-7.0309	12.4161	.1918	1.7038	9.5131
9	.3938	7.8404	12.5230	.1016	.9893	11.5494	-.1552	-1.3787	9.6486
10	.6023	11.9908	10.2217	-.1438	-1.3996	8.2627	.1709	1.5183	5.9574
CONSTRUCT									
1	-.4136	-8.2336	14.7081	.1405	1.3679	12.8369	-.1600	-1.4213	10.8169
2	-.3601	-7.1688	31.1083	.3417	3.3268	20.0409	.3624	3.2193	9.6773
3	-.3958	-7.8796	20.4112	-.4219	-4.1070	3.5437	-.1086	-.9645	2.6135
4	-.3744	-7.4528	26.9554	-.2165	-2.1080	22.5117	.3305	2.9355	13.8943
5	-.2871	-5.7155	49.8328	.3649	3.5523	37.2139	.1676	1.4888	34.9972
6	-.3153	-6.2770	43.0990	-.4311	-4.1970	25.4838	-.5121	-4.5485	4.7952
7	-.4364	-8.6875	7.0271	-.0008	-.0073	7.0270	.1793	1.5924	4.4911
8	-.1740	-3.4637	70.5030	.5654	5.5044	40.2044	-.6321	-5.6147	8.6793

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	-135.00	-35.26	.27
2	45.00	35.26	.61
3	-135.00	-35.26	.18
4	45.00	35.26	.56
5	45.00	35.26	.28
6	-135.00	-35.26	.87
7	45.00	35.26	.30
8	-135.00	-35.26	1.07

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	43.81	-67.19	.98
2	15.11	-.13	.92
3	166.11	3.82	.96
4	138.04	4.34	.94
5	-166.24	-9.63	.97
6	-139.38	-24.18	.58
7	92.61	66.19	.95
8	-109.43	12.87	.93
9	7.19	-9.90	.93
10	-6.66	7.17	.98

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1									
1.2166	-.5671	-.0923	.5945	1.4411	.2797	-.5483	-2.5257	-1.2575	1.4590
CONSTRUCT 2									
-.8760	1.1830	.3722	2.8409	-1.1634	-3.5625	2.4579	-.3930	-.6768	-.1823
CONSTRUCT 3									
.1858	-.1502	-.9379	-1.3236	.5725	.3321	-2.0463	3.5184	-.3968	.2458
CONSTRUCT 4									

	-1.8513	-1.7504	1.2483	-2.2248	-.7689	-.6046	1.9562	2.5716	1.4351	-.0112
CONSTRUCT 5	-1.0025	.3418	-.4937	.6773	-1.6234	3.6529	3.4664	-4.2120	-.2491	-1.0576
CONSTRUCT 6	2.0463	-.0264	-2.2387	-1.9527	1.1680	3.5697	-3.5369	1.7181	-.0280	-.7194
CONSTRUCT 7	-1.7438	.5395	.7096	.4895	.2724	-1.2876	-.0510	.4178	-.0787	.7324
CONSTRUCT 8	4.8015	.3131	1.9888	1.6984	-.7668	-2.0134	-2.5203	-3.9315	2.8641	-2.4139

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1	.9831	-.7444	-.3942	.0124	1.6955	.6352	-.9090	-1.5378	-1.3965	1.6557
CONSTRUCT 2	-1.4440	.7517	-.3619	1.4252	-.5445	-2.6978	1.5807	2.0095	-1.0148	.2960
CONSTRUCT 3	.8870	.3822	-.0316	.4243	-.1914	-.7354	-.9633	.5524	.0205	-.3446
CONSTRUCT 4	-1.4914	-1.4771	1.7135	-1.3277	-1.1610	-1.1526	2.5121	1.0492	1.6493	-.3143
CONSTRUCT 5	-1.6090	.3613	-1.2778	-.8345	-.9626	4.5763	2.5298	-1.6466	-.6101	-.5469
CONSTRUCT 6	2.7629	.5177	-1.3125	-.1665	.3872	2.4787	-2.4302	-1.3130	.3985	-1.3228
CONSTRUCT 7	-1.7426	.5404	.7112	.4926	.2710	-1.2895	-.0491	.4125	-.0780	.7313
CONSTRUCT 8	3.8618	-.4004	.7741	-.6441	.2371	-.5826	-3.9718	.0437	2.3047	-1.6225

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1	.0698	-.7427	-.2986	.0877	1.4887	.3559	.0228	-1.2651	-1.6171	1.8986
CONSTRUCT 2	.6247	.7478	-.5786	1.2546	-.0761	-2.0651	-.5299	1.3920	-.5152	-.2543
CONSTRUCT 3	.2672	.3834	.0333	.4754	-.3318	-.9250	-.3310	.7374	-.1292	-.1798
CONSTRUCT 4	.3949	-1.4806	1.5159	-1.4832	-.7339	-.5756	.5875	.4862	2.1049	-.8161
CONSTRUCT 5	-.6523	.3795	-1.3778	-.9134	-.7460	4.8688	1.5537	-1.9321	-.3790	-.8014
CONSTRUCT 6										

-.1600	.5232	-1.0064	.0744	-.2746	1.5848	.5519	-.4405	-.3075	-.5453

CONSTRUCT 7

-.7193	.5385	.6040	.4082	.5028	-.9766	-1.0931	.1071	.1692	.4591

CONSTRUCT 8

.2537	-.3937	1.1519	-.3467	-.5799	-1.6860	-.2907	1.1207	1.4333	-.6628

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4

.1108	-.0435	.2676	.1189	.0203	-.8111	-.2440	.3890	.1747	.0173

COMPONENT 5

-.0242	.2197	-.2878	.3905	.3509	-.1489	-.2094	-.1014	-.5939	.4046

COMPONENT 6

.0286	.5225	-.3761	.3189	-.3605	.0403	-.0077	.3420	-.0243	-.4836

COMPONENT 7

-.6148	.4157	.3120	.0304	.0733	.1274	-.4776	-.1632	.2721	.0247

COMPONENT 8

-.1764	-.0801	-.4956	.0496	.6201	-.1690	.1634	-.1042	.4462	-.2540

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT

1	-.082	2	-.791	3	.831	4	.734	5	.912	6	.413	7	-.062	8	.030	9	-.883	10	-.847

CONSTRUCT 2 WITH ELEMENT

1	-.397	2	-.554	3	.845	4	.902	5	.598	6	-.108	7	.381	8	.102	9	-.747	10	-.758

CONSTRUCT 3 WITH ELEMENT

1	-.241	2	-.855	3	.705	4	.351	5	.919	6	.426	7	-.287	8	.679	9	-.818	10	-.805

CONSTRUCT 4 WITH ELEMENT

1	-.550	2	-.903	3	.820	4	.348	5	.704	6	.259	7	.229	8	.563	9	-.691	10	-.767

CONSTRUCT 5 WITH ELEMENT

1	-.297	2	-.427	3	.562	4	.589	5	.422	6	.602	7	.485	8	-.313	9	-.610	10	-.665

CONSTRUCT 6 WITH ELEMENT

1	.117	2	-.681	3	.444	4	.144	5	.808	6	.733	7	-.540	8	.438	9	-.636	10	-.692

CONSTRUCT 7 WITH ELEMENT

1	-.428	2	-.830	3	.926	4	.716	5	.883	6	.228	7	.103	8	.359	9	-.898	10	-.885

CONSTRUCT 8 WITH ELEMENT

1 .648 2 -.243 3 .535 4 .586 5 .281 6 -.105 7 -.342 8 -.427 9 -.079 10 -.539

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT
2 .278 3 -.232 4 -.078 5 -.173 6 -.092 7 -.699 8 -.441 9 .441 10 .121

ELEMENT 2 WITH ELEMENT
3 -.841 4 -.373 5 -.880 6 -.401 7 .049 8 -.466 9 .767 10 .822

ELEMENT 3 WITH ELEMENT
4 .763 5 .789 6 .124 7 .119 8 .159 9 -.748 10 -.918

ELEMENT 4 WITH ELEMENT
5 .530 6 -.082 7 .236 8 -.261 9 -.646 10 -.710

ELEMENT 5 WITH ELEMENT
6 .453 7 -.247 8 .414 9 -.906 10 -.840

ELEMENT 6 WITH ELEMENT
7 -.106 8 .095 9 -.456 10 -.404

ELEMENT 7 WITH ELEMENT
8 -.221 9 -.108 10 .021

ELEMENT 8 WITH ELEMENT
9 -.338 10 -.191

ELEMENT 9 WITH ELEMENT
10 .801

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT
1 94.7 2 142.2 3 33.8 4 42.8 5 24.2 6 65.6 7 93.5 8 88.3 9 152.0 10 147.9

CONSTRUCT 2 WITH ELEMENT
1 113.4 2 123.6 3 32.3 4 25.6 5 53.2 6 96.2 7 67.6 8 84.2 9 138.3 10 139.3

CONSTRUCT 3 WITH ELEMENT
1 104.0 2 148.8 3 45.1 4 69.4 5 23.2 6 64.8 7 106.7 8 47.3 9 144.9 10 143.6

CONSTRUCT 4 WITH ELEMENT
1 123.3 2 154.6 3 34.9 4 69.6 5 45.2 6 75.0 7 76.8 8 55.7 9 133.7 10 140.1

CONSTRUCT 5 WITH ELEMENT
1 107.3 2 115.3 3 55.8 4 53.9 5 65.0 6 53.0 7 61.0 8 108.2 9 127.6 10 131.7

CONSTRUCT 6 WITH ELEMENT
1 83.3 2 132.9 3 63.7 4 81.7 5 36.1 6 42.9 7 122.7 8 64.0 9 129.5 10 133.6

CONSTRUCT 7 WITH ELEMENT

1	115.3	2	146.1	3	22.2	4	44.2	5	27.9	6	76.8	7	84.1	8	68.9	9	153.9	10	152.2

CONSTRUCT 8 WITH ELEMENT

1	49.6	2	104.1	3	57.7	4	54.1	5	73.7	6	96.0	7	110.0	8	115.3	9	94.5	10	122.6

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2	73.9	3	103.4	4	94.5	5	100.0	6	95.3	7	134.4	8	116.2	9	63.8	10	83.0		

ELEMENT 2 WITH ELEMENT

3	147.2	4	111.9	5	151.6	6	113.7	7	87.2	8	117.8	9	39.9	10	34.7				

ELEMENT 3 WITH ELEMENT

4	40.3	5	37.9	6	82.9	7	83.2	8	80.9	9	136.4	10	156.7						

ELEMENT 4 WITH ELEMENT

5	58.0	6	94.7	7	76.4	8	105.1	9	130.2	10	135.2								

ELEMENT 5 WITH ELEMENT

6	63.1	7	104.3	8	65.6	9	155.0	10	147.2										

ELEMENT 6 WITH ELEMENT

7	96.1	8	84.5	9	117.1	10	113.8												

ELEMENT 7 WITH ELEMENT

8	102.8	9	96.2	10	88.8														

ELEMENT 8 WITH ELEMENT

9	109.8	10	101.0																

ELEMENT 9 WITH ELEMENT

10	36.8																		

*** GRID3-TICK

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1														
2	.527	58.18	3	.570	55.27	4	-.442	116.26	5	.612	52.26	6	.370	68.30
7	.491	60.60	8	.164	80.58									
CONSTRUCT 2														
3	.042	87.57	4	-.248	104.39	5	.939	20.05	6	.079	85.48	7	.527	58.18
8	-.018	91.04												
CONSTRUCT 3														
4	-.085	94.87	5	.085	85.13	6	.818	35.10	7	.421	65.09	8	.152	81.29
CONSTRUCT 4														
5	-.176	100.12	6	-.176	100.12	7	-.412	114.34	8	-.127	97.31			
CONSTRUCT 5														
6	.079	85.48	7	.455	62.96	8	-.055	93.13						
CONSTRUCT 6														
7	.630	50.93	8	.430	64.51									
CONSTRUCT 7														
8	.703	45.33												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	14.000	54.000	8.18
2	6.500	44.750	6.78
3	15.500	47.750	7.23
4	6.000	52.500	7.95
5	8.500	71.750	10.87
6	-6.500	41.750	6.33
7	-4.000	56.000	8.48
8	5.000	80.000	12.12
9	-19.000	102.000	15.45
10	-26.000	108.000	16.36

TOTAL VARIATION ABOUT CONSTRUCT MEANS 660.0000

TOTAL PER CONSTRUCT 82.5000

UNIT OF EXPECTED DISTANCE 12.1106

DISTANCES BETWEEN ELEMENTS

ELEMENT 1																		
2	.372	3	.702	4	.986	5	.625	6	.999	7	1.011	8	.901	9	1.244	10	1.342	
ELEMENT 2																		
3	.732	4	.894	5	.658	6	.925	7	.789	8	1.081	9	1.211	10	1.234			
ELEMENT 3																		
4	.543	5	.846	6	.897	7	.784	8	1.032	9	1.239	10	1.298					

ELEMENT 4
5 1.052 6 .758 7 .545 8 1.109 9 1.195 10 1.169

ELEMENT 5
6 .761 7 1.124 8 1.029 9 1.387 10 1.382

ELEMENT 6
7 .810 8 .859 9 1.081 10 .981

ELEMENT 7
8 1.222 9 1.111 10 1.051

ELEMENT 8
9 1.005 10 1.171

ELEMENT 9
10 .360

SUMS OF PRODUCTS

ELEMENT 1
2 39.250 3 14.750 4 -18.000 5 34.250 6 -25.250 7 -20.000 8 7.500 9 -35.500 10 -51.000

ELEMENT 2
3 7.000 4 -10.000 5 26.500 6 -19.500 7 4.750 8 -23.250 9 -34.250 10 -35.250

ELEMENT 3
4 28.500 5 7.250 6 -14.250 7 6.750 8 -14.250 9 -37.750 10 -45.750

ELEMENT 4
5 -19.000 6 5.000 7 32.500 8 -24.000 9 -27.500 10 -20.000

ELEMENT 5
6 14.250 7 -28.750 8 -1.750 9 -54.250 10 -50.250

ELEMENT 6
7 .750 8 6.750 9 -13.750 10 4.250

ELEMENT 7
8 -41.500 9 -11.500 10 1.000

ELEMENT 8
9 17.000 10 -6.500

ELEMENT 9
10 95.500

THE COMPONENT-SPACE IS LIMITED TO 8 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	293.4218	44.46
2	156.8907	23.77
3	90.8952	13.77
4	72.9045	11.05
5	32.7643	4.96
6	7.7544	1.17
7	2.9800	.45
8	.8890	.13

BARTLETT TEST

EXCLUDING 6. MAJOR COMPONENTS

CHI SQUARED .5181 D.F. 2

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 2.2548 D.F. 5

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 8.8252 D.F. 9

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 17.4128 D.F. 14

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 24.8721 D.F. 20

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 35.3466 D.F. 27

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	.5000	-.5000	3.5000	2.5000	4.5000	1.5000	-1.5000	-2.5000	-4.5000	-3.5000
CONSTRUCT 2	.5000	1.5000	2.5000	3.5000	-.5000	-1.5000	4.5000	-2.5000	-3.5000	-4.5000
CONSTRUCT 3	.5000	-1.0000	1.5000	-1.0000	3.5000	2.5000	-2.5000	4.5000	-3.5000	-4.5000
CONSTRUCT 4	-.5000	-3.5000	2.5000	1.5000	-4.5000	-2.5000	-1.5000	4.5000	3.5000	.5000
CONSTRUCT 5	.5000	1.5000	3.5000	4.5000	-1.5000	-.5000	2.5000	-2.5000	-4.5000	-3.5000
CONSTRUCT 6	3.5000	1.5000	-1.5000	-.5000	2.5000	.5000	-2.5000	4.5000	-3.5000	-4.5000
CONSTRUCT 7	4.5000	3.5000	2.0000	-2.0000	2.0000	-2.0000	.5000	-.5000	-3.5000	-4.5000
CONSTRUCT 8	4.5000	3.5000	1.5000	-2.5000	2.5000	-4.5000	-3.5000	-.5000	.5000	-1.5000

COMPON 1 COMPON 2 COMPON 3

ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	-.3074	-5.2656	26.2730	-.2679	-3.3551	15.0164	.3481	3.3191	4.0001
2	-.2564	-4.3912	25.4676	-.0285	-.3569	25.3402	.4852	4.6255	3.9451
3	-.2449	-4.1954	30.1482	.2064	2.5857	23.4624	-.0547	-.5213	23.1906
4	-.0854	-1.4631	50.3593	.4773	5.9765	14.6168	-.2847	-2.7142	7.2500
5	-.3465	-5.9352	36.5232	-.2940	-3.6823	22.9636	-.0161	-.1728	22.9337
6	.0247	.4223	41.5716	.0131	.1636	41.5449	-.5000	-4.7669	16.8213
7	.0071	.1218	55.9852	.5320	6.6641	11.5748	.0003	.7659	10.9882
8	.0719	1.2315	78.4835	-.5168	-6.4738	36.5739	-.4664	-4.4467	16.8006
9	.5558	9.5201	11.3678	-.1409	-1.7647	8.2538	.2264	2.1581	3.5962
10	.5812	9.9550	8.8988	.0192	.2408	8.0408	.1839	1.7534	5.7665
CONSTRUCT									
1	-.4267	-7.3439	28.5668	.1240	1.5535	26.1535	-.2536	-2.4200	20.2972
2	-.3515	-6.0214	46.2431	.4974	6.2302	7.4274	.0457	.4354	7.2378
3	-.3260	-5.5851	51.3071	-.3608	-4.5187	30.8885	-.5603	-5.3414	2.3577
4	.2543	4.3567	63.5193	-.0680	-.8514	62.7945	-.2559	-2.4394	56.8436
5	-.3485	-5.9694	46.8664	.5043	6.3170	6.9613	-.3618	-.5689	6.6145
6	-.3595	-6.1589	44.5680	-.4396	-5.5063	14.2488	-.2144	-2.0443	10.0697
7	-.4632	-7.9346	19.5416	-.1221	-1.5299	17.2010	.3505	3.3419	6.0324
8	-.2374	-4.0662	65.9658	-.3741	-4.6854	44.0125	.6176	5.8884	9.3393

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	-135.00	-35.26	.46
2	45.00	35.26	.08
3	-135.00	-35.26	1.02
4	-135.00	-35.26	.47
5	-135.00	-35.26	.11
6	-135.00	-35.26	.39
7	45.00	35.26	.64
8	45.00	35.26	1.12

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	-147.50	27.99	.96
2	-175.35	46.39	.95
3	148.35	-6.04	.72
4	103.75	-23.80	.93
5	-148.18	-1.42	.82
6	21.17	-84.57	.74
7	88.95	6.56	.90
8	-79.23	-34.01	.89
9	-10.50	12.57	.98
10	1.39	9.99	.97

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1									
-1.7575	-2.3826	1.7013	1.8727	1.9554	1.6811	-1.4478	-1.9720	-.4185	.7680
CONSTRUCT 2									
-1.3510	-.0436	1.0252	2.9857	-2.5863	-1.3515	4.5428	-2.0671	-.1535	-1.0006
CONSTRUCT 3									
-1.2169	-2.4317	.1321	-1.4770	1.5648	2.6377	-2.4603	4.9015	-.3960	-1.2542
CONSTRUCT 4									

	.8392	-2.3832	3.5671	1.8721	-2.9905	-2.6074	-1.5310	4.1868	1.0787	-2.0319
CONSTRUCT 5	-1.3350	-.0303	2.0380	3.9901	-3.5683	-.3528	2.5424	-2.0709	-1.1824	-.0308
CONSTRUCT 6	1.6067	-.0788	-3.0085	-1.0261	.3660	.6518	-2.4562	4.9428	-.0771	-.9207
CONSTRUCT 7	2.0609	1.4660	.0566	-2.6777	-.7493	-1.8044	.5564	.0704	.9098	.1113
CONSTRUCT 8	3.2500	2.4576	.5041	-2.8473	1.0911	-4.3997	-3.4711	-.2077	2.7599	.8631

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1	-1.3414	-2.3384	1.3806	1.1312	2.4121	1.6608	-2.2743	-1.1691	-.1996	.7381
CONSTRUCT 2	.3178	.1339	-.2609	.0120	-.7548	-1.4329	1.2281	1.1529	.7242	-1.1204
CONSTRUCT 3	-2.4272	-2.5605	1.0649	.6797	.2364	2.6967	-.0562	2.5661	-1.0326	-1.1673
CONSTRUCT 4	.6112	-2.4074	3.7428	2.2785	-3.2407	-2.5963	-1.0780	3.7468	.9587	-2.0155
CONSTRUCT 5	.3571	-.1497	.7339	.9750	-1.7112	-.4353	-.8185	1.1941	-.2924	-.1523
CONSTRUCT 6	.1318	-.2357	-1.8718	1.6021	-1.2528	.7238	.4733	2.0969	-.8528	-.8148
CONSTRUCT 7	1.6511	1.4224	.3724	-1.9475	-1.1990	-1.7844	1.3704	-.7203	.6943	.1407
CONSTRUCT 8	1.9950	2.3241	1.4713	-.6109	-.2864	-4.3386	-.9783	-2.6293	2.0998	.9532

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1	-.4989	-1.1643	1.2483	.4423	2.3682	.4508	-2.0799	-2.2978	.3482	1.1832
CONSTRUCT 2	.1663	-.0773	-.2371	.1359	-.7469	-1.2152	1.1931	1.3560	.6257	-1.2005
CONSTRUCT 3	-.5677	.0310	.7728	-.8409	.1396	.0260	.3729	.0748	.1765	-.1850
CONSTRUCT 4	1.4605	-1.2239	3.6094	1.5840	-3.2850	-3.8160	-.8820	2.6090	1.5109	-1.5669
CONSTRUCT 5	.5621	.4355	.7017	.8073	-1.7219	-.7298	-.7712	.9194	-.1591	-.0440
CONSTRUCT 6										

.8435	.7561	-1.9836	1.0201	-1.2898	-.2984	.6376	1.1434	-.3901	-.4389
CONSTRUCT 7									
.4876	-.1990	.5552	-.9961	-1.1385	-.1134	1.1019	.8384	-.0622	-.4739
CONSTRUCT 8									
-.0550	-.5327	1.7933	1.0654	-.1796	-1.3944	-1.4513	.1171	.7669	-.1297

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4									
-.1984	.0920	-.3842	-.2012	.5047	.4963	.0411	-.4180	-.1715	.2392
COMPONENT 5									
-.1017	-.2779	.5672	.1315	.3264	-.1090	-.5246	-.3500	.1619	.1761
COMPONENT 6									
-.1952	-.1874	.4451	-.6738	.1054	.0457	.4610	.0405	.1317	-.1731
COMPONENT 7									
.1374	.2355	.3385	-.2664	-.5127	.3884	-.2429	-.0245	-.3909	.3377
COMPONENT 8									
-.7036	.6365	.1090	.0312	.0425	-.1116	-.1628	.1885	.0570	-.0867

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT																			
1	.302	2	.255	3	.672	4	.412	5	.705	6	.242	7	-.060	8	-.288	9	-.839	10	-.730
CONSTRUCT 2 WITH ELEMENT																			
1	.234	2	.434	3	.679	4	.707	5	.041	6	-.193	7	.676	8	-.492	9	-.708	10	-.677
CONSTRUCT 3 WITH ELEMENT																			
1	.387	2	.013	3	.269	4	-.100	5	.666	6	.381	7	-.500	8	.567	9	-.612	10	-.704
CONSTRUCT 4 WITH ELEMENT																			
1	-.244	2	-.629	3	.151	4	.132	5	-.673	6	-.322	7	-.196	8	.561	9	.544	10	.265
CONSTRUCT 5 WITH ELEMENT																			
1	.188	2	.343	3	.761	4	.806	5	.022	6	-.121	7	.571	8	-.466	9	-.733	10	-.661
CONSTRUCT 6 WITH ELEMENT																			
1	.719	2	.368	3	.078	4	-.237	5	.632	6	.067	7	-.495	8	.554	9	-.599	10	-.740
CONSTRUCT 7 WITH ELEMENT																			
1	.904	2	.839	3	.473	4	-.126	5	.583	6	-.395	7	-.060	8	-.101	9	-.707	10	-.819
CONSTRUCT 8 WITH ELEMENT																			

1	.879	2	.691	3	.239	4	-.486	5	.468	6	-.693	7	-.516	8	.023	9	-.139	10	-.351	

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

	ELEMENT 1 WITH ELEMENT																			
2	.798	3	.290	4	-.336	5	.550	6	-.532	7	-.364	8	.114	9	-.478	10	-.668			
	ELEMENT 2 WITH ELEMENT																			
3	.151	4	-.206	5	.468	6	-.451	7	.095	8	-.389	9	-.507	10	-.507					
	ELEMENT 3 WITH ELEMENT																			
4	.569	5	.124	6	-.319	7	.131	8	-.231	9	-.541	10	-.637							
	ELEMENT 4 WITH ELEMENT																			
5	-.310	6	.107	7	.599	8	-.370	9	-.376	10	-.266									
	ELEMENT 5 WITH ELEMENT																			
6	.260	7	-.454	8	-.023	9	-.634	10	-.571											
	ELEMENT 6 WITH ELEMENT																			
7	.016	8	.117	9	-.211	10	.063													
	ELEMENT 7 WITH ELEMENT																			
8	-.620	9	-.152	10	.013															
	ELEMENT 8 WITH ELEMENT																			
9	.188	10	-.070																	
	ELEMENT 9 WITH ELEMENT																			
10	.910																			

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

	CONSTRUCT 1 WITH ELEMENT																			
1	72.4	2	75.2	3	47.8	4	65.7	5	45.1	6	76.0	7	93.5	8	106.8	9	147.0	10	136.9	
	CONSTRUCT 2 WITH ELEMENT																			
1	76.5	2	64.3	3	47.2	4	45.0	5	87.6	6	101.2	7	47.5	8	119.5	9	135.1	10	132.6	
	CONSTRUCT 3 WITH ELEMENT																			
1	67.3	2	89.3	3	74.4	4	95.7	5	48.2	6	67.6	7	120.0	8	55.5	9	127.7	10	134.8	
	CONSTRUCT 4 WITH ELEMENT																			
1	104.1	2	129.0	3	81.3	4	82.4	5	132.3	6	108.8	7	101.3	8	55.9	9	57.1	10	74.7	
	CONSTRUCT 5 WITH ELEMENT																			
1	79.2	2	70.0	3	40.5	4	36.3	5	88.7	6	97.0	7	55.2	8	117.8	9	137.1	10	131.4	
	CONSTRUCT 6 WITH ELEMENT																			
1	44.1	2	67.1	3	85.6	4	103.7	5	50.8	6	86.2	7	119.7	8	56.4	9	126.8	10	137.7	

CONSTRUCT 7 WITH ELEMENT

1	25.3	2	32.9	3	61.8	4	97.2	5	54.3	6	113.2	7	93.4	8	95.6	9	135.0	10	145.0

CONSTRUCT 8 WITH ELEMENT

1	28.5	2	46.3	3	76.2	4	119.1	5	62.1	6	133.9	7	121.1	8	88.7	9	98.0	10	110.5

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2	37.0	3	73.1	4	109.8	5	56.6	6	122.1	7	111.3	8	83.4	9	118.6	10	131.9		

ELEMENT 2 WITH ELEMENT

3	61.3	4	101.9	5	62.1	6	116.8	7	84.6	8	112.9	9	120.5	10	120.5				

ELEMENT 3 WITH ELEMENT

4	55.3	5	82.9	6	108.6	7	82.5	8	103.3	9	122.7	10	129.6						

ELEMENT 4 WITH ELEMENT

5	108.0	6	83.9	7	53.2	8	111.7	9	112.1	10	105.4								

ELEMENT 5 WITH ELEMENT

6	74.9	7	117.0	8	91.3	9	129.4	10	124.8										

ELEMENT 6 WITH ELEMENT

7	89.1	8	83.3	9	102.2	10	86.4												

ELEMENT 7 WITH ELEMENT

8	128.3	9	98.8	10	89.3														

ELEMENT 8 WITH ELEMENT

9	79.2	10	94.0																

ELEMENT 9 WITH ELEMENT

10	24.5																		

*** GRID4-TICK

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.745	41.80	3	.636	50.48	4	.164	80.58	5	.685	46.78	6	.345	69.79
7	.855	31.29	8	.127	82.69									
CONSTRUCT 2														
3	.309	72.00	4	.188	79.17	5	.867	29.93	6	-.006	90.35	7	.527	58.18
8	-.030	91.74												
CONSTRUCT 3														
4	.248	75.61	5	.164	80.58	6	.721	43.85	7	.515	58.99	8	.042	87.57
CONSTRUCT 4														
5	.127	82.69	6	.236	76.33	7	.042	87.57	8	.430	64.51			
CONSTRUCT 5														
6	-.067	93.82	7	.467	62.18	8	-.067	93.82						
CONSTRUCT 6														
7	.539	57.36	8	.515	58.99									
CONSTRUCT 7														
8	.370	68.30												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	12.000	48.000	7.27
2	-2.000	18.000	2.73
3	19.000	68.000	10.30
4	10.000	58.000	8.79
5	13.000	58.000	8.79
6	1.000	36.000	5.45
7	-4.000	56.000	8.48
8	.000	76.000	11.52
9	-13.000	80.000	12.12
10	-36.000	162.000	24.55

TOTAL VARIATION ABOUT CONSTRUCT MEANS 660.0000

TOTAL PER CONSTRUCT 82.5000

UNIT OF EXPECTED DISTANCE 12.1106

DISTANCES BETWEEN ELEMENTS

ELEMENT 1															
2	.522	3	.725	4	.970	5	.676	6	.770	7	1.070	8	.874	9	.952	10	1.472
ELEMENT 2															
3	.854	4	.850	5	.743	6	.646	7	.757	8	.905	9	.734	10	1.051		
ELEMENT 3															
4	.655	5	.691	6	.858	7	.870	8	1.135	9	1.208	10	1.654				

ELEMENT 4
5 .862 6 .788 7 .522 8 1.102 9 1.182 10 1.454

ELEMENT 5
6 .548 7 1.054 8 .945 9 1.274 10 1.516

ELEMENT 6
7 .813 8 .945 9 1.150 10 1.188

ELEMENT 7
8 1.202 9 1.054 10 1.114

ELEMENT 8
9 .862 10 1.274

ELEMENT 9
10 .923

SUMS OF PRODUCTS

ELEMENT 1
2 13.000 3 19.500 4 -16.000 5 19.500 6 -1.500 7 -32.000 8 6.000 9 -2.500 10 -54.000

ELEMENT 2
3 -10.500 4 -15.000 5 -2.500 6 -3.500 7 -5.000 8 -13.000 9 9.500 10 9.000

ELEMENT 3
4 31.500 5 28.000 6 -2.000 7 6.500 8 -22.500 9 -33.000 10 -85.500

ELEMENT 4
5 3.500 6 1.500 7 37.000 8 -22.000 9 -33.500 10 -45.000

ELEMENT 5
6 25.000 7 -24.500 8 1.500 9 -50.000 10 -58.500

ELEMENT 6
7 -2.500 8 -9.500 9 -39.000 10 -4.500

ELEMENT 7
8 -40.000 9 -13.500 10 18.000

ELEMENT 8
9 23.500 10 .000

ELEMENT 9
10 58.500

THE COMPONENT-SPACE IS LIMITED TO 8 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	302.2903	45.80
2	158.0339	23.94
3	92.2362	13.98
4	65.7971	9.97
5	21.2336	3.22
6	11.4292	1.73
7	7.5947	1.15
8	1.3849	.21

BARTLETT TEST

EXCLUDING 6. MAJOR COMPONENTS

CHI SQUARED .9758 D.F. 2

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 2.0861 D.F. 5

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 4.3250 D.F. 9

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 11.5711 D.F. 14

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 18.6410 D.F. 20

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 28.6042 D.F. 27

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	.5000	-1.5000	4.5000	2.5000	3.5000	1.5000	-.5000	-2.5000	-3.5000	-4.5000
CONSTRUCT 2	-.5000	.5000	2.5000	4.5000	1.5000	-1.5000	3.5000	-2.5000	-3.5000	-4.5000
CONSTRUCT 3	-.5000	-1.5000	.5000	1.5000	4.5000	2.5000	-2.5000	3.5000	-3.5000	-4.5000
CONSTRUCT 4	.5000	-2.5000	3.5000	1.5000	-1.5000	-3.5000	-.5000	4.5000	2.5000	-4.5000
CONSTRUCT 5	.5000	-.5000	2.5000	4.5000	-1.5000	1.5000	3.5000	-3.5000	-2.5000	-4.5000
CONSTRUCT 6	4.5000	.5000	-.5000	-1.5000	2.5000	1.5000	-3.5000	3.5000	-2.5000	-4.5000
CONSTRUCT 7	2.5000	.5000	4.5000	-1.5000	3.5000	1.5000	-.5000	-2.5000	-3.5000	-4.5000
CONSTRUCT 8	4.5000	2.5000	1.5000	-1.5000	.5000	-2.5000	-3.5000	-.5000	3.5000	-4.5000

COMPON 1 COMPON 2 COMPON 3

ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	.1897	3.2985	37.1196	.3631	4.5651	16.2794	-.1045	-1.0035	15.2723
2	-.0524	-.9112	17.1698	.0586	.7367	16.6270	.0057	.0544	16.6241
3	.4013	6.9779	19.3087	-.0824	-1.0354	18.2365	-.2911	-2.7959	10.4193
4	.2317	4.0290	41.7675	-.3987	-5.0120	16.6469	-.2065	-1.9832	12.7140
5	.3209	5.5786	26.8797	.1571	1.9747	22.9803	.4317	4.1460	5.7906
6	.0988	1.7170	33.0518	-.0738	-.9279	32.1908	.5417	5.2026	5.1235
7	-.0262	-.4560	55.7921	-.5660	-7.1149	5.1704	-.1554	-1.4922	2.9436
8	-.0911	-1.5845	73.4895	.5024	6.3157	33.6020	-.0035	-.0332	33.6009
9	-.3790	-6.5889	36.5862	.2381	2.9936	27.6248	-.5177	-4.9716	2.9082
10	-.6937	-12.0605	16.5449	-.1985	-2.4954	10.3178	.2995	2.8766	2.0431
CONSTRUCT									
1	.4900	8.5188	9.9301	-.1390	-1.7478	6.0752	.1027	.9868	5.9014
2	.3935	6.8422	35.6848	-.3964	-4.9830	10.8542	-.1914	-1.8382	7.4753
3	.3691	6.4173	41.3189	.2265	2.8468	33.2149	.3879	3.7257	19.3338
4	.1684	2.9283	73.9248	.2549	3.2038	63.6604	-.6787	-6.5185	21.1702
5	.3526	6.1302	44.9212	-.4483	-5.6354	13.1630	-.2220	-2.1325	6.6155
6	.2917	5.0713	56.7620	.5268	6.6219	12.9329	.2455	2.3578	7.3737
7	.4524	7.8665	20.6181	.0549	.6904	20.1414	-.1682	-1.6151	17.5328
8	.1624	2.8232	74.5298	.4753	5.9746	38.8337	-.4514	-4.3355	20.0370

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	45.00	35.26	.19
2	-135.00	-35.26	.35
3	45.00	35.26	.71
4	-135.00	-35.26	1.24
5	-135.00	-35.26	.41
6	45.00	35.26	.45
7	45.00	35.26	.31
8	-135.00	-35.26	.83

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	54.15	-10.10	.83
2	141.04	2.66	.28
3	-8.44	-21.62	.92
4	-51.21	-17.14	.88
5	19.49	35.02	.95
6	-28.39	69.44	.93
7	-93.67	-11.82	.97
8	104.08	-.29	.75
9	155.57	-34.49	.98
10	-168.31	13.15	.99

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1									
-1.1162	-1.0536	1.0811	.5259	.7667	.6587	-.2766	-1.7237	-.2717	1.4092
CONSTRUCT 2									
-1.7981	.8586	-.2460	2.9145	-.6953	-2.1757	3.6794	-1.8765	-.9070	.2462
CONSTRUCT 3									
-1.7175	-1.1637	-2.0755	.0129	2.4410	1.8663	-2.3317	4.0848	-1.0681	-.0485
CONSTRUCT 4									

	-.0556	-2.3465	2.3247	.8214	-2.4396	-3.7892	-.4232	4.7669	3.6097	-2.4687
CONSTRUCT 5	-.6630	-.1787	.0397	3.0795	-3.4669	.8946	3.6608	-2.9413	-.1769	-.2477
CONSTRUCT 6	3.5379	.7658	-2.5353	-2.6752	.8728	.9992	-3.3670	3.9622	-.5781	-.9822
CONSTRUCT 7	1.0076	.9123	1.3428	-3.3229	.9760	.7231	-.2937	-1.7831	-.5189	.9568
CONSTRUCT 8	3.9644	2.6480	.3670	-2.1542	-.4058	-2.7788	-3.4260	-.2427	4.5699	-2.5417

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1	-.4815	-.9511	.9371	-.1709	1.0413	.5297	-1.2658	-.8456	.1446	1.0623
CONSTRUCT 2	.0115	1.1506	-.6565	.9278	.0874	-2.5435	.8592	.6270	.2796	-.7430
CONSTRUCT 3	-2.7513	-1.3305	-1.8410	1.1479	1.9938	2.0764	-.7205	2.6546	-1.7460	.5165
CONSTRUCT 4	-1.2190	-2.5343	2.5886	2.0988	-2.9428	-3.5527	1.3900	3.1573	2.8468	-1.8327
CONSTRUCT 5	1.3835	.1515	-.4245	.8326	-2.5817	.4786	.4713	-.1101	1.1651	-1.3664
CONSTRUCT 6	1.1332	.3777	-1.9899	-.0351	-.1673	1.4880	.3808	.6354	-2.1550	.3323
CONSTRUCT 7	.7568	.8718	1.3997	-3.0476	.8675	.7741	.0971	-2.1300	-.6833	1.0938
CONSTRUCT 8	1.7948	2.2978	.8591	.2278	-1.3443	-2.3378	-.0445	-3.2443	3.1472	-1.3557

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1	-.3784	-.9567	1.2244	.0329	.6152	-.0049	-1.1125	-.8422	.6554	.7667
CONSTRUCT 2	-.1806	1.1610	-1.1916	.5482	.8810	-1.5477	.5736	.6206	-.6720	-.1924
CONSTRUCT 3	-2.3619	-1.3516	-.7564	1.9173	.3854	.0581	-.1416	2.6675	.1827	-.5994
CONSTRUCT 4	-1.9001	-2.4974	.6910	.7527	-.1288	-.0216	.3772	3.1348	-.5275	.1197
CONSTRUCT 5	1.1606	.1636	-1.0453	.3923	-1.6611	1.6339	.1399	-.1175	.0612	-.7276
CONSTRUCT 6										

1.3796	.3644	-1.3035	.4518	-1.1852	.2107	.7471	.6435	-.9345	-.3739
CONSTRUCT 7									
.9256	.8627	1.8699	-2.7141	.1703	-.1008	.3480	-2.1244	.1528	.6100
CONSTRUCT 8									
1.3417	2.3224	-.4031	-.6674	.5273	.0108	-.7102	-3.2593	.9028	-.0571

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4									
-.4103	-.4310	-.0848	.3569	-.0180	-.0109	.0534	.7034	-.0985	-.0600
COMPONENT 5									
-.3542	-.3303	.6531	-.3049	.3104	-.1202	-.1656	-.1121	.1589	.2647
COMPONENT 6									
.2917	-.3959	.2582	-.2355	-.5707	.5464	.0800	.0608	-.0401	.0051
COMPONENT 7									
.1585	.1248	.1294	-.4488	-.0103	-.4036	.5123	.3099	-.4602	.0880
COMPONENT 8									
-.5144	.3564	-.0132	-.3771	-.0099	.3393	.2793	.0939	.2779	-.4322

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT																			
1	.268	2	-.306	3	.860	4	.565	5	.737	6	.392	7	.053	8	-.358	9	-.780	10	-.803
CONSTRUCT 2 WITH ELEMENT																			
1	.006	2	-.168	3	.706	4	.859	5	.336	6	.038	7	.545	8	-.490	9	-.654	10	-.663
CONSTRUCT 3 WITH ELEMENT																			
1	.240	2	-.440	3	.363	4	.260	5	.835	6	.497	7	-.415	8	.388	9	-.668	10	-.661
CONSTRUCT 4 WITH ELEMENT																			
1	.244	2	-.480	3	.492	4	.264	5	-.068	6	-.591	7	-.103	8	.512	9	.238	10	-.541
CONSTRUCT 5 WITH ELEMENT																			
1	.040	2	-.204	3	.661	4	.849	5	.113	6	.186	7	.609	8	-.586	9	-.580	10	-.595
CONSTRUCT 6 WITH ELEMENT																			
1	.784	2	.066	3	.206	4	-.215	5	.668	6	.302	7	-.733	8	.464	9	-.351	10	-.636
CONSTRUCT 7 WITH ELEMENT																			
1	.585	2	.054	3	.764	4	.147	5	.774	6	.382	7	-.172	8	-.344	9	-.680	10	-.761
CONSTRUCT 8 WITH ELEMENT																			

1 .860 2 .471 3 .342 4 -.278 5 .166 6 -.428 7 -.595 8 .110 9 .312 10 -.522

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT
2 .442 3 .341 4 -.303 5 .370 6 -.036 7 -.617 8 .099 9 -.040 10 -.612

ELEMENT 2 WITH ELEMENT
3 -.300 4 -.464 5 -.077 6 -.137 7 -.157 8 -.351 9 .250 10 .167

ELEMENT 3 WITH ELEMENT
4 .502 5 .446 6 -.040 7 .105 8 -.313 9 -.447 10 -.815

ELEMENT 4 WITH ELEMENT
5 .060 6 .033 7 .649 8 -.331 9 -.492 10 -.464

ELEMENT 5 WITH ELEMENT
6 .547 7 -.430 8 .023 9 -.734 10 -.604

ELEMENT 6 WITH ELEMENT
7 -.056 8 -.182 9 -.727 10 -.059

ELEMENT 7 WITH ELEMENT
8 -.613 9 -.202 10 .189

ELEMENT 8 WITH ELEMENT
9 .301 10 .000

ELEMENT 9 WITH ELEMENT
10 .514

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT
1 74.5 2 107.2 3 30.6 4 55.6 5 42.5 6 66.9 7 86.9 8 111.0 9 141.3 10 143.4

CONSTRUCT 2 WITH ELEMENT
1 89.5 2 99.7 3 45.1 4 30.8 5 70.4 6 87.8 7 57.0 8 119.3 9 130.9 10 131.5

CONSTRUCT 3 WITH ELEMENT
1 76.1 2 116.1 3 68.7 4 74.9 5 33.3 6 60.2 7 114.5 8 67.2 9 131.9 10 131.4

CONSTRUCT 4 WITH ELEMENT
1 75.8 2 118.7 3 60.5 4 74.7 5 93.9 6 126.2 7 100.6 8 59.2 9 76.3 10 122.7

CONSTRUCT 5 WITH ELEMENT
1 87.7 2 101.8 3 48.6 4 31.9 5 83.5 6 79.3 7 52.5 8 125.8 9 125.4 10 126.5

CONSTRUCT 6 WITH ELEMENT
1 38.3 2 86.2 3 78.1 4 102.4 5 48.1 6 72.4 7 137.2 8 62.4 9 110.5 10 129.5

CONSTRUCT 7 WITH ELEMENT

1 54.2 2 86.9 3 38.3 4 81.6 5 39.3 6 67.6 7 99.9 8 110.2 9 132.9 10 139.5

CONSTRUCT 8 WITH ELEMENT

1 30.7 2 61.9 3 70.0 4 106.2 5 80.4 6 115.3 7 126.5 8 83.7 9 71.8 10 121.5

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2 63.8 3 70.0 4 107.7 5 68.3 6 92.1 7 128.1 8 84.3 9 92.3 10 127.8

ELEMENT 2 WITH ELEMENT

3 107.5 4 117.7 5 94.4 6 97.9 7 99.1 8 110.6 9 75.5 10 80.4

ELEMENT 3 WITH ELEMENT

4 59.9 5 63.5 6 92.3 7 84.0 8 108.2 9 116.6 10 144.5

ELEMENT 4 WITH ELEMENT

5 86.5 6 88.1 7 49.5 8 109.4 9 119.5 10 117.7

ELEMENT 5 WITH ELEMENT

6 56.8 7 115.5 8 88.7 9 137.2 10 127.1

ELEMENT 6 WITH ELEMENT

7 93.2 8 100.5 9 136.6 10 93.4

ELEMENT 7 WITH ELEMENT

8 127.8 9 101.6 10 79.1

ELEMENT 8 WITH ELEMENT

9 72.5 10 90.0

ELEMENT 9 WITH ELEMENT

10 59.1

••• GRID1-CROSS

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.833	33.56	3	.405	66.12	4	.214	77.63	5	.048	87.27	6	.095	84.53
7	.405	66.12	8	-.119	96.84	9	.500	60.00	10	.476	61.56			
CONSTRUCT 2														
3	.595	53.47	4	.452	63.10	5	.286	73.40	6	.226	76.93	7	.429	64.62
8	.131	82.48	9	.762	40.37	10	.690	46.33						
CONSTRUCT 3														
4	.905	25.21	5	.810	35.95	6	.774	39.30	7	.881	28.24	8	.714	44.42
9	.762	40.37	10	.833	33.56									
CONSTRUCT 4														
5	.952	17.75	6	.756	40.89	7	.750	41.41	8	.845	32.30	9	.810	35.95
10	.893	26.77												
CONSTRUCT 5														
6	.845	32.30	7	.738	42.43	8	.940	19.87	9	.690	46.33	10	.786	38.21
CONSTRUCT 6														
7	.905	25.21	8	.857	31.00	9	.405	66.12	10	.512	59.21			
CONSTRUCT 7														
8	.667	48.19	9	.476	61.56	10	.595	53.47						
CONSTRUCT 8														
9	.560	55.98	10	.631	50.88									
CONSTRUCT 9														
10	.976	12.53												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	25.500	73.250	17.44
2	9.000	17.000	4.05
3	-5.500	28.250	6.73
4	-14.000	22.500	5.36
5	-10.000	50.500	12.02
6	12.500	41.250	9.82
7	-35.000	122.500	29.17
8	17.500	63.250	15.06

TOTAL VARIATION ABOUT CONSTRUCT MEANS 420.0000

TOTAL PER CONSTRUCT 42.0000

UNIT OF EXPECTED DISTANCE 10.9545

DISTANCES BETWEEN ELEMENTS

ELEMENT 1													
2	.576	3	.960	4	1.184	5	1.311	6	.750	7	1.766	8	.563

ELEMENT 2
3 .572 4 .716 5 .929 6 .607 7 1.299 8 .729

ELEMENT 3
4 .526 5 .984 6 1.006 7 .967 8 .964

ELEMENT 4
5 .632 6 .932 7 .626 8 1.066

ELEMENT 5
6 .760 7 .926 8 1.212

ELEMENT 6
7 1.447 8 .868

ELEMENT 7
8 1.603

SUMS OF PRODUCTS

ELEMENT 1
2 25.250 3 -4.500 4 -36.250 5 -41.250 6 23.500 7 -89.250 8 49.250

ELEMENT 2
3 3.000 4 -11.000 5 -16.000 6 7.000 7 -31.500 8 8.250

ELEMENT 3
4 8.750 5 -18.750 6 -26.000 7 19.250 8 -10.000

ELEMENT 4
5 12.500 6 -20.250 7 49.000 8 -25.250

ELEMENT 5
6 11.250 7 35.000 8 -31.250

ELEMENT 6
7 -43.750 8 7.000

ELEMENT 7
8 -61.250

THE COMPONENT-SPACE IS LIMITED TO 7 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	283.8547	67.58
2	84.7596	20.18
3	34.3667	8.18
4	7.0207	1.67
5	5.4111	1.29
6	1.9015	.45
7	1.1857	.28

BARTLETT TEST

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED .1934 D.F. 2

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 2.5930 D.F. 5

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 4.7018 D.F. 9

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 19.3276 D.F. 14

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 38.4684 D.F. 20

2 COMPONENTS FOUND SIGNIFICANT

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	.5000	1.5000	-2.5000	-.5000	2.5000	3.5000	-3.5000	-1.5000
CONSTRUCT 2	1.5000	-.5000	-1.5000	-2.5000	2.5000	3.5000	-3.5000	.5000
CONSTRUCT 3	3.5000	.5000	-.5000	-1.5000	-2.5000	2.5000	-3.5000	1.5000
CONSTRUCT 4	2.5000	1.0000	-.5000	-1.5000	-2.5000	1.0000	-3.5000	3.5000
CONSTRUCT 5	2.5000	1.5000	.5000	-1.5000	-2.5000	-.5000	-3.5000	3.5000
CONSTRUCT 6	3.5000	2.0000	2.0000	-1.5000	-2.5000	-.5000	-3.5000	.5000
CONSTRUCT 7	3.5000	2.5000	.5000	-1.5000	-2.5000	1.5000	-3.5000	-.5000
CONSTRUCT 8	3.0000	.5000	1.5000	-.5000	-2.5000	-1.5000	-3.5000	3.0000
CONSTRUCT 9	2.5000	-.5000	-2.5000	-1.5000	.5000	1.5000	-3.5000	3.5000
CONSTRUCT 10	2.5000	.5000	-2.5000	-1.5000	-.5000	1.5000	-3.5000	3.5000

	COMPON 1			COMPON 2			COMPON 3		
ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	-.4963	-8.3608	3.3465	-.1221	-1.1246	2.0819	.1569	.9198	1.2359
2	-.1660	-2.7968	9.1780	-.0943	-.8678	8.4250	.4029	2.3617	2.8476
3	.0810	1.3649	26.3871	-.4921	-4.5303	5.8639	.3184	1.6666	2.3796

4	.2621	4.4159	2.9996	-.1048	-.9646	2.0691	-.0311	-.1821	2.0359
5	.2446	4.1213	33.5149	.5963	5.4896	3.3788	-.1161	-.6803	2.9159
6	-.1988	-3.3502	30.0264	.5566	5.1246	3.7644	.2122	1.2438	2.2173
7	.6437	10.8454	4.8773	-.1675	-1.5425	2.4978	-.1496	-.6768	1.7291
8	-.3704	-6.2397	24.3156	-.1721	-1.5645	21.8048	-.7937	-4.6527	.1576

CONSTRUCT

1	-.1551	-2.6126	35.1742	.5826	5.3636	6.4059	.3529	2.0687	2.1265
2	-.2351	-3.9608	26.3122	.5217	4.8032	3.2413	.0363	.2131	3.1958
3	-.3663	-6.1708	3.9218	.0171	.1577	3.8969	.1350	.7915	3.2704
4	-.3680	-6.1999	3.5607	-.1028	-.9465	2.6649	-.1824	-1.0695	1.5210
5	-.3504	-5.9037	7.1467	-.2521	-2.3206	1.7615	-.1481	-.6680	1.0081
6	-.3116	-5.2503	14.4340	-.2945	-2.7117	7.0809	.4007	2.3489	1.5635
7	-.3254	-5.4822	11.9456	-.0799	-.7353	11.4050	.5613	3.2908	.5759
8	-.3121	-5.2586	14.3466	-.3644	-3.3549	3.0916	-.1229	-.7204	2.5726
9	-.3252	-5.4785	11.9856	.2440	2.2462	6.9401	-.4354	-2.5527	.4238
10	-.3495	-5.6892	7.3178	.1690	1.5557	4.8976	-.3469	-2.0338	.7613

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	45.00	35.26	.55
2	45.00	35.26	.06
3	45.00	35.26	.21
4	-135.00	-35.26	.29
5	-135.00	-35.26	.23
6	45.00	35.26	.63
7	45.00	35.26	.88
8	-135.00	-35.26	.19
9	-135.00	-35.26	.68
10	-135.00	-35.26	.54

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	-172.34	6.22	.99
2	-162.76	38.89	.91
3	-73.23	21.53	.96
4	-12.32	-2.31	.95
5	53.10	-5.66	.97
6	123.17	11.48	.97
7	-8.09	-4.56	.99
8	-165.75	-35.86	1.00

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1							
-.7965	1.0663	-2.2883	.1848	3.1391	2.9805	-1.8182	-2.4676
CONSTRUCT 2							
-.4655	-1.1575	-1.1791	-1.4619	3.4689	2.7124	-.9504	-.9669
CONSTRUCT 3							
.4378	-.5244	-.0001	.1174	-.9905	1.2730	.4722	-.7854
CONSTRUCT 4							
-.5767	-.0292	.0023	.1250	-.9834	-.2328	.4910	1.2038
CONSTRUCT 5							
-.4297	.5200	.9783	.0474	-1.0559	-1.6739	.3003	1.3135

CONSTRUCT 6							
.8945	1.1284	2.4253	-.1239	-1.2157	-1.5440	-.1203	-1.4485
CONSTRUCT 7							
.7795	1.5900	.9441	-.0631	-1.1590	.4099	.0290	-2.5304
CONSTRUCT 8							
.3904	-.3729	1.9260	.8783	-1.2136	-2.5457	-.1149	1.0524
CONSTRUCT 9							
-.2187	-1.4094	-2.0562	-.0641	1.8401	.4106	.0267	1.4710
CONSTRUCT 10							
-.4225	-.4776	-2.0229	.0436	.9406	.3290	.2910	1.3189

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1							
-.1414	1.5718	.3509	.7468	-.0591	-.0051	-.9195	-1.5445
CONSTRUCT 2							
.1212	-.7048	1.1844	-.9586	.6048	.0388	-.1456	-.1402
CONSTRUCT 3							
.4570	-.5095	.0775	.1339	-1.0846	1.1852	.4987	-.7582
CONSTRUCT 4							
-.6923	-.1184	-.4635	.0259	-.4190	.2940	.3325	1.0409
CONSTRUCT 5							
-.7132	.3013	-.1636	-.1958	.3279	-.3822	-.0685	.9141
CONSTRUCT 6							
.5633	.8729	1.0910	-.4080	.4012	-.0346	-.5746	-1.9112
CONSTRUCT 7							
.6696	1.5206	.5823	-.1401	-.7205	.8192	-.0942	-2.6569
CONSTRUCT 8							
-.0194	-.6892	.2752	.5268	.7868	-.6782	-.6770	.4750
CONSTRUCT 9							
.0556	-1.1977	-.9509	.1713	.5008	-.8397	.4030	1.8576
CONSTRUCT 10							
-.2325	-.3310	-1.2574	.2066	.0130	-.5370	.5516	1.5867

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1							
-.4659	.7385	-.3078	.8110	.1810	-.4440	-.6101	.0973
CONSTRUCT 2							
.0877	-.7906	1.1166	-.9520	.6295	-.0064	-.1137	.0289
CONSTRUCT 3							
.3328	-.8283	-.1745	.1585	-.9927	1.0173	.6170	-.1301

CONSTRUCT 4
-.5245 .3125 -.1229 -.0074 -.5432 .5209 .1725 .1921

CONSTRUCT 5
-.5770 .6509 .1127 -.2227 .2271 -.1980 -.2163 .2253

CONSTRUCT 6
.1948 -.0734 .3431 -.3350 .6738 -.5330 -.2233 -.0470

CONSTRUCT 7
.1733 .1950 -.4655 -.0379 -.3386 .1210 .3980 -.0452

CONSTRUCT 8
.0936 -.3989 .5046 .5044 .7032 -.5254 -.7847 -.0967

CONSTRUCT 9
.4561 -.1694 -.1381 .0920 .2045 -.2981 .0212 -.1684

CONSTRUCT 10
.0866 .4883 -.6098 .1434 -.2231 -.1055 .2475 -.0275

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4
-.0209 -.0510 .4272 -.1163 .6391 -.4661 -.4186 .0067

COMPONENT 5
-.2819 .6734 -.3939 .4158 .0261 -.2901 -.2215 .0721

COMPONENT 6
-.5272 .4004 .2273 -.6306 -.0321 .1844 .1343 .2436

COMPONENT 7
.4810 .2448 -.3683 -.4586 .1897 -.3811 .4097 -.1173

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT
1 .302 2 .353 3 -.720 4 -.505 5 .387 6 .903 7 -.553 8 -.031

CONSTRUCT 2 WITH ELEMENT
1 .511 2 .202 3 -.701 4 -.786 5 .252 6 .910 7 -.711 8 .312

CONSTRUCT 3 WITH ELEMENT
1 .955 2 .649 3 -.242 4 -.896 5 -.600 6 .599 7 -.920 8 .665

CONSTRUCT 4 WITH ELEMENT
1 .923 2 .609 3 -.199 4 -.850 5 -.680 6 .376 7 -.895 8 .881

CONSTRUCT 5 WITH ELEMENT
1 .905 2 .664 3 .028 4 -.775 5 -.778 6 .147 7 -.841 8 .871

CONSTRUCT 6 WITH ELEMENT

1 .890 2 .834 3 .308 4 -.703 5 -.791 6 .130 7 -.776 8 .506

CONSTRUCT 7 WITH ELEMENT

1 .899 2 .902 3 .029 4 -.779 5 -.649 6 .463 7 -.842 8 .388

CONSTRUCT 8 WITH ELEMENT

1 .851 2 .575 3 .231 4 -.630 5 -.817 6 -.047 7 -.738 8 .802

CONSTRUCT 9 WITH ELEMENT

1 .749 2 .263 3 -.651 4 -.839 5 -.176 6 .630 7 -.847 8 .820

CONSTRUCT 10 WITH ELEMENT

1 .821 2 .425 3 -.585 4 -.865 5 -.327 6 .606 7 -.893 8 .849

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT

2 .716 3 -.099 4 -.893 5 -.678 6 .428 7 -.942 8 .724

ELEMENT 2 WITH ELEMENT

3 .137 4 -.562 5 -.614 6 .264 7 -.690 8 .252

ELEMENT 3 WITH ELEMENT

4 .347 5 -.496 6 -.762 7 .327 8 -.237

ELEMENT 4 WITH ELEMENT

5 .371 6 -.665 7 .933 8 -.669

ELEMENT 5 WITH ELEMENT

6 .246 7 .445 8 -.553

ELEMENT 6 WITH ELEMENT

7 -.615 8 .137

ELEMENT 7 WITH ELEMENT

8 -.696

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT

1 72.4 2 69.3 3 136.0 4 120.3 5 67.2 6 25.4 7 123.6 8 91.8

CONSTRUCT 2 WITH ELEMENT

1 59.2 2 76.3 3 134.5 4 141.8 5 75.4 6 24.5 7 135.3 8 71.8

CONSTRUCT 3 WITH ELEMENT

1 17.3 2 49.5 3 109.0 4 153.7 5 126.9 6 53.2 7 157.0 8 48.3

CONSTRUCT 4 WITH ELEMENT

1	22.6	2	52.5	3	101.5	4	148.3	5	132.9	6	67.9	7	153.6	8	28.2

CONSTRUCT 5 WITH ELEMENT

1	25.1	2	48.4	3	88.4	4	140.8	5	141.1	6	81.5	7	147.2	8	29.4

CONSTRUCT 6 WITH ELEMENT

1	27.2	2	33.5	3	72.1	4	134.7	5	142.3	6	82.6	7	140.9	8	59.6

CONSTRUCT 7 WITH ELEMENT

1	26.0	2	25.6	3	88.3	4	141.2	5	130.5	6	62.4	7	147.3	8	67.1

CONSTRUCT 8 WITH ELEMENT

1	31.6	2	54.9	3	76.6	4	129.1	5	144.8	6	92.7	7	137.5	8	36.7

CONSTRUCT 9 WITH ELEMENT

1	41.5	2	74.8	3	130.6	4	147.0	5	100.1	6	50.9	7	147.9	8	34.9

CONSTRUCT 10 WITH ELEMENT

1	34.8	2	64.8	3	125.8	4	149.9	5	109.1	6	52.7	7	153.2	8	31.9

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2	44.3	3	95.7	4	153.2	5	132.7	6	64.7	7	160.4	8	43.7	°	

ELEMENT 2 WITH ELEMENT

3	82.1	4	124.2	5	127.9	6	74.7	7	133.7	8	75.4				

ELEMENT 3 WITH ELEMENT

4	69.7	5	119.8	6	139.6	7	70.9	8	103.7						

ELEMENT 4 WITH ELEMENT

5	68.2	6	131.7	7	21.0	8	132.0								

ELEMENT 5 WITH ELEMENT

6	75.7	7	63.6	8	123.6										

ELEMENT 6 WITH ELEMENT

7	128.0	8	82.1												

ELEMENT 7 WITH ELEMENT

8	134.1														

*** GRID2-CROSS

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1														
2	.667	48.19	3	.571	55.15	4	.524	58.41	5	.357	69.08	6	.310	71.97
7	.310	71.97	8	.381	67.61	9	.452	63.10	10	.750	41.41			
CONSTRUCT 2														
3	.833	33.56	4	.643	49.99	5	.476	61.56	6	.452	63.10	7	.405	66.17
8	.619	51.75	9	.500	60.00	10	.833	33.56						
CONSTRUCT 3														
4	.881	28.24	5	.762	40.37	6	.726	43.43	7	.738	42.43	8	.857	31.08
9	.512	59.21	10	.940	19.87									
CONSTRUCT 4														
5	.762	40.37	6	.774	39.30	7	.929	21.79	8	.690	46.33	9	.464	62.44
10	.821	34.77												
CONSTRUCT 5														
6	.952	17.75	7	.690	46.33	8	.929	21.79	9	.762	40.37	10	.679	47.27
CONSTRUCT 6														
7	.690	46.33	8	.845	32.30	9	.821	34.77	10	.667	48.19			
CONSTRUCT 7														
8	.595	53.47	9	.262	74.82	10	.619	51.75						
CONSTRUCT 8														
9	.679	47.27	10	.762	40.37									
CONSTRUCT 9														
10	.571	55.15												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	25.500	88.250	21.01
2	10.500	28.250	6.73
3	-.500	8.750	2.08
4	-10.000	20.500	4.88
5	-18.000	44.500	10.60
6	6.500	36.750	8.75
7	-35.000	122.500	29.17
8	21.000	68.500	16.31

TOTAL VARIATION ABOUT CONSTRUCT MEANS 420.0000

TOTAL PER CONSTRUCT 42.0000

UNIT OF EXPECTED DISTANCE 10.9545

DISTANCES BETWEEN ELEMENTS

ELEMENT 1														
2	.736	3	.897	4	1.104	5	1.430	6	.938	7	1.801	8	.797	

ELEMENT 2													
	3	.616	4	.654	5	.993	6	.777	7	1.367	8	.749	
ELEMENT 3													
	4	.538	5	.706	6	.570	7	1.032	8	.840			
ELEMENT 4													
	5	.563	6	.903	7	.760	8	1.084					
ELEMENT 5													
	6	.925	7	.585	8	1.187							
ELEMENT 6													
	7	1.306	8	.865									
ELEMENT 7													
	8	1.678											

SUMS OF PRODUCTS

ELEMENT 1													
	2	25.750	3	.250	4	-18.750	5	-56.250	6	9.750	7	-89.250	8	40.250
ELEMENT 2													
	3	-4.250	4	-1.250	5	-22.750	6	-3.750	7	-36.750	8	14.750	
ELEMENT 3													
	4	-2.750	5	-3.250	6	3.250	7	1.750	8	-3.750			
ELEMENT 4													
	5	13.500	6	-20.250	7	35.000	8	-26.000					
ELEMENT 5													
	6	-10.750	7	63.000	8	-28.000							
ELEMENT 6													
	7	-22.750	8	7.750									
ELEMENT 7													
	8	-73.500											

THE COMPONENT-SPACE IS LIMITED TO 7 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	293.3347	69.84
2	52.2086	12.43
3	40.4878	9.64
4	18.3529	4.37
5	9.2040	2.19
6	3.5194	.84
7	.8925	.21

BARTLETT TEST

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 1.5322 D.F. 2

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 4.8904 D.F. 5

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 9.8595 D.F. 9

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 18.6603 D.F. 14

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 28.3503 D.F. 20

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1							
-1.5000	1.5000	.5000	-2.5000	-.5000	2.5000	-3.5000	3.5000
CONSTRUCT 2							
2.5000	-1.5000	-.5000	-2.5000	.5000	1.5000	-3.5000	3.5000
CONSTRUCT 3							
3.5000	-.5000	.5000	-1.5000	-2.5000	1.5000	-3.5000	2.5000
CONSTRUCT 4							
3.5000	1.5000	-.5000	-1.5000	-2.5000	2.5000	-3.5000	.5000
CONSTRUCT 5							
3.5000	2.5000	.5000	-.5000	-2.5000	-1.5000	-3.5000	1.5000
CONSTRUCT 6							
3.5000	2.5000	-1.0000	.5000	-2.5000	-1.0000	-3.5000	1.5000
CONSTRUCT 7							
3.5000	1.5000	.5000	-.5000	-2.5000	2.5000	-3.5000	-1.5000
CONSTRUCT 8							
3.5000	.5000	1.5000	-.5000	-2.5000	-1.5000	-3.5000	2.5000
CONSTRUCT 9							
1.5000	2.5000	-2.0000	.5000	-.5000	-2.0000	-3.5000	3.5000
CONSTRUCT 10							
2.0000	.0000	.0000	-1.5000	-2.5000	2.0000	-3.5000	3.5000

	COMPON 1			COMPON 2			COMPON 3		
ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	-.4942	-8.4637	16.6151	-.3871	-2.7972	8.7908	-.2695	-1.8422	5.3969
2	-.1872	-3.2061	17.9709	-.3531	-2.5510	11.4633	.1443	.9164	10.6198
3	.0043	.0736	8.7446	.0461	.3334	8.6335	-.1979	-1.2590	7.0463

4	.1767	3.6614	11.1276	-.4304	-3.1098	1.4565	.1013	.6447	1.0409
5	.3483	5.9659	6.9079	.2379	1.7138	5.9536	.2541	1.6167	3.3398
6	-.1130	-1.9352	33.0049	.5616	4.0578	16.5394	-.5952	-3.7875	2.1941
7	.6414	10.9860	1.8085	-.0756	-.5461	1.5103	-.0671	-.4272	1.3277
8	-.3785	-6.4818	26.4858	.4006	2.8942	18.1094	.6500	4.1362	1.0013

CONSTRUCT

1	-.2342	-4.0105	25.9155	.5677	4.1016	9.0921	.1876	1.1936	7.6675
2	-.2901	-4.9666	17.3127	.4487	3.2425	6.7992	.1021	.6496	6.3772
3	-.3581	-6.1335	4.3802	.1389	1.0038	3.3726	-.1578	-1.0044	2.3638
4	-.3426	-5.8683	7.5635	.0017	.0121	7.5633	-.3792	-2.4132	1.7400
5	-.3386	-5.7969	8.3728	-.3558	-2.5710	1.7625	.1046	.6656	1.3195
6	-.3318	-5.6831	9.7025	-.3861	-2.7898	1.9192	.1204	.7661	1.3323
7	-.2878	-4.9283	17.7118	-.1624	-1.1733	16.3352	-.5987	-3.8098	1.8207
8	-.3386	-5.7967	8.3755	-.1963	-1.4182	6.3640	.1303	.8291	5.6766
9	-.2713	-4.6463	20.4120	-.1863	-1.3465	18.5990	.6202	3.9465	3.0240
10	-.3458	-5.9229	6.9189	.2860	2.0663	2.6494	-.0073	-.0466	2.6472

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	45.00	35.26	.32
2	45.00	35.26	.17
3	-135.00	-35.26	.27
4	-135.00	-35.26	.64
5	45.00	35.26	.18
6	45.00	35.26	.20
7	-135.00	-35.26	1.02
8	45.00	35.26	.22
9	45.00	35.26	1.05
10	-135.00	-35.26	.01

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	-161.71	-11.68	.97
2	-141.49	12.63	.79
3	77.55	-74.83	.44
4	-45.45	8.40	.97
5	16.07	14.60	.96
6	115.50	-40.11	.97
7	-2.85	-2.22	.99
8	155.94	30.23	.99

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1

-3.4819	.7492	.5172	-1.7831	.8970	2.0468	-.9275	1.9822

CONSTRUCT 2

.0446	-2.4301	-.4786	-1.6119	2.2307	.9386	-.3129	1.6196

CONSTRUCT 3

.4690	-1.6482	.5264	-.4036	-.3635	.8070	.4343	.1787

CONSTRUCT 4

.6001	.4015	-.4748	-.4511	-.4559	1.8369	.2641	-1.7209

CONSTRUCT 5

.6343	1.4145	.5249	.5365	-.4801	-2.1552	.2197	-.6946

CONSTRUCT 6							
.6916	1.4362	-.9756	1.5158	-.5204	-1.6422	.1454	-.6508
CONSTRUCT 7							
1.0646	.5774	.5212	.3809	-.7833	1.9431	-.3388	-3.3652
CONSTRUCT 8							
.6344	-.5855	1.5249	.5365	-.4801	-2.1552	.2195	.3055
CONSTRUCT 9							
-.7961	1.6302	-1.9800	1.3305	1.1185	-2.5250	-.5197	1.7416
CONSTRUCT 10							
-.9270	-1.1087	.0255	-.4413	-.4368	1.3307	.2992	1.2584

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1							
-1.8941	2.1973	.3280	-.0178	-.0787	-.2566	-.6175	.3393
CONSTRUCT 2							
1.2999	-1.2853	-.6282	-.2163	1.4594	-.8823	-.0679	.3208
CONSTRUCT 3							
.0576	-1.2938	.4800	.0284	-.6023	.2432	.5101	-.2233
CONSTRUCT 4							
.6047	.4057	-.4753	-.4459	-.4508	1.8302	.2651	-1.7257
CONSTRUCT 5							
-.3610	.5068	.6435	-.5700	.1315	-.7114	.0253	.3352
CONSTRUCT 6							
-.3885	.4512	-.8469	.3151	.1433	-.0754	-.0655	.4667
CONSTRUCT 7							
.6103	.1632	.5753	-.1241	-.5042	2.6020	-.4275	-2.8952
CONSTRUCT 8							
.0854	-1.0862	1.5903	-.0739	-.1428	-1.3587	.1123	.8735
CONSTRUCT 9							
-1.3173	1.1549	-1.9179	.7510	1.4388	-1.7689	-.6214	2.2809
CONSTRUCT 10							
-.1271	-.3792	-.0699	.4480	-.9284	.1704	.4554	.4308

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1							
-1.5485	2.0251	.5642	-.1387	-.3820	.4539	-.5373	-.4366
CONSTRUCT 2							
1.4880	-1.3791	-.4997	-.2822	1.2944	-.4956	-.0242	-.1015
CONSTRUCT 3							
.5668	-1.1488	.2813	.1302	-.3471	-.3546	.4427	.4295

CONSTRUCT 4
-.0939 .7541 -.9528 -.2014 .1544 .3937 .1030 -.1571

CONSTRUCT 5
-.1683 .4107 .7752 -.6375 -.0376 -.3152 .0700 -.0975

CONSTRUCT 6
-.1667 .3406 -.6953 .2375 -.0514 .3806 -.0140 -.0313

CONSTRUCT 7
-.4927 .7131 -.1785 .2619 .4638 .3343 -.6833 -.4187

CONSTRUCT 8
.3255 -1.2059 1.7544 -.1579 -.3534 -.8652 .1680 .3346

CONSTRUCT 9
-.1747 .5852 -1.1370 .3512 .4360 .5803 -.3565 -.2645

CONSTRUCT 10
-.1405 -.3725 -.0791 .4527 -.9165 .1426 .4522 -.4611

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4
-.4848 .7517 -.2024 .0378 -.0516 .3034 -.1829 -.1713

COMPONENT 5
-.3307 .0853 .7947 -.0845 -.4448 -.1813 .0586 .1027

COMPONENT 6
.1072 .1664 .3597 -.3797 .6424 -.2323 -.3439 -.3199

COMPONENT 7
-.2031 -.3073 .1784 .7034 .1389 .1169 -.5461 -.0812

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT

1 .230 2 .346 3 .025 4 -.832 5 -.383 6 .568 7 -.681 8 .766

CONSTRUCT 2 WITH ELEMENT

1 .613 2 .062 3 -.078 4 -.866 5 -.453 6 .467 7 -.780 8 .833

CONSTRUCT 3 WITH ELEMENT

1 .881 2 .333 3 .134 4 -.766 5 -.858 6 .458 7 -.920 8 .744

CONSTRUCT 4 WITH ELEMENT

1 .871 2 .564 3 -.014 4 -.663 5 -.885 6 .564 7 -.892 8 .509

CONSTRUCT 5 WITH ELEMENT

1 .890 2 .775 3 .006 4 -.350 5 -.888 6 -.060 7 -.874 8 .610

CONSTRUCT 6 WITH ELEMENT

1 .882 2 .805 3 -.230 4 -.262 5 -.864 6 -.050 7 -.858 8 .508

CONSTRUCT 7 WITH ELEMENT

1 .822 2 .544 3 .147 4 -.465 5 -.850 6 .525 7 -.744 8 .216

CONSTRUCT 8 WITH ELEMENT

1 .881 2 .515 3 .188 4 -.462 5 -.855 6 -.024 7 -.864 8 .717

CONSTRUCT 9 WITH ELEMENT

1 .571 2 .722 3 -.497 4 -.231 5 -.518 6 -.238 7 -.740 8 .773

CONSTRUCT 10 WITH ELEMENT

1 .728 2 .365 3 .032 4 -.812 5 -.781 6 .510 7 -.909 8 .843

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT

2 .516 3 .009 4 -.441 5 -.898 6 .171 7 -.858 8 .518

ELEMENT 2 WITH ELEMENT

3 -.270 4 -.052 5 -.642 6 -.116 7 -.625 8 .335

ELEMENT 3 WITH ELEMENT

4 -.205 5 -.165 6 .181 7 .053 8 -.153

ELEMENT 4 WITH ELEMENT

5 .447 6 -.738 7 .698 8 -.694

ELEMENT 5 WITH ELEMENT

6 -.266 7 .853 8 -.507

ELEMENT 6 WITH ELEMENT

7 -.339 8 .154

ELEMENT 7 WITH ELEMENT

8 -.802

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT

1 76.7 2 69.8 3 68.6 4 146.4 5 112.5 6 55.4 7 132.9 8 40.0

CONSTRUCT 2 WITH ELEMENT

1 52.2 2 86.4 3 94.5 4 150.0 5 117.0 6 62.2 7 141.3 8 33.6

CONSTRUCT 3 WITH ELEMENT

1 28.3 2 70.6 3 82.3 4 140.0 5 149.0 6 62.8 7 157.0 8 41.9

CONSTRUCT 4 WITH ELEMENT

1	29.4	2	55.7	3	90.8	4	131.5	5	152.2	6	55.6	7	153.1	8	59.4

CONSTRUCT 5 WITH ELEMENT

1	27.1	2	39.2	3	89.7	4	110.5	5	152.6	6	93.4	7	150.9	8	52.4

CONSTRUCT 6 WITH ELEMENT

1	28.2	2	36.4	3	103.3	4	105.2	5	149.8	6	92.8	7	149.1	8	54.0

CONSTRUCT 7 WITH ELEMENT

1	34.7	2	57.0	3	81.6	4	117.7	5	148.3	6	58.3	7	138.1	8	77.6

CONSTRUCT 8 WITH ELEMENT

1	28.2	2	59.0	3	79.2	4	117.5	5	148.8	6	91.4	7	149.8	8	44.2

CONSTRUCT 9 WITH ELEMENT

1	55.2	2	43.7	3	119.8	4	103.4	5	121.2	6	103.8	7	137.7	8	39.4

CONSTRUCT 10 WITH ELEMENT

1	43.3	2	68.6	3	88.2	4	144.3	5	141.3	6	59.4	7	155.3	8	32.6

INTER-ELEMENT RELATIONS EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2	59.0	3	89.5	4	116.2	5	153.8	6	80.1	7	149.1	8	58.8		

ELEMENT 2 WITH ELEMENT

3	105.7	4	93.0	5	129.9	6	96.7	7	128.7	8	70.4				

ELEMENT 3 WITH ELEMENT

4	101.8	5	99.5	6	79.6	7	86.9	8	98.8						

ELEMENT 4 WITH ELEMENT

5	63.5	6	137.5	7	45.7	8	133.9								

ELEMENT 5 WITH ELEMENT

6	105.4	7	31.4	8	120.5										

ELEMENT 6 WITH ELEMENT

7	109.8	8	81.1												

ELEMENT 7 WITH ELEMENT

8	143.4														

*** GRID3-CROSS

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.464	62.34	3	.548	56.80	4	.548	56.80	5	.107	83.85	6	.500	60.00
7	.607	52.62	8	-.071	94.10	9	-.036	92.05	10	.077	85.56			
CONSTRUCT 2														
3	.429	64.62	4	.500	60.00	5	.429	64.62	6	.381	67.61	7	.452	63.10
8	.310	71.97	9	.381	67.61	10	.405	66.12						
CONSTRUCT 3														
4	.881	28.24	5	.667	48.19	6	.905	25.21	7	.976	12.53	8	.548	56.80
9	.381	67.61	10	.631	50.88									
CONSTRUCT 4														
5	.810	35.95	6	.929	21.79	7	.952	17.75	8	.690	46.33	9	.619	51.75
10	.798	37.10												
CONSTRUCT 5														
6	.810	35.95	7	.690	46.33	8	.929	21.79	9	.929	21.79	10	.988	8.85
CONSTRUCT 6														
7	.929	21.79	8	.643	49.99	9	.571	55.15	10	.774	39.30			
CONSTRUCT 7														
8	.571	55.15	9	.429	64.62	10	.667	48.19						
CONSTRUCT 8														
9	.929	21.79	10	.952	17.75									
CONSTRUCT 9														
10	.940	19.87												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	30.500	104.250	24.82
2	14.000	28.500	6.79
3	1.000	8.000	1.90
4	-10.500	30.250	7.20
5	-15.000	54.500	12.98
6	4.000	40.500	9.64
7	-34.000	116.500	27.74
8	10.000	36.500	8.69

TOTAL VARIATION ABOUT CONSTRUCT MEANS 420.0000

TOTAL PER CONSTRUCT 42.0000

UNIT OF EXPECTED DISTANCE 10.9545

DISTANCES BETWEEN ELEMENTS

ELEMENT 1													
2	.679	3	.932	4	1.263	5	1.503	6	1.066	7	1.887	8	.749

ELEMENT 2
3 .479 4 .853 5 1.061 6 .645 7 1.426 8 .632

ELEMENT 3
4 .572 5 .834 6 .559 7 1.059 8 .686

ELEMENT 4
5 .848 6 .993 7 .818 8 .697

ELEMENT 5
6 .851 7 .713 8 1.045

ELEMENT 6
7 1.238 8 1.041

ELEMENT 7
8 1.354

SUMS OF PRODUCTS

ELEMENT 1
2 38.750 3 4.000 4 -28.500 5 -56.250 6 4.250 7 -103.250 8 36.750

ELEMENT 2
3 4.500 4 -14.250 5 -26.000 6 9.500 7 -49.500 8 8.500

ELEMENT 3
4 -.500 5 -10.500 6 5.500 7 -5.000 8 -6.000

ELEMENT 4
5 -.750 6 -23.750 7 33.250 8 4.250

ELEMENT 5
6 4.000 7 55.000 8 -20.000

ELEMENT 6
7 -13.500 8 -26.500

ELEMENT 7
8 -33.500

THE COMPONENT-SPACE IS LIMITED TO 7 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	284.7629	67.80
2	80.8296	19.25
3	33.6028	8.00
4	11.8333	2.82
5	4.4066	1.05
6	2.7365	.65
7	.8281	.20

BARTLETT TEST

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED 1.1822 D.F. 2

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 2.6274 D.F. 5

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 7.8610 D.F. 9

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 19.5574 D.F. 14

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 36.8031 D.F. 20

2 COMPONENTS FOUND SIGNIFICANT

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	.0000	2.5000	.0000	-2.5000	1.5000	3.5000	-3.5000	-1.5000
CONSTRUCT 2	3.5000	-.5000	-1.5000	-3.5000	2.5000	.5000	-2.5000	1.5000
CONSTRUCT 3	3.5000	.5000	1.5000	-1.5000	-2.5000	2.5000	-3.5000	-.5000
CONSTRUCT 4	3.5000	2.5000	-.5000	-1.5000	-2.5000	1.5000	-3.5000	.5000
CONSTRUCT 5	3.5000	1.5000	.5000	-.5000	-2.5000	-1.5000	-3.5000	2.5000
CONSTRUCT 6	3.5000	2.5000	1.5000	-1.5000	-2.5000	.5000	-3.5000	-.5000
CONSTRUCT 7	3.5000	1.5000	.5000	-1.5000	-2.5000	2.5000	-3.5000	-.5000
CONSTRUCT 8	3.5000	.5000	-.5000	1.5000	-2.5000	-1.5000	-3.5000	2.5000
CONSTRUCT 9	2.5000	1.5000	-.5000	.5000	-1.5000	-2.5000	-3.5000	3.5000
CONSTRUCT 10	3.5000	1.5000	.0000	.0000	-2.5000	-1.5000	-3.5000	2.5000

	COMPON 1			COMPON 2			COMPON 3		
ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	.5908	9.9699	4.9508	.0533	.4792	4.6212	.1433	.8306	3.9313
2	.2634	4.4441	8.7500	-.1248	-1.1225	7.4901	-.1615	-.9360	6.6141
3	.0340	.5733	7.6713	-.0759	-.6819	7.2062	-.3784	-2.1933	2.3958

4	-.1629	-2.7484	22.6966	.4448	3.9992	6.7027	-.3832	-2.2213	1.7685
5	-.2418	-5.7682	21.2279	-.2239	-2.0134	17.1740	.7010	4.0638	.6595
6	.0445	.7511	39.9358	-.6832	-6.1421	2.2110	-.1932	-.8879	1.4226
7	-.6284	-10.6044	4.0462	.1109	.9973	3.0517	-.1306	-.7573	2.4762
8	.2004	3.3825	25.0585	.4988	4.4842	4.9505	.3625	2.1014	.5348

CONSTRUCT								
1	.1545	2.6074	35.2016	-.5881	-5.2876	7.2429	.1696	.9833	6.2761
2	.2071	3.4946	29.7875	-.1807	-1.6248	27.1477	.8690	5.0373	1.7728
3	.3295	5.5598	11.0882	-.2717	-2.4426	5.1222	-.2470	-1.4315	3.0729
4	.3659	6.1745	3.8752	-.1511	-1.3586	2.0293	-.0832	-.4820	1.7970
5	.3585	6.0496	5.4018	.2427	2.1823	.6395	.0177	.1024	.6290
6	.3554	5.9975	6.0297	-.1475	-1.3259	4.2717	-.2498	-1.4481	2.1747
7	.3431	5.7892	8.4850	-.2771	-2.4916	2.2772	-.2095	-1.2146	.8018
8	.3216	5.4266	12.5522	.3640	3.2726	1.8422	-.0214	-.1242	1.8268
9	.3008	5.0761	16.2331	.4013	3.6076	3.2182	.2020	1.1710	1.8470
10	.3527	5.9512	6.5829	.2717	2.4426	.6166	.0172	.1000	.6066

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	45.00	35.26	.26
2	45.00	35.26	1.35
3	-135.00	-35.26	.38
4	-135.00	-35.26	.13
5	45.00	35.26	.03
6	-135.00	-35.26	.39
7	-135.00	-35.26	.32
8	-135.00	-35.26	.03
9	45.00	35.26	.31
10	45.00	35.26	.03

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	2.75	4.76	.98
2	-14.17	-11.54	.88
3	-49.95	-67.89	.84
4	124.50	-24.60	.97
5	-160.76	33.63	.99
6	-83.03	-8.17	.98
7	174.63	-4.07	.99
8	52.97	20.51	.99

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1							
-1.5405	1.8133	-.0886	-2.0753	2.3913	3.3839	-1.8615	-2.0226
CONSTRUCT 2							
1.4353	-1.4203	-1.6187	-2.9308	3.6945	.3445	-.3039	.7995
CONSTRUCT 3							
.2152	-.9642	1.3111	-.5945	-.5995	2.2525	-.0061	-1.6145
CONSTRUCT 4							
-.1480	.8739	-.7098	-.4944	-.3894	1.2252	.3802	-.7377
CONSTRUCT 5							
-.0742	-.0932	.2945	.4853	-.4321	-1.7693	.3017	1.2874

CONSTRUCT 6
-.0434 .9205 1.2962 -.5232 -.4499 .2330 .2689 -1.7022

CONSTRUCT 7
.0797 -.0246 .3033 -.5571 -.5211 2.2423 .1380 -1.6604

CONSTRUCT 8
.2939 -.9291 -.6844 2.3838 -.6451 -1.7415 -.0899 1.4123

CONSTRUCT 9
-.4990 .1632 -.6725 1.3267 .2351 -2.7259 -.3101 2.4825

CONSTRUCT 10
-.0161 -.0673 -.2022 .9693 -.4657 -1.7649 .2398 1.3071

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1
-1.2586 1.1532 -.4897 .2767 1.2071 -.2284 -1.2750 .6146

CONSTRUCT 2
1.5219 -1.6232 -1.7420 -2.2081 3.3307 -.7655 -.1237 1.6099

CONSTRUCT 3
.3454 -1.2692 1.1258 .4920 -1.1465 .5839 .2648 -.3962

CONSTRUCT 4
-.0756 .7043 -.8128 .1100 -.6937 .2970 .5309 -.0600

CONSTRUCT 5
-.1905 .1792 .4600 -.4854 .0566 -.2784 .0596 .1989

CONSTRUCT 6
.0273 .7550 1.1957 .0666 -.7469 -.6728 .4160 -1.0409

CONSTRUCT 7
.2125 -.3357 .1143 .5512 -1.0791 .5402 .4144 -.4177

CONSTRUCT 8
.1195 -.5205 -.4361 .9281 .0878 .4942 -.4529 -.2200

CONSTRUCT 9
-.6913 .6136 -.3988 -.2780 1.0430 -.2613 -.7103 .6831

CONSTRUCT 10
-.1463 .2377 -.0169 -.1173 .0813 -.0962 -.0311 .0888

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1
-1.3995 1.3119 -.1176 .6535 .5178 -.0778 -1.1465 .2582

CONSTRUCT 2
.8001 -.8098 .1640 -.2778 -.2007 .0061 .5344 -.2162

CONSTRUCT 3
.5505 -1.5003 .5842 -.0565 -.1430 .3646 .0778 .1228

CONSTRUCT 4
-.0065 .6265 -.9952 -.0747 -.3557 .2232 .4679 .1147

CONSTRUCT 5
-.2052 .1958 .4987 -.4462 -.0152 -.2627 .0730 .1618

CONSTRUCT 6
.2348 .5212 .6478 -.4883 .2683 -.8946 .2268 -.5159

CONSTRUCT 7
.3865 -.5318 -.3452 .0857 -.2276 .3541 .2557 .0226

CONSTRUCT 8
.1373 -.5406 -.4831 .8805 .1749 .4752 -.4691 -.1750

CONSTRUCT 9
-.8591 .8027 .0442 .1707 .2221 -.0820 -.5573 .2586

CONSTRUCT 10
-.1606 .2538 .0209 -.0790 .0112 -.0809 -.0181 .0526

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4
.5588 -.6928 .0950 -.1570 -.1727 .1055 .3535 -.0904

COMPONENT 5
.0813 .3263 .4771 -.5373 .0318 -.5217 .2801 -.1378

COMPONENT 6
.1688 .4084 -.6796 -.1571 -.2788 .0698 .4851 -.0166

COMPONENT 7
-.3939 -.1038 .1625 -.4072 -.3286 .3078 .1095 .6536

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT
1 .296 2 .624 3 .124 4 -.804 5 .024 6 .602 7 -.530 8 -.306

CONSTRUCT 2 WITH ELEMENT
1 .617 2 .280 3 -.403 4 -.791 5 .059 6 .203 7 -.583 8 .373

CONSTRUCT 3 WITH ELEMENT
1 .839 2 .706 3 .497 4 -.623 5 -.702 6 .517 7 -.848 8 .120

CONSTRUCT 4 WITH ELEMENT
1 .910 2 .889 3 .205 4 -.597 5 -.738 6 .334 7 -.942 8 .357

CONSTRUCT 5 WITH ELEMENT
1 .923 2 .722 3 .145 4 -.249 5 -.810 6 -.234 7 -.886 8 .780

CONSTRUCT 6 WITH ELEMENT

1	.879	2	.886	3	.487	4	-.556	5	-.783	6	.297	7	-.905	8	.271

CONSTRUCT 7 WITH ELEMENT

1	.859	2	.805	3	.389	4	-.648	5	-.709	6	.523	7	-.889	8	.148

CONSTRUCT 8 WITH ELEMENT

1	.842	2	.557	3	.010	4	.000	5	-.800	6	-.356	7	-.786	8	.837

CONSTRUCT 9 WITH ELEMENT

1	.765	2	.589	3	-.125	4	-.039	5	-.647	6	-.480	7	-.756	8	.928

CONSTRUCT 10 WITH ELEMENT

1	.908	2	.705	3	.064	4	-.193	5	-.809	6	-.263	7	-.671	8	.801

INTER-ELEMENT RELATIONS EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT

2	.711	3	.139	4	-.508	5	-.746	6	.065	7	-.937	8	.596		

ELEMENT 2 WITH ELEMENT

3	.298	4	-.485	5	-.660	6	.280	7	-.859	8	.264				

ELEMENT 3 WITH ELEMENT

4	-.032	5	-.503	6	.306	7	-.164	8	-.351						

ELEMENT 4 WITH ELEMENT

5	-.018	6	-.679	7	.560	8	.128								

ELEMENT 5 WITH ELEMENT

6	.085	7	.690	8	-.448										

ELEMENT 6 WITH ELEMENT

7	-.197	8	-.689												

ELEMENT 7 WITH ELEMENT

8	-.514														

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT

1	72.8	2	51.4	3	82.9	4	143.6	5	88.6	6	36.6	7	122.0	8	107.8

CONSTRUCT 2 WITH ELEMENT

1	51.9	2	73.7	3	113.8	4	142.3	5	86.6	6	78.3	7	125.6	8	68.1

CONSTRUCT 3 WITH ELEMENT

1	32.9	2	45.1	3	60.2	4	128.5	5	134.6	6	58.8	7	148.0	8	83.1

CONSTRUCT 4 WITH ELEMENT

1 24.4 2 27.2 3 78.2 4 126.7 5 137.6 6 70.5 7 160.4 8 69.1

CONSTRUCT 5 WITH ELEMENT

1 22.6 2 43.8 3 81.7 4 104.4 5 144.1 6 103.5 7 152.4 8 38.7

CONSTRUCT 6 WITH ELEMENT

1 28.5 2 27.6 3 60.9 4 123.8 5 141.5 6 72.7 7 154.8 8 74.2

CONSTRUCT 7 WITH ELEMENT

1 30.8 2 36.4 3 67.1 4 130.4 5 135.1 6 58.5 7 152.7 8 81.5

CONSTRUCT 8 WITH ELEMENT

1 32.6 2 56.1 3 89.4 4 90.0 5 143.2 6 110.9 7 141.8 8 33.1

CONSTRUCT 9 WITH ELEMENT

1 40.1 2 53.9 3 97.2 4 92.3 5 130.3 6 118.7 7 139.1 8 21.8

CONSTRUCT 10 WITH ELEMENT

1 24.8 2 45.2 3 85.2 4 101.1 5 144.0 6 105.3 7 150.6 8 36.7

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2 44.7 3 82.0 4 120.5 5 138.3 6 86.2 7 159.5 8 53.4

ELEMENT 2 WITH ELEMENT

3 72.7 4 119.0 5 131.3 6 73.8 7 149.2 8 74.7

ELEMENT 3 WITH ELEMENT

4 91.8 5 120.2 6 72.2 7 99.4 8 110.6

ELEMENT 4 WITH ELEMENT

5 91.1 6 132.7 7 55.9 8 82.7

ELEMENT 5 WITH ELEMENT

6 85.1 7 46.4 8 116.6

ELEMENT 6 WITH ELEMENT

7 101.3 8 133.6

ELEMENT 7 WITH ELEMENT

8 120.9

*** GRID4-CROSS

CORRELATIONS AND ANGULAR DISTANCES BETWEEN CONSTRUCTS

CONSTRUCT 1													
2	.607	52.62	3	.381	67.61	4	.500	60.00	5	.131	82.48	6	.286	73.40
7	.468	60.78	8	.048	87.27	9	.196	78.67	10	.262	74.82			
CONSTRUCT 2													
3	.738	42.43	4	.738	42.43	5	.548	56.80	6	.548	56.80	7	.738	42.43
8	.524	58.41	9	.524	58.41	10	.667	48.19						
CONSTRUCT 3													
4	.857	31.00	5	.679	47.27	6	.810	35.95	7	.952	17.75	8	.714	44.42
9	.321	71.25	10	.774	39.30									
CONSTRUCT 4													
5	.810	35.95	6	.905	25.21	7	.952	17.75	8	.738	42.43	9	.595	53.47
10	.905	25.21												
CONSTRUCT 5													
6	.905	25.21	7	.690	46.33	8	.976	12.53	9	.833	33.56	10	.905	25.21
CONSTRUCT 6													
7	.857	31.00	8	.881	28.24	9	.595	53.47	10	.857	31.00			
CONSTRUCT 7													
8	.667	48.19	9	.381	67.61	10	.810	35.95						
CONSTRUCT 8													
9	.750	41.41	10	.857	31.00									
CONSTRUCT 9													
10	.702	45.38												

ELEMENT	TOTAL	SUM OF SQUARES	AS PER CENT
1	29.500	105.250	25.06
2	13.500	28.250	6.73
3	.000	15.000	3.57
4	-13.000	24.500	5.83
5	-17.000	52.500	12.50
6	7.500	42.250	10.06
7	-34.000	116.500	27.74
8	13.500	34.250	8.15

TOTAL VARIATION ABOUT CONSTRUCT MEANS 420.0000

TOTAL PER CONSTRUCT 42.0000

UNIT OF EXPECTED DISTANCE 10.9545

DISTANCES BETWEEN ELEMENTS

ELEMENT 1													
2	.733	3	.945	4	1.289	5	1.553	6	1.010	7	1.874	8	.686

ELEMENT 2
3 .611 4 .853 5 1.039 6 .668 7 1.403 8 .500

ELEMENT 3
4 .566 5 .873 6 .726 7 1.051 8 .712

ELEMENT 4
5 .592 6 .980 7 .665 8 .813

ELEMENT 5
6 .905 7 .689 8 1.050

ELEMENT 6
7 1.324 8 .883

ELEMENT 7
8 1.415

SUMS OF PRODUCTS

ELEMENT 1
2 34.500 3 6.500 4 -34.750 5 -65.750 6 12.500 7 -99.750 8 41.500

ELEMENT 2
3 -.750 4 -17.250 5 -23.750 6 8.500 7 -45.750 8 16.250

ELEMENT 3
4 .500 5 -12.000 6 -3.000 7 -.500 8 -5.750

ELEMENT 4
5 17.500 6 -24.250 7 44.000 8 -10.250

ELEMENT 5
6 -1.750 7 56.000 8 -22.750

ELEMENT 6
7 -25.750 8 -8.500

ELEMENT 7
8 -44.750

THE COMPONENT-SPACE IS LIMITED TO 7 DIMENSIONS

COMPONENT	ROOT	AS PER CENT
1	299.8075	71.38
2	59.8572	14.25
3	32.4607	7.73
4	14.2452	3.39
5	6.9330	1.65
6	3.3944	.81
7	1.8020	.43

BARTLETT TEST

EXCLUDING 5. MAJOR COMPONENTS

CHI SQUARED .3451 D.F. 2

EXCLUDING 4. MAJOR COMPONENTS

CHI SQUARED 1.8489 D.F. 5

EXCLUDING 3. MAJOR COMPONENTS

CHI SQUARED 5.5133 D.F. 9

EXCLUDING 2. MAJOR COMPONENTS

CHI SQUARED 13.4351 D.F. 14

EXCLUDING 1. MAJOR COMPONENTS

CHI SQUARED 24.2530 D.F. 20

NEGATIVE RESULT FROM TEST

DEVIATIONS FROM CONSTRUCT MEANS

CONSTRUCT 1	-1.0000	2.5000	-1.0000	-2.5000	1.5000	3.5000	-3.5000	.5000
CONSTRUCT 2	3.5000	-.5000	-1.5000	-2.5000	.5000	2.5000	-3.5000	1.5000
CONSTRUCT 3	3.5000	.0000	1.5000	-1.5000	-2.5000	2.5000	-3.5000	.0000
CONSTRUCT 4	3.5000	2.5000	-.5000	-1.5000	-2.5000	1.5000	-3.5000	.5000
CONSTRUCT 5	3.5000	1.5000	.5000	-.5000	-2.5000	-1.5000	-3.5000	2.5000
CONSTRUCT 6	3.5000	2.5000	1.5000	-1.5000	-2.5000	-.5000	-3.5000	.5000
CONSTRUCT 7	3.5000	1.5000	.5000	-1.5000	-2.5000	2.5000	-3.5000	-.5000
CONSTRUCT 8	3.5000	.5000	1.5000	-.5000	-2.5000	-1.5000	-3.5000	2.5000
CONSTRUCT 9	2.5000	1.5000	-2.0000	.5000	-.5000	-2.0000	-3.5000	3.5000
CONSTRUCT 10	3.5000	1.5000	-.5000	-1.5000	-3.5000	.5000	-2.5000	2.5000

	COMPON 1			COMPON 2			COMPON 3		
ELEMENT	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL	VECTOR	LOADNG	RESIDL
1	.5725	9.9135	6.9725	.1832	1.4172	4.9639	-.1995	-1.1364	3.6724
2	.2361	4.1233	11.2488	-.0693	-.5359	10.9615	.1545	.8800	10.1871
3	.0219	.3796	14.8559	.1192	.9218	14.0062	-.5603	-3.1923	3.8156

4	-.2255	-3.9044	9.2560	.3611	2.7941	1.4490	.0027	.0153	1.4488
5	-.3527	-6.1063	15.2134	-.2877	-2.2261	10.2580	.4958	2.8245	2.2802
6	.1118	1.9357	38.5031	-.7813	-6.0446	1.9659	-.1684	-.9596	1.0450
7	-.6075	-10.5192	5.8469	.1629	1.2601	4.2590	-.2563	-1.4602	2.1268
8	.2413	4.1778	16.7959	.3119	2.4133	10.9719	.5316	3.0287	1.7988

CONSTRUCT

1	.1544	2.6738	34.8506	-.6409	-4.9586	10.2631	.4311	2.4561	4.2305
2	.2892	5.0071	16.9293	-.3367	-2.6051	10.1429	.2772	1.5796	7.6478
3	.3270	5.6625	9.9366	-.1972	-1.5258	7.6085	-.4048	-2.3060	2.2907
4	.3594	6.2228	3.2768	-.1293	-1.0000	2.2767	-.0641	-.3651	2.1434
5	.3424	5.9283	6.8555	.3254	2.5172	.5190	.0862	.4914	.2776
6	.3490	6.0431	5.4815	.1035	.8008	4.8402	-.2016	-1.1488	3.5205
7	.3394	5.8771	7.4598	-.2462	-1.9048	3.8314	-.3124	-1.7798	.6635
8	.3299	5.7121	9.3723	.3497	2.7057	2.0517	-.0392	-.2234	2.0018
9	.2631	4.5555	21.2473	.3263	2.5244	14.8745	.6497	3.7016	1.1730
10	.3523	6.1006	4.7830	.1196	.9250	3.9274	-.0070	-.0399	3.9258

POLAR CO-ORDINATES

CONSTRUCT	H	V	R
1	45.00	35.26	.66
2	45.00	35.26	.42
3	-135.00	-35.26	.62
4	-135.00	-35.26	.10
5	45.00	35.26	.13
6	-135.00	-35.26	.31
7	-135.00	-35.26	.48
8	-135.00	-35.26	.06
9	45.00	35.26	.99
10	-135.00	-35.26	.01

PROJECTIONS FOR ELEMENTS

ELEMENT	H	V	R
1	8.14	-6.47	.98
2	-7.41	11.95	.80
3	67.62	-72.66	.86
4	144.41	.18	.97
5	-159.97	23.49	.98
6	-72.24	-8.60	.99
7	173.17	-7.85	.99
8	30.01	32.12	.97

RESIDUAL DEVIATIONS AFTER EXTRACTING 1 COMPONENTS

CONSTRUCT 1							
-2.5309	1.8633	-1.0586	-1.6971	2.4430	3.2011	-1.8756	-.1452
CONSTRUCT 2							
.6333	-1.6923	-1.6098	-1.3710	2.2658	1.9402	-.4581	.2919
CONSTRUCT 3							
.2580	-1.3484	1.3759	-.2232	-.5031	1.8670	-.0599	-1.3663
CONSTRUCT 4							
-.0628	1.0181	-.6364	-.0968	-.3055	.8043	.2805	-1.0015
CONSTRUCT 5							
.1058	.0883	.3700	.8368	-.4093	-2.1627	.1015	1.0696

CONSTRUCT 6							
.0401	1.0610	1.3675	-.1374	-.3689	-1.1756	.1713	-.9581
CONSTRUCT 7							
.1351	.1005	.3712	-.1748	-.4274	1.8430	.0705	-1.9180
CONSTRUCT 8							
.2296	-.8602	1.3748	.7880	-.4856	-2.1386	-.0298	1.1218
CONSTRUCT 9							
-.1082	.4152	-2.0999	1.5272	1.1065	-2.5093	-.7324	2.4008
CONSTRUCT 10							
.0072	.0473	-.6337	-.1244	-1.3486	-.1820	1.2062	1.0280

RESIDUAL DEVIATIONS AFTER EXTRACTING 2 COMPONENTS

CONSTRUCT 1							
-1.6226	1.5198	-.4678	-.1063	1.0162	-.6730	-1.0680	1.4016
CONSTRUCT 2							
1.1105	-1.6728	-1.2994	-.4301	1.5162	-.0951	-.0338	1.1045
CONSTRUCT 3							
.5375	-1.4541	1.5577	.3279	-.9421	.6749	.1886	-.8903
CONSTRUCT 4							
.1204	.9489	-.5172	.2643	-.5932	.0230	.4434	-.6895
CONSTRUCT 5							
-.3553	.2627	.0701	-.0723	.3149	-.1961	-.3084	.2844
CONSTRUCT 6							
-.1066	1.1164	1.2721	-.4266	-.1384	-.5499	.0408	-1.2079
CONSTRUCT 7							
.4841	-.0315	.5981	.5132	-.9755	.3548	.3807	-1.3239
CONSTRUCT 8							
-.2660	-.6728	1.0524	-.1891	.2929	-.0247	-.4705	.2778
CONSTRUCT 9							
-.5707	.5901	-2.4006	.6155	1.8329	-.5370	-1.1436	1.6134
CONSTRUCT 10							
-.1623	.1113	-.7439	-.4584	-1.0824	.5407	1.0556	.7395

RESIDUAL DEVIATIONS AFTER EXTRACTING 3 COMPONENTS

CONSTRUCT 1							
-1.1327	1.1404	.9084	-.1129	-.2014	-.2593	-.4385	.0959
CONSTRUCT 2							
1.4255	-2.1168	-.4143	-.4344	.7332	.1710	.3710	.2648
CONSTRUCT 3							
.0776	-1.0979	.2656	.3341	.2011	.2865	-.4024	.3356

CONSTRUCT 4
.0476 1.0053 -.7218 .2653 -.4122 -.0385 .3498 -.4955

CONSTRUCT 5
-.2573 .1868 .3454 -.0736 .0713 -.1133 -.1825 .0232

CONSTRUCT 6
-.3357 1.2939 .6285 -.4235 .4311 -.7434 -.2536 -.5972

CONSTRUCT 7
.1291 .2434 -.3991 .5179 -.0931 .0550 -.0755 -.3777

CONSTRUCT 8
-.3106 -.6383 .9272 -.1885 .4037 -.0623 -.5277 .3966

CONSTRUCT 9
.1677 .0183 -.3267 .6056 -.0022 .0865 -.1949 -.3543

CONSTRUCT 10
-.1702 .1175 -.7663 -.4583 -1.0626 .5339 1.0453 .7617

CONSTRUCT VECTORS OF REMAINING COMPONENTS

COMPONENT 4
-.4406 .8218 .1928 .0264 -.1472 -.1717 -.1101 -.1713

COMPONENT 5
.1397 .2522 -.6648 .0540 -.4499 .1965 .4805 -.0083

COMPONENT 6
-.4358 -.1460 .2518 -.3316 -.3644 .2197 .1692 .6370

COMPONENT 7
-.2651 -.1712 -.0621 .7617 -.2554 .3277 -.3769 .0414

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED AS COSINES

CONSTRUCT 1 WITH ELEMENT
1 .197 2 .596 3 -.348 4 -.762 5 .022 6 .751 7 -.563 8 .165

CONSTRUCT 2 WITH ELEMENT
1 .736 2 .441 3 -.288 4 -.858 5 -.388 6 .598 7 -.818 8 .549

CONSTRUCT 3 WITH ELEMENT
1 .866 2 .537 3 .342 4 -.814 5 -.782 6 .547 7 -.840 8 .367

CONSTRUCT 4 WITH ELEMENT
1 .906 2 .848 3 .039 4 -.827 5 -.813 6 .434 7 -.933 8 .562

CONSTRUCT 5 WITH ELEMENT
1 .917 2 .707 3 .158 4 -.506 5 -.857 6 -.109 7 -.864 8 .851

CONSTRUCT 6 WITH ELEMENT

1 .906 2 .815 3 .347 4 -.680 5 -.883 6 .145 7 -.867 8 .583

CONSTRUCT 7 WITH ELEMENT

1 .869 2 .711 3 .211 4 -.856 5 -.788 6 .585 7 -.880 8 .364

CONSTRUCT 8 WITH ELEMENT

1 .906 2 .582 3 .305 4 -.474 5 -.857 6 -.126 7 -.825 8 .805

CONSTRUCT 9 WITH ELEMENT

1 .676 2 .602 3 -.337 4 -.304 5 -.489 6 -.234 7 -.719 8 .941

CONSTRUCT 10 WITH ELEMENT

1 .930 2 .722 3 .039 4 -.684 5 -.893 6 .180 7 -.864 8 .766

INTER-ELEMENT RELATIONS
EXPRESSED AS COSINES

ELEMENT 1 WITH ELEMENT

2 .633 3 .164 4 -.604 5 -.885 6 .187 7 -.901 8 .691

ELEMENT 2 WITH ELEMENT

3 -.036 4 -.656 5 -.617 6 .246 7 -.797 8 .522

ELEMENT 3 WITH ELEMENT

4 .026 5 -.428 6 -.119 7 -.012 8 -.254

ELEMENT 4 WITH ELEMENT

5 .488 6 -.754 7 .824 8 -.354

ELEMENT 5 WITH ELEMENT

6 -.037 7 .716 8 -.537

ELEMENT 6 WITH ELEMENT

7 -.367 8 -.223

ELEMENT 7 WITH ELEMENT

8 -.708

RELATIONS BETWEEN CONSTRUCTS AND ELEMENTS
EXPRESSED IN DEGREES

CONSTRUCT 1 WITH ELEMENT

1 78.7 2 53.4 3 110.4 4 139.6 5 88.7 6 41.3 7 124.2 8 80.5

CONSTRUCT 2 WITH ELEMENT

1 42.6 2 63.8 3 106.7 4 149.1 5 112.8 6 53.3 7 144.8 8 56.7

CONSTRUCT 3 WITH ELEMENT

1 30.0 2 57.5 3 70.0 4 144.5 5 141.5 6 56.8 7 147.2 8 68.5

CONSTRUCT 4 WITH ELEMENT

1 25.1 2 32.1 3 87.7 4 145.8 5 144.4 6 64.3 7 159.0 8 55.6

CONSTRUCT 5 WITH ELEMENT

1 23.5 2 45.0 3 80.9 4 120.4 5 149.0 6 96.3 7 149.8 8 31.7

CONSTRUCT 6 WITH ELEMENT

1 25.0 2 35.4 3 69.7 4 132.8 5 152.0 6 81.6 7 152.5 8 54.3

CONSTRUCT 7 WITH ELEMENT

1 29.6 2 44.7 3 77.6 4 148.9 5 142.0 6 54.2 7 151.7 8 68.7

CONSTRUCT 8 WITH ELEMENT

1 25.0 2 54.4 3 72.2 4 118.3 5 149.0 6 97.3 7 145.6 8 36.4

CONSTRUCT 9 WITH ELEMENT

1 47.4 2 53.0 3 109.7 4 107.7 5 119.3 6 103.6 7 136.0 8 19.8

CONSTRUCT 10 WITH ELEMENT

1 21.6 2 43.8 3 87.7 4 133.2 5 153.2 6 79.6 7 149.8 8 40.0

INTER-ELEMENT RELATIONS
EXPRESSED IN DEGREES

ELEMENT 1 WITH ELEMENT

2 50.8 3 80.6 4 133.2 5 152.2 6 79.2 7 154.3 8 46.3

ELEMENT 2 WITH ELEMENT

3 92.1 4 131.0 5 128.1 6 75.8 7 142.9 8 58.5

ELEMENT 3 WITH ELEMENT

4 88.5 5 115.3 6 96.8 7 90.7 8 104.7

ELEMENT 4 WITH ELEMENT

5 60.8 6 138.9 7 34.6 8 110.7

ELEMENT 5 WITH ELEMENT

6 92.1 7 44.3 8 122.4

ELEMENT 6 WITH ELEMENT

7 111.5 8 102.9

ELEMENT 7 WITH ELEMENT

8 135.1